

COLORADO
RIVER
BASIN
MANAGEMENT
STUDY

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F I N A L
R E P O R T

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The Grand Canyon Trust wishes to thank the state water agencies of Arizona, Colorado, California, New Mexico, Nevada, Utah, and Wyoming for their help in contacting basin stakeholders. We thank those stakeholders for their support and participation in this effort.

We thank the Commissioner of the Bureau of Reclamation for the opportunity to conduct this study and to better understand the issues and people of the Colorado River basin. Finally we wish to acknowledge the staff of the Upper Basin and Lower Basin regions of the Bureau of Reclamation for their assistance, guidance, and patience throughout this process.

THIS REPORT IS THE WORK OF GRAND CANYON TRUST.

Despite the extensive stakeholder participation in this study, it is important to note that this report is the product of Grand Canyon Trust. As such it does not necessarily represent the position of the participants or the Bureau of Reclamation. It was our purpose to interact with a variety of diverse and often conflicting interests, to accurately collect their thoughts and to fairly and honestly analyze them. There was explicit acknowledgement throughout the study that stakeholder participation would not be interpreted as support for the product.

However, the information included here is the product of broad stakeholder participation. Accordingly Appendices I & II contain verbatim comments and perspectives on Colorado River Basin management provided by study participants. Diverse, thoughtful, passionate and often contentious, these viewpoints provide a unique snapshot of the basin today. They are worth reading.

The Colorado River has always evoked strong emotion, a powerful symbol representing a region and its way of life. From its distant beginnings the river has overcome many obstacles, crossing high plateaus, adapting to great fluctuations in hydrology and sediment load. May the people of its region remain as resilient.

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Colorado River Basin and Areas Served by Its Waters



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The Colorado River in Grand Canyon National Park.



Never has the Colorado River been called upon to provide so much to so many.

The Colorado River drains 240,000 square miles of the arid southwest, nearly 1/12 of the continental U.S. Initially developed to promote irrigated agriculture, the river now provides a variety of consumptive and non-consumptive resources to a diverse set of stakeholders. The principal river in an arid region, the Colorado has always represented life itself. But, while its consumptive values for agriculture and drinking water remain high, over the past several decades the river's waters have come to mean more than simply economic prosperity. Increasingly, it provides recreation and aesthetic values to a rapidly urbanizing region. For more than 500 miles in the center of the basin, the river runs through national park lands, a national heritage. Drinking water demands from growing regional populations and Native American water rights claims increase demands on the river. Threatened or endangered native species and their habitats exist in many sections of the river. The rising importance of non-consumptive uses such as recreation, aesthetics, and the recognition of the need to protect cultural and natural resources complicate management. Fifty years ago the challenge was harnessing the river to deliver its water efficiently. Today we face the challenge of satisfying even greater demands placed on the river.

Management of the water and related resources in the Colorado River basin is undergoing great change. The lower basin states completely used their water allocations under the Colorado River Compact for the first time in 1996. The operations of Glen Canyon Dam have been altered to incorporate protection of the environmental and cultural resources of Grand Canyon National Park. Serious discussions to transfer water between states and even between upper and lower basins are underway. Several inclusive partnerships to recover endangered species at the state and basin level are in progress.

These changes are occurring for a variety of reasons. There have been fundamental changes in the economics and demographics of the region. While the basin itself remains largely rural and agricultural, the surrounding regions are dominated by fast-growing urban areas. The restructuring of the utility industry and increased funding for environmental protection have forced changes to the river's hydroelectric resource. Greater demands for recreation and non-consumptive uses of water compete with traditional irrigation. Societal values favor even greater environmental protection and species restoration. Native American voices, long ignored, are more effectively entering the management process.

In 1994, Grand Canyon Trust entered a cooperative, cost-sharing agreement with the Bureau of Reclamation to identify basin management issues and to describe thoughtful perspectives about current and future management of water and related resources. More than 650 stakeholders, reflecting a diversity of interests from across the basin and service areas, participated in the Colorado River Basin Management Study. This diverse group identified critical management issues that face, or will face, the managers and stakeholders. The Colorado River Workshop, organized as part of this study, provided a forum that allowed many of these historically contentious stakeholders to successfully come together and discuss these critical issues.

From the number and diversity of issues identified, it is clear that even greater challenges in the use and management of Colorado River resources lie ahead. The successful resolution of these challenges depends on effective management. There is a tendency to focus debate on whether or not the extensive body of laws, treaties, and compacts, known as the Law of the River, is broken. But such a debate may deflect attention from more pressing issues of basin management. Throughout the study participants from all interest groups suggested changes in current management, but few suggested discarding it entirely. Colorado River management has evolved over time to address the river's issues. That framework provides continuity and gives confidence to stakeholders. It can be expected that management will continue to adapt to resolve present and future basin issues.



Just above the border with Mexico, The All-American canal delivers water to southern California.

Federal, regional, state, and local managers are attempting to address these challenges, but change is often painful. The issues are complex, including not simply economic but significant components of lifestyle, land use, property rights, and cultural heritage. Rural stakeholders shared concerns that their community base is being threatened and often feel powerless to oppose it. Native Americans and other stakeholders expressed anger that their voices continue to fall on deaf ears. The aesthetic values of water, often expressed as free-flowing rivers, exists in irrigated fields and city parks as well. The protection of cultural resources within the basin is of increasing concern. Conservation and environmental protection are part of management in every corner of the basin. But the size of the basin and the complexity of the issues make solutions elusive.

Perhaps the most common theme in our conversations with many stakeholders across the basin is the overwhelming number and diversity of issues facing basin management today. In spite of that, we discovered a high degree of optimism from stakeholders that creative solutions will be found. We were impressed with the strong, diverse support for such cooperative efforts as the Upper Colorado River Fish Recovery Program, Colorado River Work Group, Colorado River Basin Salinity Control Forum, Glen Canyon Adaptive Management Work Group, Colorado River Wildlife Council and the recently initiated Lower Colorado River Multi-Species Habitat Conservation Plan. While not immune to criticism, these and similar efforts are grappling with what were described by stakeholders as the essential components of effective management: greater inclu-

siveness of interests and issues, more effective coordination and strategic planning, and better information integration. The success of these processes is sufficient to suggest that their lessons be extended throughout the basin. The strategies outlined in this report do not suggest the need to radically redirect current management approaches. Instead, they support and build on creative work going on across the basin.

This study was not without controversy. A partnership between a federal management agency and a regional conservation organization was met with suspicion in many quarters. Yet throughout the study appreciation was voiced by many parties for the opportunity to present their concerns. We found basin stakeholders to be as deeply involved in finding solutions as with finding fault. More often than not stakeholder comments were articulated in the form of suggestions for steps to remedy their concerns and several common elements emerged. Among these were better education, communication, information, understanding, coordination, planning, identification, flexibility, and cooperation at all levels of management. While many suggested the need for these components at the basin level, others argued for more regional or local control. Regardless of where they would be implemented the following components were found to be a consistent part of the solutions suggested by Colorado River basin stakeholders.

CRITICAL COMPONENTS OF BASIN MANAGEMENT

Discussions throughout the study suggested that the next 75 years of Colorado River basin management will be fundamentally different from the past 75 years. Stakeholders urged broader stakeholder participation to integrate tribal, recreation, environmental and other interest groups into the process. It was evident that future management should incorporate the values of natural resource protection, aesthetics and recreation along with traditional consumptive uses. Future challenges should focus on balancing the increasing demands on the river's limited resources and incorporating the scientific knowledge available in its decisions.

Several components of basin management repeatedly surfaced in stakeholder comments and during discussions at the Colorado River Workshop. These are not entirely new elements and are evident to varying extents in many of the processes presently underway across the basin. The following critical components of basin management wove a common thread throughout the study discussions.

■ COORDINATION AND INTEGRATION IN MANAGEMENT

It is evident that the solutions to the complex and inter-connected issues of the Colorado River basin span regional, state, and water district boundaries. Participants repeatedly voiced frustration with a lack of coordination and integration across these boundaries. In the future, these components will become increasingly important to achieving effective basin management. Many current processes embrace this component, yet opportunities exist throughout the basin for better coordination between individual groups and processes.

■ BROAD STAKEHOLDER INVOLVEMENT

Historically many stakeholder groups have not participated in basin management. Foremost among these have been the Native American tribes who, as sovereign

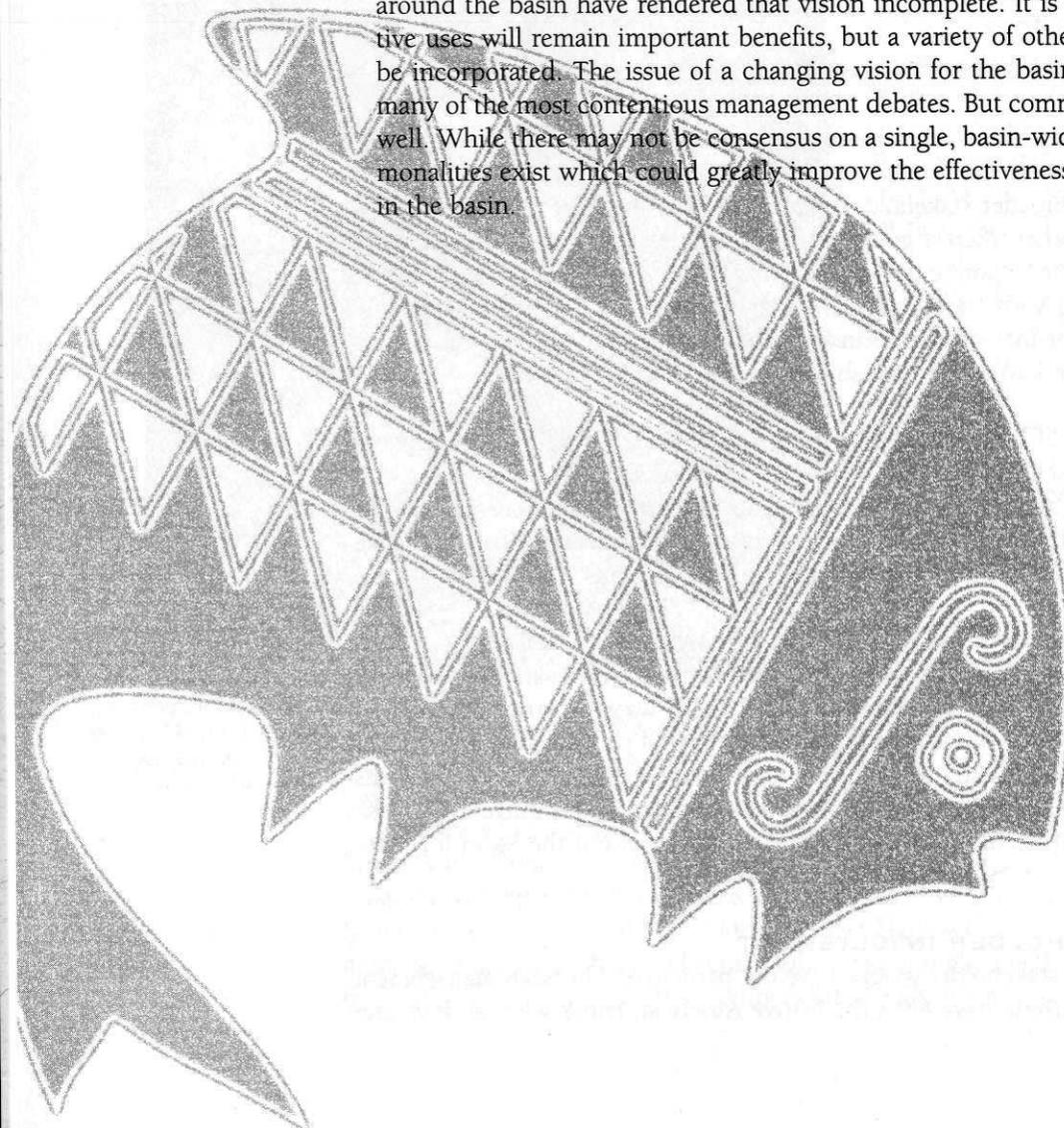
nations, have a special relationship with the federal government. But environmental, recreation, and other non-consumptive groups have been absent as well. Despite vocal concerns by some over the potential loss of control, participants voiced strong support for the inclusion of all stakeholders in management processes.

■ INTEGRATION OF SCIENTIFIC KNOWLEDGE INTO MANAGEMENT

At one time the need for technical expertise in management was limited to water storage and power generation. An increasing emphasis on the protection of natural and cultural resources demands that additional knowledge be included in management. The challenge lies not only in acquiring this knowledge, but in putting it to use. Managers spoke of being awash in data but struggling with a process for incorporating that information into management decisions. Others commented on the need for better coordination between scientists and managers. From the comments in the study, these needs will continue to increase.

■ A CLEAR, BASIN-WIDE VISION

For seventy-five years, basin management has focused on fully developing the waters of the Colorado River for consumptive purposes. It was apparent from participant's comments that economic, demographic and social changes in and around the basin have rendered that vision incomplete. It is clear that consumptive uses will remain important benefits, but a variety of other benefits must also be incorporated. The issue of a changing vision for the basin lies at the heart of many of the most contentious management debates. But common ground exists as well. While there may not be consensus on a single, basin-wide vision, basic commonalities exist which could greatly improve the effectiveness of decision making in the basin.



SUGGESTED APPROACHES FOR EFFECTIVE MANAGEMENT

The Bureau of Reclamation, with its technical resources and long history in water resource management, is in a unique position to provide continued leadership within the basin. While no single entity can guarantee all of the critical components identified within this study: better coordination, greater stakeholder involvement, integration of science into management actions, and the definition of a common basin vision, Reclamation's commitment to these components can greatly encourage and enhance these changes. There are examples individual processes within the basin that are striving to be inclusive and extend beyond traditional political boundaries and many study participants supported the formation of larger regional institutions to facilitate communication, integration, and cooperation. But others adamantly argued that such institutions would be infeasible, ineffective or unnecessary. Regardless of the outcome of that debate, Reclamation, with responsibilities and a presence across the basin, can greatly aid the stakeholders of the region in achieving the critical components identified in this study. The following approaches will foster, promote, and facilitate more efficient, integrated management of the resources of the Colorado River basin within the current institutional structure.

In this contentious region, facilitation and control are very different things. While each of these actions is consistent with Reclamation's responsibilities and mission, they should be approached cooperatively with the basin states, various tribes, state and federal management agencies, water users, and other stakeholders. Each presents a significant and positive step toward more effective basin management, supporting current efforts throughout the basin and reinforcing local and regional managers.

■ ENHANCING BASIN COMMUNICATIONS

At present there is a limited communication network throughout the basin. While good communication often exists within individual processes, there is no link between basin managers and stakeholders that spans the geographical and political boundaries of the basin. Reclamation, with its broad knowledge of basin management, can encourage that central communication link. Such a communication network could take several forms; a frequent newsletter, an electronic bulletin board, or a series of regional forums are suggestions. The network should engage tribes, environmental groups, small water districts and other interested stakeholders of basin management on current issues, processes, and decision points. Better communication and transfer of knowledge will be key elements to solving the increasingly complex issues of basin management.

■ DEVELOPING A BASIN-WIDE VISION

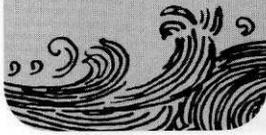
A basin-wide vision cannot simply be articulated, it must incrementally evolve within processes that include all stakeholders. We urge Reclamation to build on the success of the Colorado River Workshop by providing a vehicle for parties to begin to create a new vision for the future of the Colorado River. Annual forums, or a series of smaller forums, to discuss basin issues would allow stakeholders to incrementally move toward a vision outside the contentious confines of other management processes. Regular, open discussion provides greater understanding between parties and increases the potential for issue resolution.

■ COLLECT AND INTEGRATE SCIENTIFIC KNOWLEDGE

The increasing need to provide for ecosystem health along with water storage and power production necessitates an effective method of integrating expanding scientific knowledge into management. Fundamental to accomplishing this task is a solid understanding of the present state of knowledge. There is a need for a central clearing house for the scientific knowledge that is quickly accumulating. Such an effort could take many forms. Much of the current research is housed in universities, state and federal agencies, and private research institutions across the country. An alternative to the traditional archives approach would be an electronic "center" that could provide managers, users, and stakeholders with references and data links to information housed elsewhere. Seminars and workshops on basin issues, such as the upcoming Glen Canyon Dam Flood Flow Workshop could be sponsored in cooperation with states, tribes, water-users, and environmental groups to better educate the public.



Moab, Utah, a rural community along the Colorado River in the upper basin. Once dependent on irrigated agriculture and mining, Moab now relies on a growing recreation & tourism economy.



The Colorado River has always been recognized as the lifeblood of the arid southwest. Initially it was harnessed to promote agriculture in a hostile and sparsely populated region. But during this century, demands on the river's resources have grown and diversified as the southwest has become settled and developed. Today real and potential consumptive uses by agriculture and urban populations exceed the volume of water available, while senior Native American water rights claims create further uncertainties. Growing urban populations increase demand for recreation and aesthetics. Efforts to protect natural and cultural resources place immediate additional demands on the system. Stakeholders are more numerous and issues more complex. Never before has this river, sometimes labeled the most over-allocated in the world, been called upon to provide so much to so many.

Management issues facing the basin today are largely driven by two realities. First, we are approaching the river's limits for consumptive use. During 1996, the lower basin exceeded its allocation of 7.5 million acre-feet for the first time. While some upper basin allocations remain undeveloped, lower basin demand, coupled with uncertainties in long-term basin hydrology and the outcome of Native American water rights claims, is forcing consumptive users to face the finiteness of the river's water resource. Equally important is the rising demand for protection and restoration of the non-consumptive resources of the Colorado River. Changing societal values, inside and outside the basin, which elevate management for recreation, aesthetic, cultural and environmental resources of the river, add new stresses to the system. We are simply asking the river and its managers to do more with less.

The management of the Colorado River is in a period of great change. Over the past decade a number of creative and cooperative efforts have emerged in both upper and lower basins. Several proposals for intra and interstate transfers of water from within and across basins have been discussed. Water banking proposals have been offered by states and tribes. Creative conservation programs are stretching utilization of the river's water resources. These initiatives and proposals would have been unheard of a decade ago. With the complex issues before and these examples to guide us, it seems reasonable to expect even greater changes in the next decade.

Reclamation (on behalf of the Secretary of the Interior) plays a crucial role in the diverse and often competing public needs for the Colorado River and its resources. The secretary, through Reclamation, develops an Annual Operating Plan for the Colorado River, completes periodic review of the Long-Range Operating Criteria for its reservoirs and has a unique role as Water Master in the lower basin. With present and future challenges there is a critical need to ensure that management strategies and approaches associated with performing these responsibilities are broad, flexible, and responsive to accommodating a number of long-term demands.

Reclamation asked Grand Canyon Trust (Trust) to identify the critical management issues before managers, water users, and other stakeholders, and, where possible, include approaches that could be taken to resolve them. As a result the Trust initiated this comprehensive study of basin management issues. In further consultations, it was decided that the most thoughtful, informed suggestions would be produced with the involvement of a broad cross-section of stakeholders. From that decision came the current study design and this format for presenting the results.



In October 1994, Grand Canyon Trust entered into a two-year cooperative, cost-sharing agreement with the Bureau of Reclamation to conduct a study that identifies basin management issues and describes balanced, diverse perspectives and thinking about current and future management of water and related resources in the Colorado River basin. The results will be used to identify potential approaches which can help the Bureau of Reclamation in meeting its responsibilities in management of Colorado River basin resources. The study incorporated facilitated discussions with a wide range of water users, managers and other stakeholders throughout the basin. The three goals were to develop a comprehensive summary of the emerging trends and management issues facing Colorado River basin resource managers, solicit and compile the concerns and recommendations of people and organizations interested in basin issues; and establish a workable dialogue among these various parties. The study workplan has been flexible, responding to input from stakeholders and evolving to produce the most useful product possible.

The effort was designed to be inclusive rather than exclusive. For the purpose of the study the Colorado River basin is defined as the watershed of the Colorado River and its service areas, an area sometimes referred to as the "hydrocommons." Therefore, southern California, the Wasatch Front of Utah, the Front Range of Colorado, and parts of New Mexico's Rio Grande valley are included. A stakeholder is defined as anyone with an active interest in the management of the Colorado River. In theory that could include private citizens on the far side of the continent or around the world. However in practice, we found those actively involved in basin issues to be located within this hydrocommons.

Products of the study include a compilation of emerging trends and management issues within the basin; the proceedings of the Colorado River Workshop, a stakeholder workshop on future management within the basin; and this final report suggesting various management approaches drawing on information collected from stakeholders in the study and the results of the workshop.

During the facilitated discussions portion of the study, over 650 water users, managers and other stakeholders of the Colorado River were contacted and asked to characterize the most critical issues that face, or will face, the managers and users of the Colorado River over the next few decades. Participants were asked to characterize critical management issues, but no attempt was made to statistically measure the level of concern or to prioritize issues. Special attention was given to attaining broad diversity in geography and interest group representation. Comments were gathered in individual phone conversations followed by mailed response forms. In addition, thirteen regional meetings, involving over 240 stakeholders and managers, were held to answer questions and receive input. These meetings provided invaluable dialogue and insight into the issues of the basin. Stakeholders provided 700 comments (see Appendix I) describing a range of critical management issues. These formed the basis for facilitated discussions at the Colorado River Workshop which was attended by more than 180 people. Results of these study components are described in summary form in this report.

STUDY PARTICIPANTS BY INTEREST GROUP AND GEOGRAPHY

INTEREST GROUPS:

• Federal agencies	19%
• Tribal	16%
• Agriculture/rural	14%
• Municipal/Industry	13%
• State agencies	12%
• Individual	11%
• Environmental	7%
• Power	4%
• Academic	4%

GEOGRAPHIES:

• Arizona	26%
• Colorado	16%
• Utah	15%
• California	13%
• Nevada	12%
• New Mexico	10%
• Wyoming	6%
• Other	2%

Total # of Participants: 669



It was immediately evident in listening to stakeholders around the basin that the issues of the Colorado River go beyond simply allocating its waters. Comments represented a vast diversity of concerns. Once collected they were organized into 5 general categories for analysis:

- issues involving hydropower prices, marketing and revenues,
- issues of water allocations; reconciling supply with demand,
- issues that involve the institutional framework of basin management,
- issues involving protection of environmental, recreation, and cultural resources, and
- issues involving roles of federal, state, tribal, and local governments.

From the rolling plains of Wyoming to the dry, desert farmland of Arizona and California, from the rural farms of Colorado's West Slope to the thirsty metropolitan areas of Phoenix, Las Vegas and southern California; a common concern for "quality of life" was voiced. The comments seem to indicate that quality of life depends on a complex, sustainable mix of economic prosperity, social stability, and environmental health. The challenge lies in achieving a suitable balance of that mix.

Following are summaries of the critical management issues as described by stakeholders. For the full text of comments, see Appendix I.

ISSUES INVOLVING HYDROPOWER PRICES, MARKETING, AND REVENUES

Although not generally identified as the principal justification for reclamation projects on the Colorado River, the generation of hydroelectric power has played a critical role by providing funding for construction and operation of these projects. These concerns reflect both hydropower's historic role as the funding source for water delivery projects and as a provider of relatively inexpensive, clean energy. Recently it has also provided funding for natural and cultural resource protection. The overriding issue is how to reconcile calls for maximizing the production and minimizing the cost of the hydropower resource with attempts to reduce the social and environmental impacts of power generation throughout the basin.

The future of the basin's hydropower is filled with uncertainties. Deregulation is creating tremendous changes within the utility industry while natural resource protection measures increase costs. These uncertainties create unparalleled stresses to those who depend on the resource.

SPECIFIC HYDROPOWER ISSUES IDENTIFIED

- Economic/environmental impacts of market-based pricing of hydropower resources.
- Expansion, reconstruction and/or construction of new hydropower facilities.
- Hydropower's role in funding project repayment and resource protection programs.
- Economic/environmental impacts of sale of federal generation and market entities.
- Impacts to hydropower resources due to industry deregulation and changing efficiencies.
- Impacts to hydropower resources due to cultural and natural resource protection.
- Hydropower's effect on growth and environmental issues
- Long-term power contracts remove flexibility from the system.
- Impacts of hydropower on recreation, cultural, natural, and other resources.
- Identification of hydropower as a critical issue.
- Impact on flood control from maximizing power resource

Total comments: 75

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

The issues that involve finding solutions to supply and demand were predictably numerous. The diversity of views pointed out the many interests competing for the river's water resource. Agriculture still consumes the majority of Colorado River water and its economic importance to the rural areas of the basin and to the nation as a whole was an important issue. The loss of the positive qualities connected with rural lifestyles was also mentioned. Several participants commented on the impact of rising water prices on farming, while others argued that cost-based vs. market-based water pricing represents a subsidy to a specific sector. Environmental protection requirements and competing demands for water flows by recreation and environmental tourism were identified as concerns as were the economic, environmental and social consequences of the potential sale of federal water delivery facilities.

The primary reason given for increased demands on the river's water resource is, directly and indirectly, the rapid population growth and development throughout the region. This growth brings not only competing demands for consumptive uses but also an increase in demand for satisfying non-consumptive values of aesthetics, recreation, and natural resource protection. Increasing numbers of people and attendant development alter rural communities and surrounding natural resources. It was suggested that the pressure of population growth necessitates better integration of land and water management especially in flood plain management. The use of water as a tool for managing this growth was mentioned often with differing conclusions as to its utility. Several stakeholders suggested that the uncertainty of the resolution of senior Native American water rights claims increased tension within the basin. The potential for off-reservation water marketing was also suggested.

Three main strategies for stretching water resources were commonly mentioned. Many comments identified opportunities for conservation and water reuse. Others suggested the possibility of increasing supplies by enhancing precipitation or tapping other river systems. Interstate and intrastate water marketing proposals for redirecting allocated water were the third alternative.



SPECIFIC ALLOCATION ISSUES IDENTIFIED IN COMMENTS

AGRICULTURE ISSUES: (46)

- Impacts to irrigated agriculture from market-based pricing of water and power resources
- Economic/social impacts to communities from declining agricultural base
- Economic/social impacts to agriculture from environmental protection measures
- National economic impacts from rising costs for irrigation water
- Consequences of privatization of federal water facilities
- The social/economic implications of agriculture's changing role in the basin

POPULATION GROWTH/DEVELOPMENT ISSUES: (43)

- Competing demands for water from regional population growth
- Implications of water delivery contracts negotiated on cost basis rather than market basis
- Water as a tool in urban planning
- Need to coordinate water management with land management
- Increasing aesthetic, "non-use", cultural, and recreation values
- Population growth/development impacts on rural areas and natural resources
- Conflicts between recreation and environmental protection

ISSUES INVOLVING NATIVE AMERICANS: (10)

- Uncertainties regarding Native American water rights claims
- Implications of potential tribal water marketing
- Resolution of Native American water rights claims

CONSERVATION/WATER EFFICIENCIES: (90)

- Opportunities for conservation in agriculture and urban water use
- Difficulties in shifting water rights to meet changing land uses
- Implications of potential interstate and intrastate water marketing
- Impacts to water supplies from environmental protection
- Conflicts between water conservation and environmental protection
- Problems and opportunities for water reuse
- Opportunities for economic incentives from Federal, state, and local governments for conservation
- Identifying existing flexibility to more equitably serve an expanded range of functions
- Opportunities to enhance precipitation
- Definition of surplus and shortage in water supplies
- Integrate ground water management with surface water management
- Opportunities for ground water and on-stream storage
- "Use it or lose it" mentality as disincentive for efficient water development
- Uncertainties involving Federal water rights
- Opportunities for inventive solutions to river salinity and other water quality issues

Total comments: 189



SPECIFIC INSTITUTIONAL ISSUES IDENTIFIED IN COMMENTS

INSTITUTIONAL FRAMEWORK ISSUES: (139)

- Preservation of the Law of the River, in recognition that the system works
- Navigation and flood control are important issues
- Recreation and cultural resources are important issues
- Need to identify and balance many conflicting public values
- Benefits/concerns of basin-wide planning (15)
- Opportunities for regional coordination (4)
- Opportunities for a more proactive, flexible management framework (17)
- Need mechanisms to implement temporary, long term water transfers (2)
- Long-term drought response
- Benefits of long-term planning (6)
- Integration of scientific data/modeling into management (8)
- Finding appropriate funding
- Impacts of changing political climate
- Integrate (and fund) non-consumptive as well as consumptive uses into management
- Importance of education/knowledge for public and managers
- Need for long-term certainty of agreements
- Implications for watershed planning

PUBLIC PARTICIPATION ISSUES: (22)

- Designing new mechanisms for meaningful, affordable public participation
- Effective and inclusive, consensus based processes needed
- Definition of stakeholder; general public or water user?
- Education of public on management issues
- Better communication between agencies and users

NATIVE AMERICAN ISSUES: (3)

- Incorporating economic and cultural institutions into management
- Resolution of Native American water rights claims

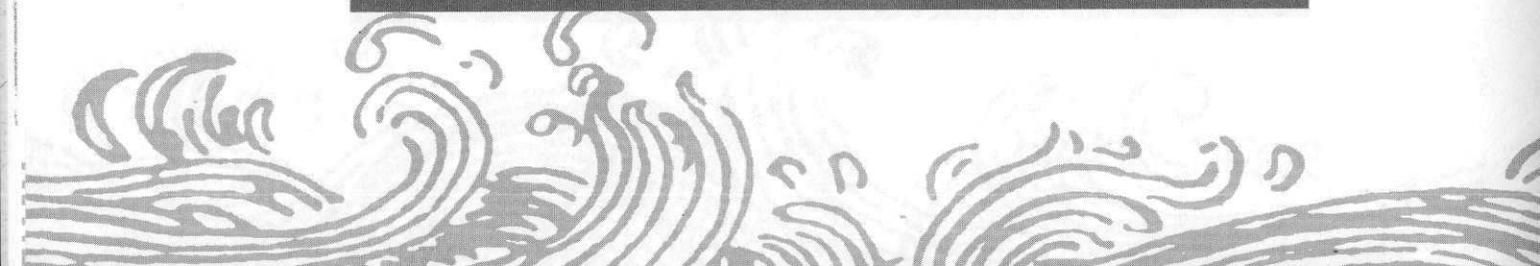
ISSUES WITH MEXICO: (10)

- Mexico's growing economic influence due to NAFTA
- Coordination with Mexico on shared resources
- Greater knowledge and coordination of future demands
- Implications of irrigation water management in Mexico

COORDINATION BETWEEN MANAGERS AND USERS (10)

- Lack of standardized methods for science
- Difficulty in reaching manageable solutions in larger geographical area
- Coordination between land and water managers
- Difficulty in integrating agencies with differing mandates
- Benefits in forecasting; i.e., droughts, future power needs, water needs

Total comments: 184



ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

Issues that involve the institutional framework of basin management drew a large number of comments. General themes centered on greater cooperation and planning, more flexibility in management, and better integration of issues and the information needed to resolve issues. The need for better coordination between managers, users, nations, scientists, and basins was a common theme. While many comments urged varying degrees of change to the management framework, several commented on the need to recognize where the present structure has served well. Many comments targeted the need for a common vision, a broad perspective and basin-wide planning to minimize conflicts, reduce litigation (although, as one comment pointed out, as long as there are legal divisions there will be litigation), and provide regional dispute resolution. Problems with management of large geographical areas, the preeminence of state's rights, and need for a more local voice was also recognized. Several comments suggested that state issues be resolved within the state.

The need for the effective integration of scientific data and information into management and the importance of education and knowledge were identified by many stakeholders. Appropriate funding mechanisms were considered critical to many of the issues raised. Mechanisms to allow implementation of temporary, long-term water transfers and the need for greater certainty that agreements will hold in the long-term were identified.

Effective mechanisms for meaningful, affordable participation, the importance of education of the public on management issues and the benefits of better communication between managers and the public were often mentioned. The difficulties in incorporating the cultural and economic institutions into management were noted. Most comments identified the need for inclusive rather than exclusive processes although a few disagreed, suggesting that stakeholder definition be limited to those receiving direct entitlements.

Several comments pointed to a lack of coordination between managers and between managers and users and the difficulty in integrating agencies with differing mandates. Many commented on the need for better integration of scientific understanding into management and the lack of standardized methods for science.



ISSUES OF ENVIRONMENTAL, RECREATION, AND CULTURAL RESOURCE PROTECTION

Large numbers of comments indicated that the resolution of these issues, linked to population growth and shifting societal values, is critical to successful management of Colorado River resources. The need for coordination between managers, states, species recovery efforts, and even between nations was repeatedly mentioned. Ecosystem approaches and creative partnerships were often cited as part of the solution. There were several comments describing the need to define and include better science, to strike a balance, and to agree on goals and objectives.

Many sub-issues involving endangered species restoration and water quality concerns were mentioned. The impact of critical habitat designation, the role of the federal government in listing species, and methods for implementing species recovery were all discussed. Adequate funding for these programs and agreement on recovery goals were considered important. Several comments focused on concerns over how the Endangered Species Act was interpreted and enforced and a few questioned the very legitimacy of the Act. Wetland protection, links between tributary and mainstem management, coordination of land and water management, and riparian habitats on both sides of the international border were increasingly important. Water quality concerns went beyond salinity levels dictated by treaty obligations to Mexico, extending to eutrophication, biocontaminants, agriculture runoff, heavy metals, municipal wastewater, point and non-point sources. Resolution of federal reserved rights; sedimentation of reservoirs, watersheds, and the mainstem; and the potential for construction of new reclamation projects were all stakeholder concerns.

Conflicts between resources and uses were commonly cited. Environmental and cultural resource protection impact both the quality and cost of water and power resources just as dam and reservoir reoperation have impacted both the quality and cost of hydropower. Many comments mentioned the link between power and consumptive water uses and impacts to natural, cultural, and recreation resources; each impacting the other. Protection of these resources affects the supply of water and power. Likewise, recreation can have impacts on environmental resource protection and the management of native and non-native species often conflict.

Despite these dire observations many comments centered on solutions. The need for coordination, flexibility, and ecosystem approaches was again a focus. The benefits of a more basin-wide perspective, the protection of cultural resources and the challenges of incorporating tribal cultures into management were identified. Scientific information was generally considered an important tool in managing non-consumptive resources, but lack of information, incomplete data and the need for mechanisms to incorporate this information limit its effective use in management. The possibility of a new scientific bureau was suggested.



SPECIFIC ENVIRONMENTAL AND CULTURAL ISSUES IDENTIFIED IN COMMENTS

INSTITUTIONS: (3)

- Navigation and flood control issues

NATIVE AMERICAN ISSUES: (3)

- Impacts to cultural resources

ISSUES INVOLVING MEXICO: (15)

- Water quality, quantity to meet treaty obligations
- Water quality and quantity from Mexico
- Delta ecosystem restoration
- Importance of habitat in Mexico to endangered species recovery/coordination of efforts
- Issues of deliveries to Mexico in excess of treaty agreements

ENVIRONMENTAL PROTECTION ISSUES: (157)

- Increasing importance of non-consumptive water uses
- Water quality issues
- Endangered species requirements
- Impacts to water/power resources from dam/reservoir reoperation for environmental protection
- Sedimentation in reservoirs accumulation below Gila confluence
- Compartmentalized endangered species recovery efforts
- Impacts on state water deliveries
- Coordination of water management with adjacent land management
- Priorities in management of native and non-native species
- Impacts on native species from aquatic and riparian non-natives
- Conflicts between non-consumptive uses and hydropower resources
- Funding for environmental and cultural resource protection
- Implications of increasing river recreation in regard to restoration efforts
- Non-use/extrinsic values
- All-American canal lining impacts ground water pumping in Mexico
- Link between mainstem and tributaries on environmental protection
- Impacts of population growth on natural/cultural resources
- Funding mechanisms for non-consumptive resource protection
- Recreation impacts on natural resource protection

COORDINATION BETWEEN MANAGERS/USERS: (1)

- Opportunities for creative partnerships in natural resource protection

Total comments: 179



ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

SPECIFIC GOVERNMENTAL ROLE ISSUES IDENTIFIED IN COMMENTS

AGRICULTURAL ISSUES: (4)

- Economic /environmental impacts of potential sale of water delivery facilities

INSTITUTIONAL ISSUES: (54)

- Future role of Bureau of Reclamation
- States vs. Federal commitment to Mexican treaty obligation
- Funding to meet treaty obligation: states vs. Fed.
- States vs. Fed role in water management
- States' ability to develop water allocated under Compact
- Water rights between states
- Issue of private property (or individual rights) rights vs. public good
- Funding to meet management goals

POPULATION GROWTH/DEVELOPMENT ISSUES: (1)

PUBLIC PARTICIPATION ISSUES: (10)

- Potential for local vision, involvement in management process
- Local or watershed management of resources
- Role of local government officials in management processes

NATIVE AMERICAN ISSUES (16)

- Resolution of water rights claims
- Funding for development of water rights
- Federal Trust responsibilities
- Sovereignty of tribes

ISSUES INVOLVING MEXICO: (6)

- Relative treaty obligations of Federal government and water users

ENVIRONMENTAL PROTECTION ISSUES: (5)

- Endangered species impacts fall disproportionately on tribes
- Federal responsibility to funding endangered species protection

CONSERVATION/WATER EFFICIENCY ISSUES: (1)

- Opportunity for creative partnerships between Reclamation and water agencies

COORDINATION BETWEEN MANAGERS/USERS: (14)

- Lack of a planning/facilitating agency to coordinate agency efforts
- Opportunities for creative partnerships between states, between states and tribes

Total Comments: 111

Surprisingly, there was more consistency in these comments than in other categories. Many comments pertained to the future role of the Bureau of Reclamation in basin management. Some suggested it continue its transition from water development to a management agency with a role in creating partnerships and facilitating management solutions. Others felt that the federal government should be removed completely from basin management. Many stressed the social, economic and environmental impacts of proposals to sell water facilities to private interests. The importance of the historic funding role of the federal agencies was mentioned in terms of treaty obligations to Mexico, conservation incentive programs and in recovery of endangered species.

State water rights and the ability to develop water allocated by compact were both common topics. The role of local governments in river management, the potential for local vision and watershed management, and the economic and environmental implications of the sale of water and power generation and marketing entities were considered important issues. The present and future relationship between the state and federal governments, often defined as "states' rights" or "individual rights vs. the public good," were important at all levels of management. The resolution of Native American water

rights claims, the issue of tribal sovereignty and federal trust responsibilities, and potential impacts from endangered species protection were all identified as important issues.

Several comments stated the need for recognition and respect for the existing laws that control the water of the Colorado River basin.



The Colorado River Workshop was held in Phoenix, Arizona during February, 1996. The purpose of the Workshop was to bring stakeholders together to discuss specific issues identified during the study. Over 180 participants, a cross-section of basin interests, addressed such issues as hydropower, efficient water use, endangered species issues, water marketing, stakeholder involvement, the role of science in management, and framework of basin management in facilitated discussion sessions. The goal of the session was not to reach consensus or resolve these issues but rather to increase understanding and communication among diverse viewpoints. Each issue topic was introduced by the author of a background paper, followed by a panel discussion, and individual breakout sessions. The following observations serve as a general summary of the sessions but are not intended to represent "consensus" of the workshop participants. A separate proceedings document is available.

STAKEHOLDER INVOLVEMENT

Author Kurt Dongoske outlined the special problems to involvement on basin management encountered by Native Americans over the decades. Building on these examples, participants discussed stakeholder involvement in a broader context. A list of individuals or groups of individuals with interests in Colorado River basin management were identified and factors that encourage and inhibit participation by these stakeholders were considered. Common driving forces for participation include growing demands for water, concerns for the environment, and recognized needs to defend or assert rights through institutional channels such as litigation or legislation. On the other hand, the common inhibiting forces included economic burdens (i.e., the cost of participating), cultural differences, and a perceived lack of urgency. Common suggestions to ensure more meaningful participation were: improve informational outreach and educational efforts appropriate for the audience, improve institutions to ensure that participation will make a difference; and provide financial resources to enable all stakeholders to participate.

ENDANGERED SPECIES RECOVERY

A briefing paper by Robert Wigington and Dale Pontius outlined the current recovery programs and made a case for better integration of these efforts. Participants began by listing areas in which endangered species protection is working, pointing out for example that we have more information on the problem of species decline and its economic implications, and that programs have resulted in additional funds being made available to restore species and their habitats. However, shortcomings were identified as well, including the fact that these programs have failed to establish secure populations of listed species in most areas, funding is still not secure, and there is little agreement on program goals or appropriate recovery areas. How can the programs be improved? Suggestions focused on developing a strategic approach to endangered species recovery, with better articulated goals, more meaningful participation from affected interests, and a broader, long-term vision.

EFFICIENT WATER USE

Author Jim Dyer described the opportunities for creative conservation and efficiency in agricultural and domestic water use. Using their own experience, participants identified common goals for maximizing resource availability; reducing costs; and improving

environmental quality. Several participants pointed out that water efficiency should not be a goal in itself, but should be seen as a way to reach these other goals. Obstacles to water efficiency discussed include political/cultural objections to changing water use, high costs of implementing improvements, and legal obstacles to change (including interstate allocation issues and unresolved federal and Indian reserved water rights).

HYDROPOWER RESOURCES

General disruption and uncertainty within the hydropower community were the dominant themes for author Ken Maxey. Panel and participants agreed that new environmental regulations and changing social values are important internal (within the basin) influences on hydropower, while regional and national trends toward decentralization and competition are increasingly influential. While solutions were elusive, many argued for better coordination of funding demands and greater planning to limit costly disruptions to the system.

WATER MARKETING

Author Rod Smith outlined the current proposals for the transfer of water from one entity to another. Participants discussed a variety of water marketing proposals in the context of the Law of the River and the helpfulness of a basin-wide authority in evaluating potential impacts. While no consensus on these issues emerged, the concerns raised helped the groups identify some appropriate guidelines for evaluating transfers including: protection of stakeholders, including Native Americans and other water rights holders; clearer definition on water rights and inclusion of all relevant parties; flexibility to deal with water shortages or surpluses; and fairness in distributing proceeds and profits. Considerable discussion of the need to protect existing water rights led to some suggestions that the best way to do this was to allow only temporary transfers.

THE ROLE OF SCIENCE IN MANAGEMENT

The difficulties and need for better cooperation between manager and scientist was the thrust of the briefing paper by Steven Carothers and Dorthy House. In order to address science in management, participants chose to discuss the roles of scientist and manager and how they interacted. A set of responsibilities for each was compiled. However, participants concluded that the roles are not separate. Each has a set of responsibilities that helps give direction to the other. Management decisions guide science, scientific understanding guides management and managers and scientists must recognize their independent responsibilities and remain objective. Discussions, which included both managers and scientists, yielded a better understanding of the effective role of each.

INSTITUTIONAL OPTIONS FOR BASIN MANAGEMENT

This important final workshop topic was conducted with all participants in general session. The briefing paper by Larry MacDonnell and Bruce Driver examined options for improving the laws and politics guiding management of the Colorado River. The authors outlined their understanding of the Law of the River - its foundations and areas that could be improved. They suggested that non-consumptive uses of water are valuable too and presented several suggestions for change, set in the context of new principles for water management in the basin. Among the new institutions presented for discussion were: a water trust to fund environmental restoration; an expanded approach to water banking; and a new federal/interstate water compact. Participants

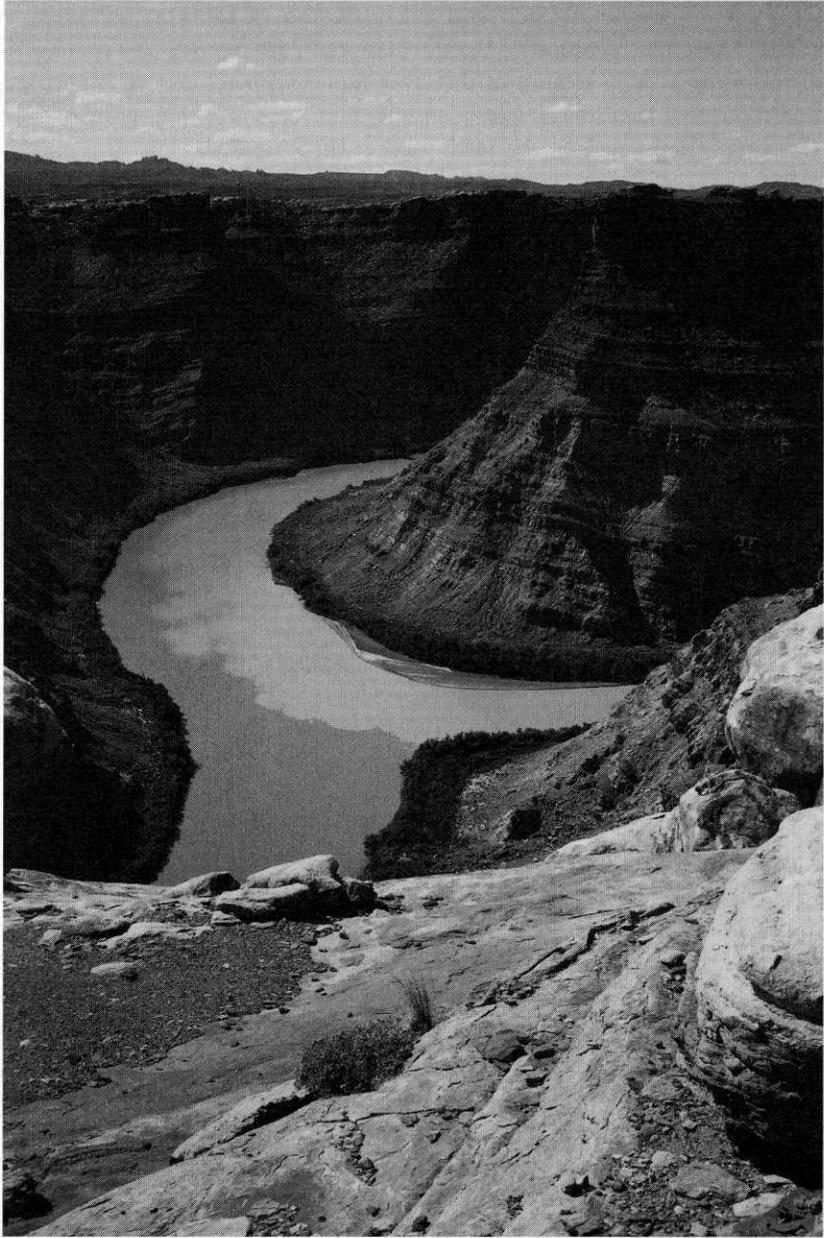
discussed these ideas in a general session challenging and supporting the authors on a variety of topics. Many felt that there was no need to revisit the 1922 compact. Others pointed out the changes, i.e., water marketing, that are underway within the basin are examples of the flexibility of the current system. But many embraced the idea of a more regional approach and the inclusion of more stakeholders in the process. The prominent position of the the National Park Service as a manager of the lands surrounding a large section of the river was discussed. Native Americans present pointed out that their needs had been long neglected and that many of the issues before this group depended on the resolution of these issues.

This discussion allowed an informal airing of issues from many interest groups and contributed to a general understanding by all who attended. While there remained fundamental disagreements over solutions to many basin issues, substantial agreement was reached on key components necessary to create a workable dialogue among these various parties. These tenets include processes that include the range and diversity of stakeholder interests fostering communication and cooperation, and the need for fairness, equity, and consistency in management.

WORKSHOP PARTICIPANTS BY INTEREST GROUP

Consulting firms and individuals	19%
Federal agencies	17%
State agencies	12%
Environmental/Recreation	11%
Municipal/Industry	10%
Agricultural/Rural	10%
Tribal	10%
Utilities, power users	7%
Other	5%

The Colorado River Workshop did not arrive at consensus, but it successfully brought together a set of involved stakeholders from across the basin who represented diverse and often conflicting interests. That format provided open, substantive discussion of important topics and set a positive example for future issue oriented forums.



The confluence of the Green and Colorado rivers in Canyonlands National Park.



CRITICAL MANAGEMENT ISSUES

STAKEHOLDER COMMENTS

Stakeholders throughout this study were asked the following question. Taken together their comments represent a current snapshot of the needs, concerns, and issues of the Colorado River basin. Comments are reproduced verbatim.

What are the critical management issues that face, or will face, managers, users, and other stakeholders of the Colorado River basin over the next decades?

INDEX OF TOPICS

- 22** ISSUES INVOLVING HYDROPOWER PRICES/MARKETING/REVENUES
- 26** ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND
- 36** ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT
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- 55** ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

ISSUES INVOLVING HYDROPOWER PRICES/MARKETING/REVENUES

NO NAME SPECIFIED

SANTA CLARA CITY

SANTA CLARA, UT

Hydro power prices being stabilized (held down) is very essential. The consequences of privatization of federal power marketing entities must be given careful consideration.

JIM BURDICK

CHURCH AND DWIGHT CO., INC.

GREEN RIVER, WY

Use of Hydro-electric power changing to base load vs. historical swing load to meet peak usages will cause increased power generation via higher cost alternates. This will decrease Hydro-electric revenue and increase consumer cost and overall air pollution due to increased coal fired capacity; since surely environmental concerns will not allow clean Atomic power.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

If were looking at this for 30 years, and looking at upper and lower basins in total, we should consider the repayment schedules of all facilities along river, not just Glen Canyon Dam.

Don't focus just on hydropower generation, include all effects of dams.

Impacts of conflicting demands for hydropower and water resources.

Also mention impacts of water users.

Also include effects on recreation as a resource.

Need a number, not just a bullet, for addressing water. Perhaps it seems so fundamental that it goes without saying. But maybe it needs to be brought up to be inclusive.

Lots of language going around about privatization. Some entities evaluating the sale of marketing are also talking about privatization of generation facilities. Everything is on the block.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

Continued focus on power revenues to pay for resource protection. Power feels that \$ should come from other sources, state, recreation, etc.

Seems to be in two arenas, one is policy change, another is different uses of public participation and recognizing new values. Privatizing power entities includes sale of generation facilities, not just marketing side.

When talking title transfer, its essential to discuss what caveats go with each transfer. If the buyers want to leave ESA commitments with federal government, that is a problem. This becomes an issue as we begin to discuss what can reasonably be transferred. Such discussion may greatly reduce the number of potential projects for transfer.

Issues of whether or not there needs to be NEPA compliance in transfers.

There is an issue involving title transfer, new parties coming in, e.g. if Western is done away with. Will they be allowed to make profits, or have shareholder dividends?

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Is power delivery or water delivery more of an issue in lower stretches of river? It's both. What inhibits solving these problems?

JO CLARK

WESTERN GOVERNORS ASSOCIATION

DENVER, CO

Essentially all contracts are cost-based. Market mechanisms have little impact under current policy, but the fact they are long term contracts does—it removes flexibility from the system.

BONNIE COLBY

DEPT. OF AG. ECON., UNIVERSITY OF ARIZONA

TUCSON, AZ

Closely tied to the economic aspects of irrigation as low cost power makes irrigation more economical.

MIKE COWAN

WESTERN AREA POWER ADMINISTRATION

GOLDEN, CO

- implications of changing power market mechanisms due to electric utility deregulation.
- impacts of operating to keep reservoirs at the fullest level possible on power generation.
- implications of potential climatic changes on hydropower production.

JAMES DEACON

ENVIRONMENTAL STUDIES, UNLV

LAS VEGAS, NV

The effect of hydropower on growth in the basin and on environmental issues may make it even more important than irrigation or water conservation as a management issue. It involves questions of least cost end use as much as does water conservation.

CHRIS GEHLKER

SIERRA CLUB, GRAND CANYON CHAPTER

PHOENIX, AZ

I would put a slightly different slant on this issue, combining elements from the economic aspects of irrigation to focus on privatization of the water and hydropower resources in the Colorado basin. I believe that privatization is coming and that it provides opportunities but also presents severe challenges to the environmental community.

JOHN KEANE

SALT RIVER PROJECT

PHOENIX, AZ

These issues are ultimately going to be easier to negotiate than changes in the institutional framework and the resolution of Native American water rights.

ISSUES INVOLVING HYDROPOWER PRICES/MARKETING/REVENUES

DAVID LUTTRELL

LINCOLN COUNTY POWER
PIOCHE, NV
No specific comment.

DANIEL MCARTHUR

CITY OF ST. GEORGE
ST. GEORGE, UT

The hydropower from the dams constructed on the Colorado is our low cost imbedded resource that makes it possible to compete with the private sector who have their low cost imbedded resources. In addition, the resource is clean, renewable and environmentally safe. We feel that most of the recent decisions made as a result of studies completed on the river system are inappropriate and not well founded.

TOM MORRIS

WATER QUALITY/WETLANDS, NAVAJO NATION
WINDOW ROCK, AZ

Sources state that currently available and oncoming technologies in energy efficiency and production i.e., solar could, if implemented, drastically reduce the need for electricity from hydro, coal, nukes, oil/gas.

DAVID ONSTAD

LITCHFIELD PARK, AZ

Many of the currently proposed alternatives for environmental mitigation place severe restrictions on the way hydro facilities are operated. Glen Canyon Powerplant has had its operational flexibility greatly reduced. It also has had maximum flow rates imposed which reduce the maximum amount of power which can be produced. Operating costs have remained constant, which means that the cost of the reduced amount of electric power generated must increase to maintain the current revenue stream.

PHIL MUTZ

NEW MEXICO INTERSTATE STREAM COMMISSION
SANTA FE, NM
No specific comment.

DAVID ONSTAD

LITCHFIELD PARK, AZ

In the past, wholesale and retail electric power rates have generally been cost based without much regard for market forces. State and federal regulators had established elaborate review procedures with the intent of controlling the prices utilities charged for the electric power and energy sold under their jurisdictions.

The Electric Power Act of 1992 is changing the way electric power is priced by moving it from a regulated environment to a free market environment. The traditional vertically integrated electric utility is already competing with independent power producers and non utility generators in the supply of generation area of the business.

The transmission and distribution areas of the business are also getting closer to true competition. However, before this is possible, the Federal Energy Regulatory Commission (FERC) will have to establish rules for the transmission sys-

tem which will open it up to all suppliers and users on an equal basis, so an electric utility cannot use its transmission system to compete unfairly with other power producers and distribution companies. FERC is currently working on rules to remove the market lever transmission companies currently have in the transmission area.

We have already seen wholesale electric rates fall as the independent power producers bring on newer, more efficient generation to compete with those power plants which have higher costs. Just because a company has a power plant doesn't mean that they can always recover the costs associated with the more expensive methods of producing electricity. Power producers must compete with other producers and those with a reliable product at an attractive price will sell the most electric power.

DAVID ONSTAD

LITCHFIELD PARK, AZ

Federal power rates are still cost based rates. Because of large investments in transmission, visitor centers, replacements and environmental studies, these rates have increased dramatically in the past few years, particularly in the Southeast. The following table shows the rates for the last 10 years.

Year	SLCIP	BCP	APA
1983	9.92		
1986		3.15	
1987		6.75	14.17
1991	16.20	10.21	20.70
1993	16.72	14.56	24.20
1995		12.21	25.11

The CSRP and Boulder Canyon rates have had the largest increases. These rates are starting to exceed current rates for spot market power. While spot market power is not suitable for most smaller utilities without some generating capacity they can use for reserves, the price doesn't have to go much higher before it cannot compete in today's emerging free market system. The ability to greatly increase the price of electricity to pay for environmental mitigation cannot be accomplished without paying attention to the market price of electricity.

FRED PARADY

RHONE-POULENC
GREEN RIVER, WY

Operation of the hydroelectric system and the western area power grid-interacts specifically with the Jim Bridger power plant, affecting local taxes and jobs. In the larger picture, the move to restrict hydro operation's traditional role as a supplier of peak power demand is going to magnify other power generation (coal especially) demands and attendant environmental trade offs.

ISSUES INVOLVING HYDROPOWER PRICES/MARKETING/REVENUES

BILL PERSONS

AZ GAME AND FISH DEPARTMENT
PHOENIX, AZ

This issue seems to be one of the most important ones in the coming years. Clearly my experience with Glen Canyon Dam and the Glen Canyon Environmental Studies may bias my outlook somewhat. Potential privatization of WAPA may make it more difficult to move toward what we are calling Ecosystem Management, including the concept of Adaptive Management of the resources.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Shouldn't we be paying off projects that we already have before starting new ones?

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

The reference to the 2007 repayment, implication is that the dam will be privatized once it is repayed. Additional revenue should go to stakeholders, or to salinity control.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

There will always be inefficiencies because of the hydrologic cycle. Systems were based on certain engineering realities, and you can't change that. Can't really change infrastructure without a lot of money.

Can't artificially alter prices to fund other programs.

Important not to forget that when looking at issue of power rates and revenues, you can get to a point where you shoot yourself in the foot. What happens is hydropower becomes a non-vital resource and people find other power sources. Then the cash register is gone that funds lots of programs. Read North West Power Planning Act, with salmon recovery costs, lots of power customers are going to other sources.

Basic issue is what are the changes you want to make and how do you accomplish/pay for that. Revenue reapportionment is just one way to do that. Need to look at all ways to pay for what you want to do.

We can always sell the power, no matter what the cost. The question is do we want to keep the power available in the upper basin for upper basin economic development?

Restructuring of power entities is an issue.

Take a look at reallocation of project costs based on changing uses and benefits.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

Privatization is a major issue.

Sale not only of power but of water facilities. Colorado River will probably be last place there will be transfer out of federal hands. But it's coming somewhere. Discussion should not be only of power. Uncertainty is enough that it needs to be discussed.

Problem in Glen Canyon was abruptness of the change. There needs to be time to adjust if there are going to be changes of use to minimize the impacts.

Lots of dollars involved in hydroelectric generation. Hydro is the best peaking power opportunity we have and it's being eliminated. This power is becoming a baseload power source. We have to find replacements for that and we're now paying as much or more for less of the resource. That's a trend. The future is in gas and coal.

Deregulation of utilities in California - no one knows what's going on. People are using the principles of the breakup of the phone, etc. industry, and they're not the same. There are many uncertainties.

Usage aspect; if there is continued downward trend in peaking resource, what do we replace it with?

Money for programs traditionally from power. Fed money is going away, how do we pay the bill to recover endangered species?

As costs continue to increase for power, implications are that power users will buy somewhere else and the projects will lose a large portion of repayment. Ties into reduction of federal dollars to fund programs.

Implications of using power money to fund resource protection programs.

Electric industry has always been cost based. It's not subsidized, in fact it subsidizes 90% of the irrigation. Perception of subsidy in power rates is not true. It occurs in irrigation.

Trend toward storing less water in reservoirs and the impacts to hydropower.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Since we're discussing contracts, how does that play against deregulation taking place in CA market. How might that impact Hoover?

Impacts of having to replace power resources lost due to reoperation from Grand Canyon Protection Act.

Issue is what are the principles that underlie any privatization effort of the power marketing administrations. Should there be preferences, competition, etc. Even if it stays in hands of the federal government, these should be addressed, should status quo remain, or should it change.

KENT TURNER

LAKE MEAD NRA

BOULDER CITY, NV

No specific comment.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

Flood control is not listed.

ISSUES INVOLVING HYDROPOWER PRICES/MARKETING/REVENUES

Changes to Glen Canyon Dam doubled our electric rates. I am concerned about how it is to be handled, we already paid for it. I think DC will do it without our influence, Utah Power & Light is our competition so this is the big issue that we have to resolve.

REGIONAL STAKEHOLDER MEETING

YUMA, AZ

Division of storage. One issue is the effect the different reservoir storage criteria have on the lower river. The less storage there is in Hoover, the greater chance of flooding in the lower river.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

Man-made floods greater than 28,000 cfs below Davis Dam create severe economic and recreation problems for downstream stakeholders and the bypassed water cannot be used for generating electricity.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

Flood control is a very important issue. Expansion and/or reconstruction of hydropower facilities is an issue.

JANET ROGERS

COLORADO RIVER COMMISSION OF NEVADA

LAS VEGAS, NV

We feel that this is a crucial issue and deserves further investigation.

ROBERT SCHEMP

METROPOLITAN WATER DISTRICT OF SOUTHERN CA

LOS ANGELES, CA

We have identified, and suggest the addition of another issue for discussion: The impacts of (power generation and transmission) resource replacement for lost Glen Canyon Powerplant generation.

EARL ZARBIN

PHOENIX, AZ

Defederalization - removing the Federal government from any role in Colorado River management would throw the responsibility on the states where it belongs. Dam and power facilities should be sold to the water users and/or private corporations. This would remove the need of taxing people in New York, etc. to fund western water projects, including hydroelectric projects.

RICHARD WAHL

UNIVERSITY OF COLORADO

BOULDER, CO

Congress is considering many proposals to transfer more responsibility for managing Western lands, as well as water and power facilities, to entities in the West. What legal mechanisms are in place to protect currently public uses of these federal assets? For example, state laws to protect instream flows vary from one state to another. As another example, a September 1995 legislative proposal by the American Public Power Association to transfer Power Administrations to collectives of preference customers con-

tained few, if any, environmental protections (the transfers themselves were exempted from NEPA in the proposed legislation, as well as rate regulation by FERC or state PUCs). Are private, corporate, or quasi-public western resource managers, such as power customers, equipped to protect public resources? Are state resource managers prepared to accept more responsibilities?

DAVE WOOD

CANYONLANDS NATIONAL PARK

MOAB, UT

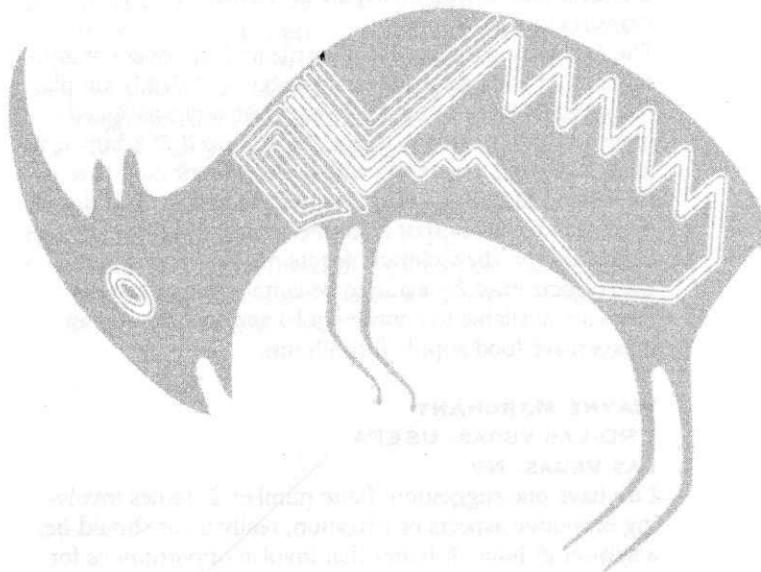
Underpriced power has been a basic cause of the growth of population and development in the Colorado basin, and an incentive for wasteful, inefficient use of energy. Accompanying the direct environmental impacts of dams and transmission lines have been vast secondary impacts from the population and industrial growth fueled by the cheap power. Power need to be priced to reflect the environmental impacts of power development, which will also encourage conservation and improved efficiency, making our existing power sources go farther.

DAVID LUTTRELL

LINCOLN COUNTY POWER

PIOCHE, NV

No specific comment



ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Need to see power issue from the irrigation side. Problem is borrowed in excess of value of land, can't sell land to pay debt which is a horrible situation. It has been subsidized, so cost of power wasn't an issue.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

What is irrigation's long term role in basin?

What are the long term affects of losing agriculture. Can't predict it. No long term look at what impacts will be. Short term decisions made that seemed a good idea at the time. Just like facing environmental consequences today from past mistakes. Need forum for long term thinkers to come forward.

CAP is good case in point. High repayment prices were predicted 30 yrs ago.

Does irrigation have long term role in basin. In Arizona, if it does, it won't be very big, especially as subsidies go away. Same with Salt River Project.

That will be issue for local areas, urbanizing reclamation projects, e.g. Yuma.

Loss of agricultural land and water to M&I users.

Or, replacement of traditional lifestyle to a modern lifestyle. Losing cultural identity.

Urbanization of West. Mindset was to protect agrarian concepts, now the mindset is for the developers. Agrarian support is going away.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

What are the implications of rising hay prices.

TELLIS CODEKASCOACHELLA VALLEY WATER DISTRICT
COACHELLA, CA

The economy of much of California and the river communities of Arizona depends on availability of steady supplies of Colorado River water. Last year river-water-supplied growers along the lower Colorado produced \$1.6 billion in fresh fruits and vegetables which were distributed here in the United States as well as around the world. That figure does not include output from the Mexicali Valley, also dependent on the Colorado for its prolific crop output. Every effort must be made to be certain that adequate flows are available to continue jobs and income and an inexpensive food supply for millions.

WAYNE MARCHANT

CRD-LAS VEGAS, USEPA

LAS VEGAS, NV

I do have one suggestion, Issue number 2, Issues involving economic aspects or irrigation, really is, or should be, a sub-set of Issue 9, Issues that involve opportunities for

conservation/efficient water use. I recommend that it be subsumed under Issue 9, which really is the core issue. The fact that Issue 2 includes only three subsidiary bullets implies that it doesn't stand well alone. Consolidation would reduce the number of issues by one, which can't hurt, given their complexity.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

We talk a lot about subsidies for agricultural water. But what's happened in old projects is subsidy is capitalized in the land value. New owner and operator has subsidy reflected in mortgage; the real subsidy walked. So charging market rate now would bankrupt users because they no longer really get the benefit. Lots of social impacts.

Social implications of change from cost basis to a market basis.

Emergence of other uses with competing demands, e.g., recreation and environmental tourism.

If we look basin-wide, there is lots of talk about agriculture's share of water (80%) and that's going to be where water supply changes. Not just agriculture vs. environment, but also agriculture vs. urban, etc. Should that be more specifically mentioned? Add specific sources of competition, other demands.

THOMAS HAVENS

AMERICAN WATER RESOURCES

COLORADO SPRINGS, CO

Economic aspects of irrigation and efficient use of water are the same concept! Its obvious Ag holds the key. Use or lose will be replaced by conserve and sell. It is simple and powerful and by allowing the market to work many problems will be solved without massive regulation and counter-productive involvement by institutions that are in fact close to obsolete.

DANIEL MCARTHUR

CITY OF ST. GEORGE

ST. GEORGE, UT

The population growth/development currently taking place in southern Utah is being well planned for and local officials are ensuring adequate water supplies are available to meet the growth. Colorado River water is critical to the long range plan. We need to be able to use this water for our citizens and at the same time ensure it is being used effectively.

SCOTT B. MCELROY

GREENE, MEYER, & MCELROY

BOULDER, CO

Historically, small family farmers have, in the words of Wallace Stegner, been the stayers in the region. The recognition that environmental values must occur in a way that is the least disruptive of the legitimate reliance concerns of these interests.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Over time we've developed a system in the upper basin that's unique, irrigation issues in lower basin is very different than in the upper basin states.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Are farmers paying as much as they should for their water? Context is that some people feel that Colorado River water is delivered at a cost lower than groundwater, for example.

Water is a natural resource, we shouldn't get into this. Those who bought water rights years ago shouldn't have their prices messed with just because the value has gone up.

Pricing isn't the issue, its just one little part of the issue.

As an irrigator, always need to remember that kilowatt hours means water to people outside of the basin. 90% of reason we're here is because of the state's water laws. We don't want the federal government to take over the water laws. After all these many years, we've established what is needed in different areas. The laws cover the situations, we don't want to see major changes.

Very complex issue.

Salinity and agriculture; When someone looks at land and sees it is only worth so many dollars per acre, they may say, let's buy it out. But we improve land because the product has a value, and one product is community. We can afford to buy out ranchers, but that's not necessarily the best route.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

The concern for farmers is, with rising price of water, we can only afford to grow high value cash crops. Alfalfa is gone.

Impacts of water prices on different types of crops. Costs relate to delivery costs because of infrastructure limitations.

Impacts of resource protection on irrigation.

Economic impacts of what's going on in Mexico, social and economic implications of water quality.

Not just quantity but also quality of received water, largely salinity issue. Can't use reclaimed water for certain crops because of salinity problems.

Could say the effect of urbanization on agriculture.

An important issue is the social impacts from loss of agriculture or implementation of programs to enhance water supply to certain areas and uses.

Are we looking at agriculture's future role in basin? Could be more specific and relate specifically to conservation, etc.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

Financial impacts and arrangements that occur from changing water uses. Way beyond irrigation. It's financial impacts to stakeholders, it could be bondholder in NYC. We're talking about constraints or limits of how you may use your water and its effect on bonds, etc.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

The United States has subsidized agriculture all over the country, all subsidies may not be bad.

Part of the issue is in defining a subsidy.

Most water goes to irrigation where we grow low-value crops. Are we going to perpetuate this kind of economics?

There needs to be a balance. Some people enjoy looking at fields, there are aesthetic values for agriculture as well.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

Should lower basin be competing with Mississippi Delta where lands are being retired and cotton is subsidized in Arizona.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

In the paper, the Spectrum, people write about the economic aspects of irrigation in our area. Some view it is all just play farming, it doesn't help the economic status of the county. But to the users it is very important. Many would say stop farming, send it down the river. Some don't think agriculture is a feasible way to use water, but some of us think of it as our way of life. This is what we are afraid of. Like the endangered species act, it is hard to prove, like the tortoise that was brought in, not native. Other species that are native, will live regardless of the drought. I am concerned because the Bureau has changed their role in building of the west—building of dams to turning it over to an agency to make a study. I am concerned about what they are taking away from us, particularly through the Endangered Species Act. Different views of people who move into the area than those who have lived here. Some people want to take control and they do it through the Act. I think they might be more interested in POWER than in the species they are protecting.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

Cost based vs. market based. If we are to consider market values of water, there must also be a financial commitment from new uses of water.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

JAMES B. RHODES

YUMA MESA IRRIGATION AND DRAINAGE DISTRICT
YUMA, AZ

Agricultural users continue to be subject to adverse comments from people who don't take into consideration the true value of agricultural products to the American and world consumers. The number of families served by a single farm continue to climb because of an increase in efficiencies and the availability of irrigation water. The U.S. trade deficit would be much higher without agricultural exports.

ROBERT SCHEMP

METROPOLITAN WATER DISTRICT OF SOUTHERN CA
LOS ANGELES, CA

With regard to privatization, we believe that facilities are operated more efficiently when the end users of the facility operate it. There are cost savings associated with end user operation due to reduced overhead, and better maintenance of the facility because of local reliance on it and the actual user's understanding of its importance.

In discussing the social and economic implications of agriculture's changing role in the basin, we suggest that you address the concept of agriculture making changes related to agricultural production and land use, i.e. taking marginally productive land out of production. This would result in putting available water to more effective beneficial use or land with greater potential to increase production with improved irrigation methods and management.

NO NAME SPECIFIED

SAN DIEGO COUNTY WATER AUTHORITY
SAN DIEGO, CA

No specific comment

D. LARRY ANDERSON

DEPT. OF NAT. RESOURCES, DIV. OF WATER RESOURCES
SALT LAKE CITY, UT

Pressures on the water resources of the Colorado River in the 1990's are brought about by increasing population much more than directly for increasing commercial/agricultural activity. These pressures are exacerbated by a reluctance to allow irrigated acreage to decline, and by a desire to preserve/restore free-flowing streams. The declining economic returns to livestock-related agriculture, particularly in the Upper Basin states, could create an increase in supply if an effective water market existed or was permitted to develop.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Urbanization of the West or look at long term-effect of urbanization.

Cultural resources not mentioned. These too have problems with population pressure.

Population growth is root of all problems.

My issue is rural growth in AZ, and how it affects riparian systems. We've already lost the riparian system in Phoenix

and Tucson, it will happen in other areas. How do we have growth, but protect those systems that bring us to the desert, e.g. cottonwoods, etc. This is not dealt with in mainstem issues.

BILL BURKE

LAKE MEAD NRA

BOULDER CITY, NV

California and Nevada are quickly approaching a crisis in serving the population of the southwest. Need to slow down population growth or look at other options to slow the demand for water.

JO CLARK

WESTERN GOVERNORS ASSOCIATION

DENVER, CO

It is the increase and change in nature of population that is causing the clash among competing values. As the basin grows more urban, urban values for aesthetics, wildlife, recreation, environmental quality, etc. are causing more impact than simply the shift of use (quantity) from ag. to municipal demands.

THOMAS CONTRERAS

PINE VALLEY DISTRICT, DIXIE NATIONAL FOREST
ST. GEORGE, UT

Washington County has been the fastest growing county in Utah for the last 10 years. The growth has surpassed state prediction exponentially. At this point water needs and development is of utmost concern based on present available sources and their ability to meet anticipated immediate future needs.

MIKE COWAN

WESTERN AREA POWER ADMINISTRATION
GOLDEN, CO

Suggest adding the following as an example:

- Infrastructure (road, water and power supply system, sanitation facilities, etc.) associated with population growth.

JIM DEACON

ENVIRONMENTAL STUDIES, UNLV
LAS VEGAS, NV

Growth is the driving force behind resource use conflicts between competing users, human and environmental quality, attempts to avoid the market mechanism, etc. Creative ways to foster development uncoupled from growth offer the best opportunities for effective, comprehensive solution to water and other problems generated by growth.

MAUREEN GEORGE

LAKE HAVASU CITY

LAKE HAVASU CITY, AZ

How to address water supply for those communities along Colorado River who have no other source of supply - eg groundwater. Resolution of Indian marketing issues need to develop shortage plan that clearly spells out order of cut-backs in time of shortage.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

DAVID GUY

CALIFORNIA FARM BUREAU FEDERATION
SACRAMENTO, CA

In the long-term, the important relationship between available water supplies and demands is the single most important issue on the river. We have grave concerns with the existing policy in the Colorado River Basin where local jurisdictions can approve new demands on water, and then the water purveyor for that area is forced to secure a water supply to meet these demands, irrespective of the impacts on other existing users and areas of origin throughout the basin. It is our belief that there must be an adequate water supply prior to the approval of new demands on the river.

It may be interesting to note that we are currently sponsoring legislation in California to address this issue throughout California. It is possible that this concept may also have some applicability to the Colorado River in the future. Otherwise burgeoning urban areas will continue to expand without an adequate water supply.

J.C. LATHAM

ARIZONA STATE LAND DEPARTMENT
PHOENIX, AZ

Many areas along the river are becoming developed with both permanent and vacation homes. The population is becoming more affluent, this means that there is more demand for services and utilities.

The increased development and population is putting more demand on the natural resources; thereby the population is encroaching into uninhabited areas.

TOM LINCOLN

BOR, ARIZONA PROJECTS OFFICE
PHOENIX, AZ

Despite the stated mission of Grand Canyon Trust, I was surprised to see no reference to the cultural environment. An anthropological perspective should be emphasized equivalent to a natural one. Theoretical and methodological approaches championed by anthropology have direct bearing on issues. Historic perspective, human response to natural situations, cultural behavior, etc. all provide important clues on how the river might be better managed in the future.

DOUG LOFSTEDT

EPA-SALINITY
DENVER, CO

Strategies to address increasing urban demands for more Colorado River water, e.g. Las Vegas, So. California, AZ Management of growth.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

Virgin River, its hard to get water out of the Colorado, yet much of Virgin River goes into the Colorado, we have to catch and use that water. Our whole life style depends on catching water and being able to use it.

The Wild and Scenic Rivers Act. What are the impacts of that Act?

JERRY MASON

UTAH WILDLIFE FEDERATION
SALT LAKE CITY, UT

Utah is lacking in land use planning, and water planning can't be done without the land. Our growth rate is very high, presenting a challenge not faced before.

TODD MACFARLANE

KANE COUNTY WATER CONSERVANCY DISTRICT
KANAB, UT

We feel that Item No. 4, involving population growth, development and competing demands for limited water resources in the basin, is probably the most important single issue that needs to be thoroughly addressed. This item also needs to include additional sub-issues involving water storage, long-term water planning, balancing competing demands between urban/rural users, water marketing, and interbasin/interstate transfer mechanisms.

TOM MORRIS

WATER QUALITY/WETLANDS NAVAJO NATION
WINDOW ROCK, AZ

Population growth in the Colorado River Basin is and will be an extremely critical factor in water management, water quality and environmental protection concerns. Water use efficiency and protection of riparian/wetlands areas is a must.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

Growing populations impact federal and Native American as well as state entitlements.

Increasing demands in rural areas as well as urban areas.

Increases in domestic demand for water.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

In states growing beyond their Colorado River apportionment, there has been no moratorium on growth. This is a basin wide concern. Population growth with out long term commitments for water.

You failed to mention the economy as an issue, e.g., Californians coming into our community. That sets a whole new bunch of priorities. That is the prime issue.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Population growth issue. Colorado comes up with stupid projects just to use water.

People have to be free to migrate, that's population dynamics. We can't lock the door.

Increased population in one area may have adverse impact on down river populations.

Obviously Native American water rights have top priority. It has largest effect on upper basin.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

WAYNE MARCHANT

CRD-LAS VEGAS, USEPA

LAS VEGAS, NV

Issues involving patterns of population growth and development are very important.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

Flood plain management is an issue.

The aesthetic and lifestyle connected with loss of farmlands is a concern.

Population growth and its associated impacts affects every corner of the basin. It is of critical importance at both local and regional levels.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Speaking of increasing demands from urban areas, also need to look at water diverted from other river systems and its impacts on Colo. River. (See 10).

This refers to a bill that requires developers to consult with water board before building. The issue is linking of water demands to supplies.

Impact on supply of Colorado River water caused by environmental or other demands from other river systems.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

We can collect good data, but we don't know what to do with it.

This isn't really a good issue for this group to discuss.

We think population growth drives everything.

This is the context by which all other issues are discussed. There is really nothing this forum can gain by analyzing this issue. We just need to recognize that growth has created a lot of the problems, and continuing growth will exacerbate those problems and create new ones.

Using water as tool for population management and location population.

HAL SIMPSON

DIVISION OF WATER RESOURCES

DENVER, CO

Recreational water needs.

RICHARD WAHL

UNIVERSITY OF COLORADO

BOULDER, CO

Due to increasing population, the formerly remote lands (e.g., Forest Service and BLM) are becoming more heavily used and, in some cases, are crowded. Yet, because of the vastness of the federal domain, it is very difficult to police the use of these lands-whether that it is prevent overuse, litter, or vandalizing of native antiquities.

Unless dramatic steps are taken, many of the values of these western lands are likely to be degraded or lost. These dramatic steps might include (1) higher recreational fees for developed sites, (2) requiring fees and permits for back-country use, (3) developing a system of registration and tagging for all antiquities.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

Interstate marketing is a tremendous issue, and not just for the tribes.

CHRIS GEHLKER

SIERRA CLUB, GRAND CANYON CHAPTER

PHOENIX, AZ

Resolving the rights of Indians will have tremendous impact on the basin.

STEVE KREST

FARMINGTON, NM

Laws and regulations that restrict interstate sales of Indian water rights should be abolished.

TOM MORRIS

WATER QUALITY/WETLANDS NAVAJO NATION

WINDOW ROCK, AZ

Unresolved reserved water right claims are already causing tension, anxiety, and crisis among some water users.

DAVID OSIAS

ALLEN, MATKINS, LECK, GAMBLE & MALLORY

SAN DIEGO, CA

To create the platform for maximum utilization of the finite water resource and to be able to proceed on a timetable and through a process that is less court-focused and glacial in time, uncertainties regarding Native American and Mexico impacts on future long term water supplies need to be promptly resolved.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

We can not make decisions for the Native Americans because they're not here.

This is a very important issue.

I'm not convinced that tribes are really interested in selling existing water supply off reservation. It's a whole different issue when talking unquantified water rights not presently used.

Impacts to non-Indians of proposed off-reservation marketing.

For the most part the issue is paper water, not wet water.

PETER BUTLER

FRIENDS OF THE ANIMAS RIVER

DURANGO, CO

No specific comment

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

DONALD K. FREVERT / CRAIG PHILLIPS

BUREAU OF RECLAMATION
DENVER, CO
No specific comment

TOM LINCOLN

BUREAU OF RECLAMATION ARIZONA PROJECTS OFFICE
PHOENIX, AZ
No specific comment

NO NAME SPECIFIED

SAN DIEGO COUNTY WATER AUTHORITY
SAN DIEGO, CA

Incentives for agricultural water users to become more efficient.

NO NAME SPECIFIED

SANTA CLARA CITY
SANTA CLARA, UT

Conservation of water and its efficient use is a major issue. Groundwater storage scenarios need to be developed - ways to improve quality and quantity of drinking water is also a key issue.

D. LARRY ANDERSON

DEPT. OF NATURAL RESOURCES, DIV. OF WATER
RESOURCES
SALT LAKE CITY, UT

There exist real opportunities for intrastate and interstate marketing of water, particularly rural-to-urban in Upper Basin states, and Upper Basin states to California and Nevada. Improving efficiency in water use always entails cost, and (absent legislative mandate) will occur only if the saved water can produce benefits in excess of these costs. Constraints to water transfers are based more on perceived political and philosophical considerations than on economic or other tangible factors.

GEORGE BRITTON / BILL CHASE

CITY OF PHOENIX
PHOENIX, AZ

Will the Administration attempt to create, through regulation, a market mechanism for the interstate sale of Colorado River water?

Will the Administration attempt to issue the May 1994 proposed regulations which would have created a "top water" bank in Lake Mead for conserved water and set up a process for leasing Colorado River water between Lower Basin States?

Will Arizona attempt to block such regulations through litigation as they threatened to do in response to the proposed May 1994 regulations?

Will the negotiations among Lower Basin States and the Colorado River Indian Tribes, which are currently at an impasse, start again?

Will the other parties agree they are not seeking a permanent water transfer of a portion of Arizona's Colorado River entitlement as Arizona has insisted as a precondition to resuming negotiations?

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

"Use it or lose it" is a negative statement. We don't see that philosophy here.

We've never discussed water use in the "use it or lose it" phraseology. Don't know of any state or body that has gone out under this concept alone and done things.

The idea was that under the compact, a state doesn't have to go out and build a lot of storage projects in order to protect their entitlement.

Need to clarify the distinction of "use it or lose it" in relation to the Compact and in relation to state water rights.

There will always be concerns of transfers. Utah can do what it wants with its water, but their actions affects the whole upper basin. Any interstate transfer proposals should be shared openly.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Issue of integrating non-federal and federal facility operations, e.g., Metropolitan Water District wants to take northern California water and bank their Colorado River water in an aquifer, etc. Use of nonfederal facilities for water banking for more efficient use of water. Can say opportunities or impact

JIM BROOKS

NEW MEXICO FISHERY RESOURCES OFFICE
ALBUQUERQUE, NM

Conservation and efficient use is a very important. Let's look beyond the ends of our noses.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Marketing, related to disposition of conserved water, who gets it, how it's defined, etc.

"Use it or lose it" is accurate mentality.

Environmental impacts of water conservation efforts, e.g., endangered species in Imperial Irrigation District drains, or ditch lining and its effects on wetlands. This also relates to water quality, as conservation decreases drainage, water quality decreases.

Laws and regulations hamper efforts to get conservation on ground; prior appropriation doctrine.

Energy Policy Act of 1992 deals with conservation of water for improving hydroelectric development.

Water conservation for enhancement of hydro development.

Funding mechanisms for water conservation.

Opportunities for economic incentives for water conservation.

Drought planning related to economics of district.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Uncertainty of adjudication of federal water rights.

The fact that we've priced the water in AZ beyond the ability of irrigators to pay.

General adjudication: Fed water rights issues on table, still face number of years of uncertainty.

State attempts to regulate water use by establishing AMAs (active management areas). See these sprouting up in several basins.

Prior appropriation won't go out the window, but we will make concrete the rules for transfer.

BRIAN CLUERNATIONAL PARK SERVICE, WATER RESOURCES
DIVISION

FT. COLLINS, CO

Without population control, there will continue to be pressure on water resources. The only alternative is to develop conservation strategies with incentives and rewards for using less water. For this idea to have any effect, people are going to have to learn to live in their environments rather than modifying them, ie. fountains in deserts, bluegrass in deserts, etc.

WAYNE COOKUPPER COLORADO RIVER LAKE COMMISSION
CITY, UT

Water Market Huckstering (1) Fostered by greed rather than viable solutions (2) Looked to because it's cheap rather than realistic (3) Diverts attention away from useful and necessary planning activities (4) Develops unrealistic expectations among some while destroying willingness to cooperate among others (5) Unhealthy setting in which to attempt to discover regional or Basin-wide solutions.

DONALD K. FREVERT / CRAIG PHILLIPSBUREAU OF RECLAMATION
DENVER, CO

Identifying flexibility within existing project authorization to more equitably serve an expanded range of functions.

State legislative initiatives with the objective of revising state law to accommodate increased efficiencies of water use.

ELIZABETH GARDENERDENVER WATER
DENVER, CO

Conservation/Coordination. If downstream states are more efficient in their water use there will be more water available to us to keep in Colorado.

AMOS JOHNSONDEPT OF WATER RESOURCE; NAVAJO NATION
FORT DEFIANCE, AZ

Interstate and inter-basin water marketing is a critical issue to the Navajo Nation.

MIKE COWANWESTERN AREA POWER ADMINISTRATION
GOLDEN, CO

Suggest adding the following examples:

- public and private incentives to conserve and preserve water resources.
- definition of surplus and shortage conditions.
- allocation of surplus and shortage in water supply.
- opportunities for re-use of water.

CHRIS GEHLKERSIERRA CLUB, GRAND CANYON CHAPTER
PHOENIX, AZ

The current legal/institutional framework encourages inefficiency in the use of water. Reform of this system is an important goal.

MAUREEN GEORGELAKE HAVASU CITY
LAKE HAVASU CITY, AZ

Is there an economically feasible way to make recharge in Central AZ available to river communities?

DAVID GUYCALIFORNIA FARM BUREAU FEDERATION
SACRAMENTO, CA

The conservation and transfer of water, particularly agricultural water, is an essential issue to management within the Colorado River for all parties. This issue is closely related to Issue No. 3 involving the institutional framework, since they are both essential for adequate management of the Colorado River.

JOHN HAMILLCOLORADO RIVER RECOVERY PROGRAM, USFWS
DENVER, CO

Interstate water sales and transfers.

E. RICHARD HARTINSTITUTE OF THE NORTH AMERICAN WEST
SEATTLE, WA

The Southwest is notorious for lagging distantly behind in establishing conservation programs and opportunities.

PAM HYDEAMERICAN RIVERS
PHOENIX, AZ

Opportunities for conservation/efficient water use are needed to provide the flexibility - both institutionally and within the given constraint of a finite resource under huge demand - that we now lack. Clearly the basin's growth and demand for water will eventually exceed the supply available, unless we constantly work to identify and implement creative solutions to the growing problem. Removing barriers to efficient water use will allow implementation of more logical means of matching supply to demand.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

W.B. LORD

BOULDER, CO

Consumptive water uses throughout the basin are wasteful and inefficient. Much should be done to improve this situation. Improving irrigation efficiency, through ditch lining, etc., can be useful, but far more important is getting rid of economically inefficient and environmentally damaging irrigation in the first place. Similarly, urban water conservation can be useful, but discouraging urban growth in water-short areas is more fundamental.

WAYNE MARCHANT

CRD-LAS VEGAS, USEPA

LAS VEGAS, NV

Conservation and efficient water use, especially with respect to agriculture, is the most important issue.

JERRY MASON

UTAH WILDLIFE FEDERATION

BRIGHAM CITY, UT

Without a plan no one can manage.

DAVID OSIAS

ALLEN, MATKINS, LECK, GAMBLE & MALLORY

SAN DIEGO, CA

Focus should be on maximum utilization of the finite resources—promoting efficiency in consumptive and non-consumptive use; storage as a device to stretch availability; and marketing/transfers as a tool for reallocation are central to future Colorado River management.

LORI POTTER

SIERRA CLUB LEGAL DEFENSE FUND

DENVER, CO

Water Marketing - What mechanisms are needed to address the legal and legislative issues needed to get from here to there. What needs to happen to get past legal barriers?

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Old irrigation policies (flood irrigation) almost impossible to change.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Opportunities for voluntary participation in conservation efforts.

Make conservation market driven. Farmers will do what is needed to make profits. It's not the pricing of the water but the pricing of the commodity.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

Ground water management is an issue.

Opportunities for conservation by the end users is an issue.

Opportunities for surface water storage of Colorado River water is an issue.

The definition of conservation itself is an issue. For example, is increased storage conservation as well as less demand?

Impacts on groundwater from surface water management decisions.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Intrastate water marketing is also an issue.

The issue is reservoir storage not simply groundwater storage.

There is a need for a better institutional framework to look at better use, and have ability to move water. All bullets under this topic are very broad issues, except for "use it or lose it" bullet, which is very specific. Perhaps it would be valuable to have more specific bullets here.

It is important to continue the basic premise that any user/diverter should put water to beneficial and reasonable use.

Opportunities for incentives for efficient water use.

Opportunities for water reuse - problems /opportunities for.

There is a responsibility of water diverter and the end user for efficient water use.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

"Use it or lose it" is a negative statement. We don't see that philosophy here.

We've never discussed water use in the "use it or lose it" phraseology. Don't know of any state or body that has gone out under this concept alone and done things.

The idea was that under the compact, a state doesn't have to go out and build a lot of storage projects in order to protect their entitlement.

Need to clarify the distinction of "use it or lose it" in relation to the Compact and in relation to state water rights.

There will always be concerns of transfers. Utah can do what it wants with its water, but their actions affects the whole upper basin. Any interstate transfer proposals should be shared openly.

Something wrong using an agricultural water rights for non-ag purposes in California, can't do that in Wyoming. Consistency in application of state water laws.

HAL SIMPSON

DIVISION OF WATER RESOURCES

DENVER, CO

Urban water conservation opportunities.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

RODNEY SMITH

STRATECON

CLAREMONT, CA

Nurturing Development of Market Institutions. A growing general consensus in state and federal water policy is that markets have an important role in providing economic incentives for water conservation and water allocation. The long delay in the issuance of Reclamation's draft regulations for the Lower Colorado River Basin and the recent misfiring of the so-called Three State Process indicate that the rules of the road governing water transactions remain to be definitively established. Especially given the special role of the Interior Secretary as watermaster in the Lower Basin, the development of market institutions needs clear criteria, guidelines, and policies that would be followed by Interior when it approves proposed transactions. The list of issues is long, but generally understood (even though some of the specific provisions need further refinement, I find Reclamation's draft regulations a good checklist of the issues). The specifics of how each issue is clarified will ultimately determine the respective role of market and non-market decision-making in the conservation and allocation of Colorado River water.

ROBERT SCHEMPMETROPOLITAN WATER DISTRICT OF SOUTHERN CA
LOS ANGELES, CA

Metropolitan supports water conservation and efficient water use practices as described in the Regional Water Supply Solution section of the cover letter. Metropolitan and the Central Arizona Water Conservation District have executed an agreement implementing a demonstration project on interstate underground storage of Colorado River water in Arizona. The Southern Nevada Water Authority also participated in the storage of water under this program. That section of the letter discusses our support of, and the essential need for interstate water transfers for a period of time as a component of a regional solution. The simplified process achieved with the President's approving Public Law 104-20 provides flexibility to Reclamation in implementing additional measures to control salinity.

The Imperial Irrigation District (Imperial) and Metropolitan have executed an agreement to construct a concrete lined canal parallel to the All American Canal. We are now awaiting commencement of negotiations for a construction funding agreement with Reclamation, and are attempting to reach consensus regarding a mitigation agreement among Metropolitan, Imperial, Reclamation, the U.S. Fish and Wildlife Service, Bureau of Land Management, and the California Department of Fish and Game. The Mitigation agreement formalizes the commitments made in the Final Environmental Impact Statement/Report (FEIS/R) prepared by Reclamation. Potential project effects of lining the canal on Mexico's water are described in the FEIS/R. It is the position of the United States Section of the International Boundary and Water Commission that the water seeping from the All American Canal is United States water and it is therefore appropriate to conserve this water and put it to beneficial use in the United States.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

We must deal with the fact that most of the demand for Colorado River water is outside the basin rather than within.

When you move water from one basin to the other it destroys economic base that built up around the water.

Water banking, what are we in the upper basin going to get out of this? Political power is south of us.

Present mentality of established water rights precludes someone from coming along later with a better use. We get development where we don't need it.

The traditional water development strategy is where can we get more? Do we have a need for additional water?

Water marketing brings problems with it, but there is good with it also. It can establish a system to allocate water to area with highest use.

There is a problem with terminology of water regulation districts, they don't conserve water, they manage it.

Conservation is not always possible. Today use is 10 gal per capita per day on reservation. We're not going to see conservation there, probably an increase in use.

There is a lack of economic incentives/disincentives for conservation of water.

Its important to look at historic ways we've used water, there may be things we've done right over time. We must learn from it and not "chuck" it because it doesn't fulfill all our wants.

If you put water to people who can pay the most, you're going to do some damage to the present system.

Highest use to me means keep as much water in the river as possible.

Old farms that have been subdivided and now have houses on them. They are no longer agricultural, but these property owners are still receiving irrigation. And they are less efficient with the water than the original farmer. There needs to be a simpler process of transferring water rights. Above all else, new projects should do no harm.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

The upper basin can't be expected to provide water to the lower basin until the lower basin resolves its own needs. This living beyond your means certain mentality needs to be adjusted, California and Las Vegas have warped the view of how water should be used.

HAL SIMPSONDIVISION OF WATER RESOURCES
DENVER, CO

Reducing non-beneficial consumptive uses.

ISSUES OF ALLOCATIONS: RECONCILING SUPPLY WITH DEMAND

PHILLIP WOODS

EPA, REGION 9
SAN FRANCISCO, CA

Benefits to agricultural water users (and other users) from improved irrigation management.

SAM SPILLER

U.S. FISH AND WILDLIFE SERVICE
PHOENIX, AZ

Conservation and efficient use should be tied to keeping sufficient water in the system to continue natural processes and provide for environmental protection.

JACK STANFORD

FLATHEAD LAKE BIOLOGICAL STATION, U. OF MONTANA
POLSON, MT

Environmental issues cannot be resolved effectively without allowing senior water rights holders to lease their water to downstream or in-stream users.

KENT TURNER

LAKE MEAD NRA
BOULDER CITY, NV

Interstate sale of water rights. While this is not being done at this point, the impact would be severe and negative to the states losing the water. Tribes have many large paper rights which if sold off the reservation could cause a significant loss economic and resource wise to the state economy. Perhaps temporary sales in some years would work but there would be no market for water getting there anyway.

DAVE WOOD

CANYONLANDS NATIONAL PARK
MOAB, UT

As with power, the underpricing of water supply has fueled development and population growth and encouraged wasteful use of water. The use it or lose it doctrine, also a contributor to this waste, is out of date in an age of over allocated water sources and societal concerns about environmental losses from water development. Water conservation, water pricing that reflects true costs, and replacement of use it or lose it with a cooperative approach are critical priorities.

HAL SIMPSON

DIVISION OF WATER RESOURCES
DENVER, CO

Enhancing precipitation.

DONALD K. FREVERT / CRAIG PHILLIPS

BUREAU OF RECLAMATION
DENVER, CO

No specific comment

DAVID HARRISON

MOSES, WITTEMYER, HARRISON, AND WOODRUFF, P.C.
BOULDER, CO

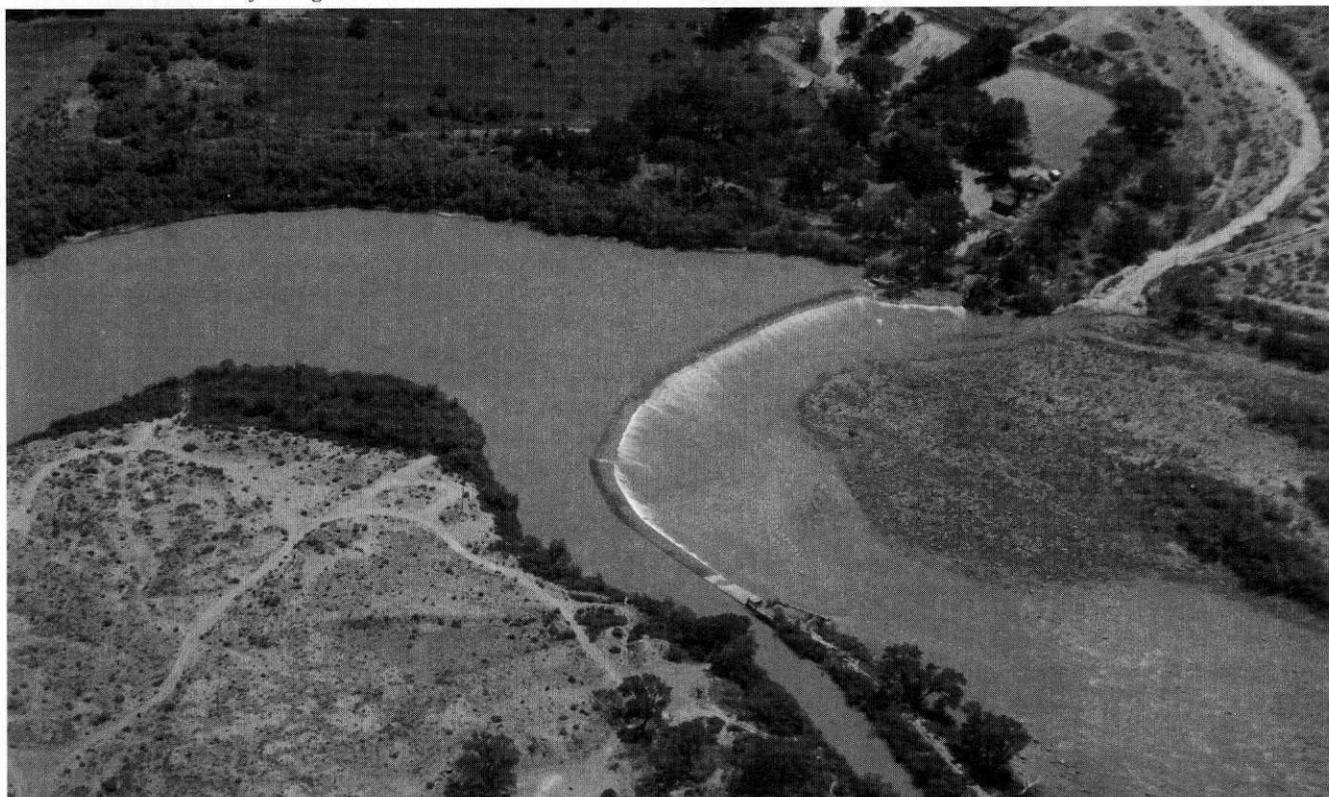
No specific comment

PHIL MUTZ

NEW MEXICO INTERSTATE STREAM COMMISSION
SANTA FE, NM

No specific comment

A small dam diverts water for irrigation on the Green River above Green River, Utah.



ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

D. LARRY ANDERSON

DEPT. OF NATURAL RESOURCES, DIV. OF WATER RESOURCES

SALT LAKE CITY, UT

I believe there are perhaps three major issues under which all other might be grouped: (1) water resource allocation among uses (e.g., conservation storage, flood control, hydropower, in-stream flow, etc.); (2) increase of efficiency in meeting the allocations; and (3) distribution of benefits from river operation. As examples how some listed examples might be categorized, the first four issues under #1 (hydropower) would be placed under 'distribution of benefits' (the last would be an allocation among uses issue), most of the institutional framework issues relate to 'increase of efficiency', and most Native American issues are associated with 'distribution of benefits'.

DEAN BLINN

NORTHERN ARIZONA UNIVERSITY
FLAGSTAFF, AZ

The basin is too large for a single commission. I suggest sub-basin commissions. The Flathead Basin Commission in Montana is a good model. All agency leader and equal members of informed citizens are at same table talking about the implications of monitoring and data for water quality, feasible,

JIM BROOKS

NEW MEXICO FISHERY RESOURCES OFFICE
ALBUQUERQUE, NM

My experience has been that there is usually a solution to the problem. Basin-wide planning, particularly if you can employ a modeling process for consumptive uses, forces all sides to cooperate.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Long term implications of land resource connected to water and power resource.

The land the facilities sit on, e.g., Navajo Steam Plant project renegotiations. If land negotiations fall through, need to find new site. Or, uncertainties with resources not federally owned; associated resources.

BILL BURKE

LAKE MEAD NRA
BOULDER CITY, NV

More long-range planning is needed to identify and consider all agency needs that are affected by Colorado River management.

JAMES DECKER

ENVIRONMENTAL EDUCATION
DURANGO, CO

Institutional framework is organized against water management strategies. Law of the River as presently configured militates against cooperation and towards adversarial management; protecting states rights and river basin rights. Use it or lose it legal and social attitude reduces possibilities for institutional reform. This permeates the system down to water conservancy choices.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Suggest the need to look at things on a broader scale. Find things that are doable in each Regional Stakeholder Meetings. What can we do in the next year and how do we do it? e.g. get Fish and Wildlife Service, The Nature Conservancy, Reclamation, state Fish and Game, etc. to sit and look at river and do it.

Coordination of long-term interagency budgeting process.

Alternative to litigation is key as planner, because we need framework. We have 90-95% agreement and hire lawyers to fight over the other 5%. I like this one.

Management structure fails to respond often, but especially in budget process. No flexibility to get together and solve things without relinquishing some power in the individual agency.

Issue is where does BOR get in the way for good water management. Where can Bureau's input be positive, e.g. moving water around from big projects for drought planning. It hasn't been done.

Overall issue is that something is happening on the river, and we don't want to miss the opportunity to sit down and come up with a management structure that works. When the boat turns over, you can right it however you want.

Physical problems amenable to physical solutions are often decided by politicians. Not rational from a physical sense.

What happens after the prior appropriation phase?

There is no common vision on how to manage, and no agreed upon goals and objectives or process to meet those goals. Must look at where we can save things and where do we just do our best to hold the line. Bureau planning programs in the 60's could be model. Right now we act like we can save everything and it doesn't look like we can.

NEPA process, and maybe Endangered Species Act process, are reactive, not proactive process. There is a need to sit down and find shared vision. Existing system creates road-blocks and fights.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Proposed rules from Bureau of Reclamation for lower basin management.

Inability of Law of River to allow interstate marketing.

Need for Las Vegas to expand its uses, lack of flexibility in current mechanisms to allow them to use other unused area. Deals also with population growth.

Cultural resources is major issue not yet represented.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

We're reacting to a change in values, but those values will change again. What will we do to be prepared to follow the values in the future.

Most bullets imply that present institutional structure doesn't work. There should be some recognition of the part of the structure which does work.

Basin-wide, or problem shed theme is valid, but it's not the only one. If we want broad participation, we need to recognize that.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Forum? Focus is both on the general need and on specific mechanisms.

Need an issue that addresses the issues of having an Upper Colorado River Commission and not a lower one. Should we have a lower basin traditional organization? Air it in the public forum.

Or should a group of stakeholders be put together to assist in lower basin management?

People feel Arizona Department of Water Resources does not represent them. This comes up in many different ways, e.g., compartmentalization.

Basin wide forum? Get a lower basin forum, then merge it with upper basin.

Implications of narrow focus on planning for water and power resources.

Inability to predict the future. Adds scope as well as time.

Age old issue of differing demands of water vs. power users. Now, water has priority because of law. Issue is balance of demands.

There is no mention of allocations made based on erroneous water supply data. Some feel allocations need to be looked at again. Supply issues.

On one hand, some say let's reopen the Colorado River Compact; but others say don't touch it. This is somewhat covered under Topic 3.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Tools for making operational decisions along river; modeling. Colorado is doing an independent, parallel effort from Bureau of Reclamation, indicates distrust of federal efforts.

Get information from Reclamation/USGS modeling efforts for Colorado River.

Accurate water use accounting. Groundwater pumping effects on surface water. Relates to determining transferable

water supplies accurately. Numbers come from accounting efforts of LeGrande Nielson.

PETER BUTLER

FRIENDS OF THE ANIMAS RIVER

DURANGO, CO

It is very difficult to address issues such as water quality and non-consumptive uses when the main institutional framework governing the River is based on consumptive use.

JO CLARK

WESTERN GOVERNORS ASSOCIATION

DENVER, CO

Main issue to me is that there is no basin council or mechanism for integrating various issues, interests & concerns. As a result, Law of the River and courts prevail. As uses change, there is a need for balancing and adapting mechanisms.

BONNIE COLBY

DEPT. OF AG. ECON. UNIVERSITY OF ARIZONA

TUCSON, AZ

Demand for public involvement in decision processes (#5) and issues involving Native American water rights (#6) could be combined under issues that involve institutional framework of basin management (#3).

WAYNE COOK

UPPER COLORADO RIVER COMMISSION

SALT LAKE CITY, UT

Resistance to use of flexibility that exists within the Law of the River to solve changing Basin water needs (1) Perception that law is inflexible (2) Sufficient system water to meet most probable needs beyond 2025 (3) Sharing of risk must be equitable (4) Profiteering must not drive solutions.

TELLIS CODEKAS

COACHELLA VALLEY WATER DISTRICT

COACHELLA, CA

Working together to ensure adequate supplies of Colorado River water while meeting our obligations regarding endangered species appears to be the key to accomplishments by basin management.

Many programs have been proposed and some have seen some experimentation. Many promise to stretch water use for much of the west. But we need our 21st-century water plans in place before there can be augmentation on a meaningful scale. That's the task at hand.

It appears that in order for us to move ahead with plans to ensure Colorado River water for future demands while we meet our obligations regarding endangered species, we'll have to work more closely in focusing our efforts or perhaps face court-imposed restrictions that none of us could endure without making sacrifices.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

NO NAME SPECIFIED

SAN DIEGO COUNTY WATER AUTHORITY
SAN DIEGO, CA

Long-Range planning to help avoid shortages (100) years.
Utilization of in-stream storage.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Glen Canyon Dam issues are microcosm of rest of basin.

Also, where is management and planning institutional structure to allow us to come to table and plan? Where is the data from which to base these large-scale management decisions? They don't exist and we're trying build them up piecemeal.

Planning is main lacking area. We talk about problems, but no plan comes out. Plan must come from highest levels to have impact.

JIM CURRAN

NEVADA DIVISION OF WILDLIFE
RENO, NV

All activities on the river have some impact on the others. It is essential that coordinated management occurs.

Similar to coordination between managers and users, all of us have to be able to coordinate our activities with all users and attempt to minimize conflicts before major problems occur.

MAUREEN GEORGE

LAKE HAVASU CITY
LAKE HAVASU CITY, AZ

How to address water supply for those communities along Colorado River who have no other source of supply - eg groundwater. Resolution of Indian marketing issues need to develop shortage plan that clearly spells out order of cutbacks in time of shortage.

DAVID GUY

CALIFORNIA FARM BUREAU FEDERATION
SACRAMENTO, CA

The second most critical issue is the institutional framework of basin management. Making this framework amenable to real solutions is the obvious challenge to all stakeholders in the process and is absolutely essential to good water management within the context of the Law of the River.

JADE HENDERSON

WYOMING STATE ENGINEER'S OFFICE
COKEVILLE, WY

New uses versus traditional uses of water, in the context of market value on the Colorado River. Water has value. Traditional users continue to pay for the water delivered by projects developed for those uses. If society's values for water use are changing from the primary uses of agriculture and hydropower, then where is the checkbook of the new competing interests of aesthetics-recreation-ecology to buy water from the paying users? Changing social values and expanding population centers do NOT entitle non-paying users to seize or control the water; the mecha-

nism of the marketplace allows sincere purchasers to buy out established uses.

STEVE GLAZER

HIGH COUNTRY CITIZENS' ALLIANCE
CRESTED BUTTE, CO

Pro-actively influence the uses of our water resources instead of just being reactive.

- As we reach and exceed the limits of a finite resource, innovative and flexible management must be employed, replacing rigid parochial approaches.
- Continue to encourage intra-basin solutions.
- Continue to pursue reconciliation of conflicts between state and federal mandates.
- Recognize contingent valuation of our resources, including non-market values, when doing cost/benefit analysis and risk assessment.
- Phase out subsidies that distort priorities.

Insuring equity and justice while implementing basin management.

- Basin of Origin protection when considering trans-basin diversions.
- Ensure that all appropriate stakeholders are allowed to participate.
- Recognizing changing public values.

Address a major flaw in the Colorado River Compacts.

- It was wrong to assume that the river could be consumed to extinction.
- Under this broad topic, all environmental and other non-proprietary interests and concerns can be addressed.
- Should the Lower Basin be helping with the Recovery Program in the Upper Basin?
- Requiring remediation by those causing impairments instead of making downstream users clean-up the water before they can use it (Internalizing impacts).

RICK GOLD

BUREAU OF RECLAMATION
SALT LAKE CITY, UT

Of major importance is how management of the basin works, versus how folks will think it works or would like it to work. Many would suggest the holistic management of the Colorado River Basin. No mechanism exists, no broad authorities, no entities equipped. Could this be the new Reclamation?

PAM HYDE

AMERICAN RIVERS
PHOENIX, AZ

Institutional framework and population growth/development are interconnected. The changing demographics of the region create difficulties in water management which are sometimes exacerbated by inflexibilities in the present institutional framework. In order to avoid a multitude of ancillary problems related to the river and water use, it is imperative to understand, and perhaps influence where possible, patterns and trends in population growth and development, and to rework the institutional framework of basin management to incorporate more flexibility. Management in the future will need to be able to react quickly to changed conditions, and use creative solutions.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

JOHN KEANE

SALT RIVER PROJECT
PHOENIX, AZ

This has some overlap with coordination of managers (#10), especially pricing and protection of non-consumptive users and the impacts of water transfers. The current framework does not handle a number of issues, and should be completely overhauled. Also, should the USBR have a role at all or a much reduced role, replaced by some regional, non-federal structure.

DOUG LOFSTEDT

EPA-SALINITY
DENVER, CO

I think this general concept will continue to gain interest as the ecosystem/watershed approach becomes more widespread. An associated issue will be how to develop efficient and effective basin-wide institutional arrangements. I would guess that interest in a basin-wide approach to dealing with stream/water quality issues will also increase, e.g. moving past the current focus on just salinity to other issues like Selenium.

W.B. LORD

BOULDER, CO

Institutional issues are top priority because their satisfactory resolution determines how adequately all of the other substantive issues can be resolved. Existing institutions perpetuate imbalanced water management and are too inflexible to respond to changing needs and perceptions.

LARRY MACDONNELL

SUSTAINABILITY INITIATIVES
BOULDER, CO

Constructing a framework within which Colorado River water use entitlements can be traded to meet emerging needs. To me, the number one issue concerns devising a means by which the apportioned waters of the Colorado River can be allowed to move according to the needs of their use. This will come as no surprise since I have been working on this issue recently. I suspect that much of the conflict in the Basin would go away if there really was an effective means for the apportioned waters to move according to demand.

TODD MACFARLANE

KANE COUNTY WATER CONSERVANCY DISTRICT
KANAB, UT

We are in the process of developing a county-wide water resource management plan. Once that plan is completed in early 1996, we will be in an even better position to further identify and address issues that are of particular concern to us. In light of our master-planning effort, one of our biggest concerns is the need for certainty. We want to be comfortable that after we have invested the time and resources in a comprehensive study and plan, that we will be able to rely upon it well into the future, without constantly changing conditions and uncertainty created by competing demands elsewhere in the basin, on adjacent public lands, and public land and water use policies including threatened and endangered species.

WAYNE MARCHANT

CRD-LAS VEGAS, USEPA
LAS VEGAS, NV

In general, I believe you have captured the most nettlesome issues very well. Reaching consensus on just this list of formidable topics would be a challenge worthy of the diplomat (Assistant Secretary Holbrook) who seems to have at least achieved a temporary peace in Bosnia-Herzegovina. To find solutions to the problems inherent in these issue statements is even more formidable.

RICHARD MARZOLF

U.S. GEOLOGICAL SURVEY, WATER RESOURCES
BOULDER, CO

Institutional framework of basin management, is of highest priority. Issues which involve economic aspects of irrigation (as land use) and hydropower marketing (a strong driver of population growth and land use) are also important. The more I think about this the less I am able to separate these issues into independent categories. That's instructive, however, because it means that the problem's complexity is probably real. It is all underpinned by western water law, and we should deal with these as interacting issues and not as separate ones. These four groups of issues are crucial to water resource development, management, and use. The priority of issues in the remainder of your list seem far subordinate to these; that is, if society doesn't improve in the big four, the rest won't matter.

Each [of the other items on your list] has great importance in its own right. No. 6, Native American water rights; No. 7, Mexican issues, and No. 5, public involvement are basically legal issues, different subsets of the larger legal picture.

Water efficiency and coordination between managers and users are immensely important issues involving public education. Education will be a central element of any change in a societal approach to water resource use.

I considered your list for omissions too. One glared.

Knowledge/Education issues

- Science applied to water quality issues, mediation of water quality by natural processes
- Areas of research for developing water resource management
- Mechanisms of technology transfer and public education
- Integration of culture, economics, law, history, and science into water resource decisions
- Legal research required to modernize appropriative water rights.

PHIL MUTZ

NEW MEXICO INTERSTATE STREAM COMMISSION
SANTA FE, NM

Experience indicates that critical management issues will likely change or new, more critical issues will emerge over the next few years.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

DAVID OSIAS

ALLEN, MATKINS, LECK, GAMBLE & MALLORY
SAN DIEGO, CA

The existing institutional framework needs to be modified to enable the maximum utilization of the finite water resource to proceed on a timetable and through a process that is less court-focused and glacial in time.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

MET views this as one of top three with hydropower and water efficiency issues. Looking to regional solutions to form decision making bodies. This is key to problems below. We won't find solutions if we have to resort to litigation.

Issue is the need to develop framework for Law of the River that would allow some changes to occur; that needed modifications to law can occur, e.g. allow banking in reservoirs to occur. Could be legislation, agreement, etc.

LORI POTTER

SIERRA CLUB LEGAL DEFENSE FUND
DENVER, CO

An equally important issue involves marketing, endangered species, economics, and the future direction of the Bureau. How do we meet increasing demands? The Animas/La Plata project will surely be Reclamation's last big project, certainly on Colorado River. If completed, this project would remove 200,000 acre-feet of water out of river. This is a large, costly depletion and involves many other issues listed here.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

There is a need to identify and balance the many conflicting public values.

- Native and non-native species
- Recreation vs. power
- Recreational uses of fishermen and jet skis

There is need for institutions for basin-wide management.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

Cannot eliminate litigation. When you deal with legal boundaries, you have litigation.

State issues should be resolved within the state, e.g., Nevada and Southern California.

Legally you can't look with an interbasin perspective. They are two separate entities.

Need to take an ecosystem view and add cumulative impacts of all kinds of development. We have become used to how the river is used and treated. We need a clearer picture painted with minute detail, e.g., illegal use, etc. Look at the real condition of the river.

Taking a drainage type philosophy, who will decide what the parameters are, who will be the judge, I'm the affected party. I can't take the steps I see necessary for quality because they are against the law.

Models and predictions say there will be diminished runoff supply. An issue should be that we need to plan for these changes, regardless of whether it happens. There needs to be a system in place.

How do you fund other than consumptive uses?

Is the status quo on the river providing the largest benefit to the largest group?

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

How do we pull tributary issues into mainstream management processes. They are better addressed in conjunction.

Finding implementable, agreeable funding in general is an across the board concern.

Disagrees with concern over short planning time. Most present planning is long-term (50 years).

BILL PERSONS

AZ GAME AND FISH DEPARTMENT
PHOENIX, AZ

I assume this is where an Ecosystem Management or Adaptive Management group will become involved in managing the Colorado Basin (this should really include both upper and lower basin states to encompass the larger scale ecosystem). Again, my experience as a resource researcher/manager may bias my outlook.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Bigger issue is not conflicts between components of Law of the River, but conflicts in interpretation of the components.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

Changing uses in the basin are very significant. If one could couple a better understanding of the changing uses, with new processes and approaches to resolve roadblocks to better uses, etc.

It's too easy to stop things from happening in the basin, there has to be a better way.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Plan, don't accommodate.

The larger picture is often ignored, just because local people want a project doesn't make that a good water project.. People in New Jersey should not subsidize the southwest.

A community should never overplan its resource base. Recognition of carrying capacity.

There is a disconnect between allocation of resources and then shifting of cost. Shifting of costs should be considered in cost benefits of any new project.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

Combining the basins has real problems. Upper and Lower basins were formed to allow upper basin to develop at a slower rate. If we lose the dividing line, we'll have lost chance to develop at a slower rate.

Water management needs to be a cooperative effort, however the Law of the River is antagonistic. How are you going to pull off a cooperative paradigm when it's not cooperative?

There is a lack of flexibility in the system. Look at adjudications within the different states—there are conditional water rights in New Mexico that are 60 years old. No one can touch the water. The Bureau is the villain in one case, water users in another.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

The Bureau of Reclamation meeting is trying to develop a more sophisticated way of routing water. Problems now are due in a big way to how the water is monitored and routed. There is a need for more sophisticated monitoring and modeling to mimic a more natural process.

Trend regarding consumption and use - consumptive to non-consumptive and rural to urban. Where water is used and how it's valued.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

Lack of information, in old Virgin River pictures, the channel was much wider, the river was much more braided and vegetation has come in —tamarisk. Regardless, it is changing, the information isn't available for what happens to bedload, etc. The people who want to know will have to pay for it if they want to know.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

An alarming trend is the loss of gauging systems. We need to monitor water and sediment throughout the basin in order to have effective monitoring. All the great ideas in the world are no good if you can't predict what will happen on the ground.

I'd like to see a list of trends in management of river management, world wide. I think there is a worldwide trend developing and it needs to be identified. Good to put this river system in perspective with other rivers.

One benefit of this project could be a common understanding of what impacts are and why they are important to consider. That should be an outcome.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Of general concern are the impacts of current legislation and regulations on every issue and the changing political climate in general.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

What does conflicts between components of the Law of the River mean? There are two forms of Law of the River; with and without Endangered Species Act. Some don't characterize as broad a scope for the law of the river. This is an issue of declining importance, because there is understanding being reached.

Long-range planning is not realistic, except in CA. There is long planning period, but the CA model is being recognized. Long-range planning is not the best way and the view is getting shorter.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

Certainty is of great concern to many parties. In order for long-term planning to be effective, there must be a level of confidence that agreements will hold.

On the Virgin River, one obstacle to comprehensive planning is a lack certainty that agreements made will hold up over the long-term.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

There is concern about possible reallocation as a result of this process or others.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

The overall basin use versus the sub-basin use, like Virgin River vs. the Colorado River use. People who want water in the Colorado versus in the sub-basins.

LEW STEIGER

GRAND CANYON RIVER GUIDES

FLAGSTAFF, AZ

Most critical - without a better mechanism for solving disputes, we'll never get through the hard questions facing water management in the next century.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

The issue of resolving apportionment is deemphasized and it should be the number one issue.

These issues can not be divorced from land use and water shed issues. These need to be emphasized.

JAMES B. RHODESYUMA MESA IRRIGATION AND DRAINAGE DISTRICT
YUMA, AZ

Obviously, recent issues in the Colorado River Basin indicate the changing nature of the needs of the Basin. We believe that there is general agreement that the overall management mechanisms are satisfactory. We also believe that the Law of the River still works and we are not particularly aware of significant conflicts within the Law and related rules and regulations.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

JOHN RITENOUR

GLEN CANYON NRA
PAGE, AZ

Recreation values beyond river running, lake associated recreation, fishing, commercial use such as concessions, etc.

Having just come through a drought, an analysis of impacts could help predict future consequences. The best laid plans will be affected by future droughts and planning should use drought conditions as a parameter, not normal precipitation.

JANET ROGERS

COLORADO RIVER COMMISSION OF NV
LAS VEGAS, NV

Add a new bullet reading
- Need mechanisms to implement water marketing for long term transfers of water within the Colorado River Basin.

ROBERT SCHEMP

METROPOLITAN WATER DISTRICT OF SOUTHERN CA
LOS ANGELES, CA

This topic is of great interest to Metropolitan. The entities which have participated in attempting to develop the regional solution most recently include the states of California and Nevada and water agencies in those states which hold contracts with the Secretary of the Interior, Indian tribes with present perfected rights to Colorado River water, and the Department of the Interior. Mr Abe Sofaer has been facilitating the process. The State of Arizona and agencies in Arizona which hold water delivery contracts had participated in previous discussions under the auspices of a Lower Basin Technical Committee which explored a number of regional solution elements. The basin-wide dispute resolution forum suggested in the first bullet is a variation of one of the elements being considered by the entities.

BILL SWAN

DOI, OFFICE OF THE SOLICITOR
PHOENIX, AZ

Need, below Hoover Dam, a land use plan/comprehensive study. There are many managing agencies + private land = a hodgepodge. Lots of land managers between Hoover and Powell..

JOHN SHIELDS

STATE ENGINEER'S OFFICE
CHEYENNE, WY

The first bullet under 10 (Federal versus State, Tribal, and Local roles in management) certainly also applies, and in my view, is a critical component part of Issue No. 3 Issues that involve to institutional framework. I strongly feel it should be treated as a part of Issue No. 3.

The Bureau of Reclamation is actively involved in the process (ongoing) that is expanding/pushing the envelope with regard to the institutional framework in the Lower Colorado Region. This has both positive as well as negative effects and is bringing issues to bear that have never been addressed in the past. I feel that the statement management

framework fails to adequately respond to changing demands and values is prejudging your study before it has been done (and certainly is a matter of opinion). Preservation of the Law of the River, and reliance on and support of the Colorado River Compacts is not necessarily bad.

DUANE L. SHROUFE

ARIZONA DEPT. OF GAME AND FISH
PHOENIX, AZ

Issues that involve the institutional framework of basin management are clearly important from the perspective of conserving wildlife and wildlife habitat. However, in addressing these kinds of issues it is critical to recognize the authorities vested at the State and Local levels. Basin-wide or Sub-Basin-wide approaches that address important wildlife resources on a landscape scale clearly point out feasible and achievable strategies for conservation. They cannot, however, result in the abrogation of authority vested in the states. Ultimately, as with environmental protection and coordination between managers, they must develop consensus based approaches.

RONALD THOMPSON

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT
ST. GEORGE, UT

Long-term water use planning:

- Determining future needs
- Pursuing projects to meet those needs
- Assurance of water supply
- Assurance of in-stream flows
- Water conservation

River management:

- Floodplain management
- Habitat conservation and management
- Channel maintenance
- Bedload transport and discharge

KENT TURNER

LAKE MEAD NRA
BOULDER CITY, NV

To accomplish integration of the operational criteria with resource requirements, it seems you need an institutional framework for basin management and conflict resolution and forum for rights adjudication.

RICHARD WAHL

UNIVERSITY OF COLORADO
BOULDER, CO

I think it will be increasingly important for institutions in the basin to accommodate flexibility in water use, whether that be in response to environmental concerns, increased population pressure, drought, climatic change, or from other sources. Flexible institutions need to be developed to consider, develop rules for, simulate, and implement water transfers and water banking, both within states and between states.

ANDY WALCH

DOJ, GENERAL LITIGATION
DENVER, CO

Subsumes environmental protection issues (#8).
Global Issues

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

HAL SIMPSON

DIVISION OF WATER RESOURCES
DENVER, CO

Long term drought response.
Improving data quality.

ROBERT WALSH

BUREAU OF RECLAMATION; LOWER COLORADO REGION
BOULDER CITY, NV

From my perspective, most of the other issues (hydro pricing, irrigation economics, population growth, etc.) come under this umbrella. It is necessary to look at all these other issues, see what is likely to occur, of maybe what needs to occur, then develop an institutional framework that can be responsive to the other issues in whole or in part to best (efficiency, cost-effectively, and in public interest) put needs in next few decades.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Public involvement is becoming a bigger requirement and demand. There really isn't a mechanism for it other than NEPA. Colorado River Workgroup is this kind of thing.

Need for effective processes for broad public involvement or ways of involving the public in decision making processes.

Demand for public inclusion in decisions on policy regarding water and power delivery contracts.

STEVE KREST

FARMINGTON, NM

Public involvement, while more time consuming, allows new ideas to enter the decision arena.

SCOTT B. MCELROY

GREENE, MEYER, & MCELROY
BOULDER, CO

There clearly is a need for additional public involvement in many of the decision making processes. The question is how to facilitate such involvement in a way that is affordable to tribes, small irrigation districts, and grass roots environmental organizations.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

There is a need to clarify the "terms of engagement" for this project so that people understand how this project relates to their day to day activities. This is a key ingredient in all stakeholder processes. There is a need to clearly define what is expected of people in the way of participation or contribution before they come to the table.

Doing things differently with water than we've done in the past, e.g., Coachella using Colorado River water to recharge an overdrafted aquifer. How do we address that to be sure stakeholders are involved? It may make sense to some people but it may not to others.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Issue of public participation involves new rules and regulations for river management.

The issue of expanded roles for public input to address environmental concerns.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

That should be the definition of stakeholder. Those who pay have a stake.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

Future approaches to the management issues should be based on open discussions and consensus by a variety of interests.

REGIONAL STAKEHOLDER MEETING

YUMA, AZ

Overall impression is there should be separation within issue involving public involvement (#5). Isn't the appropriate public already involved. There's too much permissiveness in letting anybody get involved. I wouldn't want to hang it all on environmentalists, but they're disruptive and stir things up. Do we need so much public input? Everybody doesn't have an equal say in this.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Add: Implications of public trust doctrine. To what extent is there a public out there that water needs to be managed for and who is the public? How do we know when we have adequate public involvement to protect the public?

Huge one with managers and decision makers.

PHILLIP WOODS

EPA, REGION 9
SAN FRANCISCO, CA

No specific comment

DUANE L. SHROUFE

AZ GAME AND FISH DEPARTMENT
PHOENIX, AZ

Issues involving the demand for public involvement is decision processes are clearly priorities reflected in my prioritization. Public participation in the NEPA process is essential, and is crucial to the spirit of the law. It seems plausible that other federal laws, perhaps the Endangered Species Act, may soon focus more on the NEPA model to include broader public participation.

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

RODNEY SMITH

STRATECON

CLAREMONT, CA

Reforming the Decision-Making Process for Federal Policy- Mechanisms must be designed that provide for meaningful input from both the public and existing entitlement holders. In the Three State Process, for example, recreational, environmental, and power interests as well as entitlement holders were kept out-of-the-loop for many months as federal and state-appointed representatives explored ways to change the Law of the River, as well as reservoir operations without any analysis of the consequences of the proposed actions on stakeholders. At least for the Lower Basin, the mechanisms for decision-making lay in disarray.

SAM SPILLER

US FISH AND WILDLIFE SERVICE

PHOENIX, AZ

Issues involving the demand for public involvement in decision processes and Issues involving coordination between managers and users are closely related. More communication and similar processes in the upper and lower basin are needed, even within the same agency. Involving the public would have great value in getting agencies and users working together for an overall ecosystem approach to river management.

ROBERT WALSH

BUREAU OF RECLAMATION; LOWER COLORADO REGION

BOULDER CITY, NV

Without public involvement, policies and decisions made will not be universally understood or accepted, and we'll maintain status quo, each interest protecting and fighting for its own turf instead of working together to meet all interests as much as possible.

E. RICHARD HART

INSTITUTE OF THE NORTH AMERICAN WEST SEATTLE, WA

Until Native American rights have been either negotiated or litigated, broad planning cannot be concluded. Since neither the Congress of the current Administration are now supporting the costs of a negotiated settlement, litigation will, or could, go on for years.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

3d bullet refers to fact that Indians want a spot at the table, and it's a matter of integrating their culture into the discussions, e.g. this type of meeting may not be what they like to attend.

The terms "economic" and "cultural" have tremendous importance in this issue.

DAVID HARRISON

MOSES, WITTEMYER, HARRISON, AND WOODRUFF, P.C. BOULDER, CO

No specific comment

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Effects of North American Free Trade Agreement on Mexican agriculture and on water reaching the Gulf.

North American Free Trade Agree has made agriculture in Mexico more visible, so they will want their water quality and quantity, every drop.

How do we share resources with Mexico?

All along border we find shared resources. How do we manage that, e.g. delta, or potable water supply?

THOMAS HAVENS

AMERICAN WATER RESOURCES

COLORADO SPRINGS, CO

Must face up to Mexico sooner than later. US/Mexico future will continue to grow in many ways. Obvious gateway to South America makes this country strategic to vision of free trade with all South America, clearly economic opportunity, environmental loss is issue.

DAVID OSIAS

ALLEN, MATKINS, LECK, GAMBLE & MALLORY

SAN DIEGO, CA

To create the platform for maximum utilization of the finite water resource and to be able to proceed on a timetable and through a process that is less court-focused and glacial in time, uncertainties regarding Native American and Mexico impacts on future long term water supplies need to be promptly resolved.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Implications of irrigation water management in Mexico. The efficiency of their irrigation delivery systems, and the effect on future water supply.

Lack of coordination with Mexico's future demands. I'm referring to lower level coordination. We don't have a clue what their doing.

LOUIS SORENSEN

CITY OF KINGMAN

KINGMAN, AZ

Has any consideration been given to the issue of climate alterations -ie cloud seeding, particularly in the upper basin. In the event that there is an extended drought in the upper basin states when the snow pack is so important- perhaps the lower basin states might have to participate in climate altering activities, such as cloud seeding - to replenish the snowpack.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

We conceptually understand that there should be integration at every level. In reality, everyone has their own assignments and there just isn't overlap. We can't coordinate with Fish and Wildlife Service on a project basis, much less on a basin basis. The theme is what's missing that requires this coordinated approach. It's revolutionary

ISSUES THAT INVOLVE THE INSTITUTIONAL FRAMEWORK OF BASIN MANAGEMENT

to get rid of state, federal, local approach and replace it with ecosystem approach. But the revolution is now going the other way.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Issue of law enforcement to protect resources; how to address it. Could expand that to Coast Guard in Grand Canyon, etc. Jurisdictions are also an issue.

Issue of forecasting and issues surrounding that e.g., droughts, future power supply needs, etc.

J.C. LATHAM

ARIZONA STATE LAND DEPARTMENT

PHOENIX, AZ

It is of extreme importance that there be better coordination between all agencies either involved with the Colorado or control lands bordering the river.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

While it's true that the larger the geographical area you look at the better the solutions, those solutions become more unmanageable. There is no mechanism for comprehensive management. We have a need for local solutions based on regional perspective.

Also, there is a lack of standardized methods for science.

Separate science from managing at the same time. Don't have scientists make policy decisions.

Glen Canyon Dam bypasses water to benefit downstream resources.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Better communication between agencies and users. Water right owners want to be consulted with, not told what to do.

DUANE L. SHROUFE

AZ GAME AND FISH DEPARTMENT

PHOENIX, AZ

Issues involving coordination between managers and users fits well within the Partnership. The consensus based approach to conserving and utilizing resources must be sensitive and responsive to the needs of natural resource users of all kinds - water users, power users, sports fishermen, recreational boaters, tribal economic development, non-consumptive users, and the public in general. Those of us with management authorities must, within the bounds of applicable State and Federal law, respond to the public trust vested in each of us.

DONALD K. FREVERT / CRAIG PHILLIPS

BUREAU OF RECLAMATION

DENVER, CO

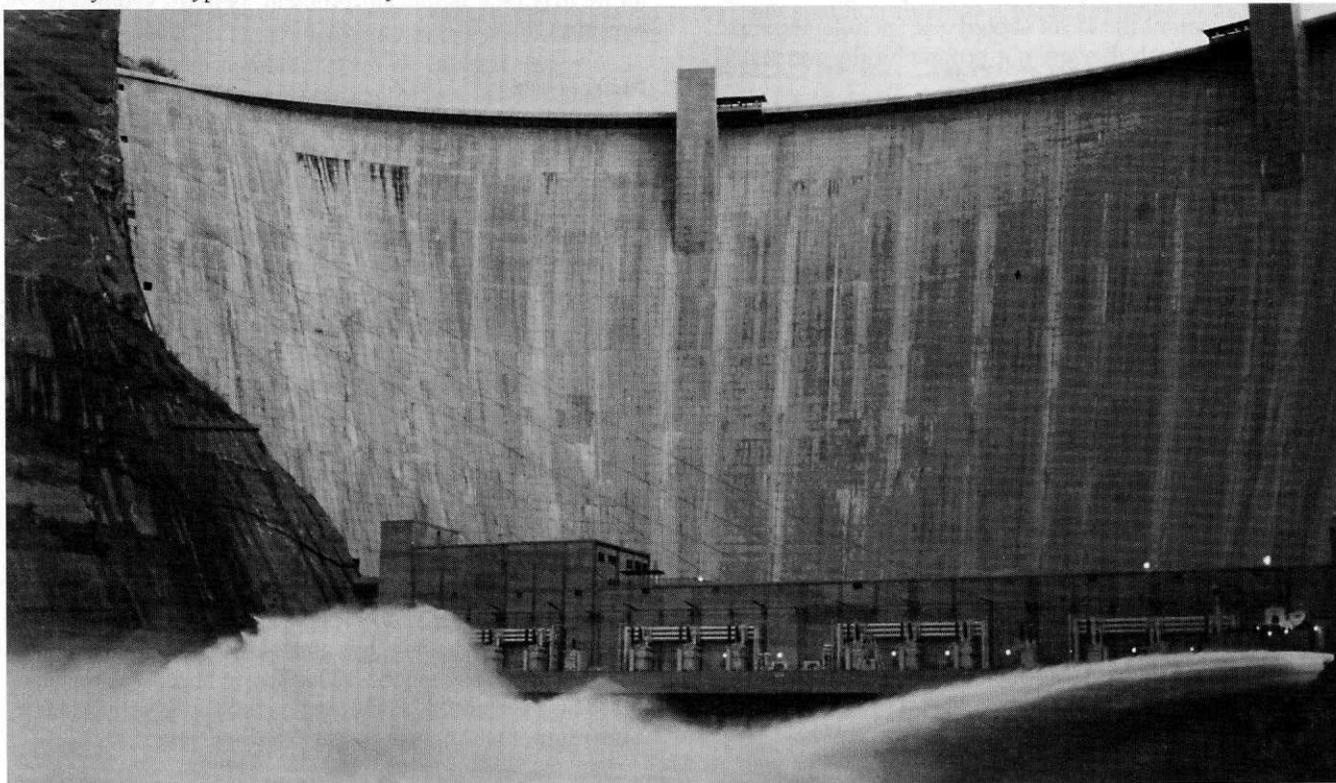
No specific comment

DAVID LUTTRELL

LINCOLN COUNTY POWER

PIOCHE, NV

No specific comment



ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

REGIONAL STAKEHOLDER MEETING

YUMA, AZ

Navigation and flood control issues are not here. These are two primary purposes for the management of the river. These are serious issues that need to be looked at.

Flood control.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Protection for cultural resources.

All these are tied into cultural resources. Native Americans will wake up and press the laws that are for their benefit. Will see more of that in the short term.

New player coming to table with different cultural bases. That will be problematic. We have to make decisions in different ways.

What is the future of Delta?

Problem of sediment accumulation below Gila confluence.

Salinity, quantity, and sediment. Sediment is becoming huge issue because of floods, etc. What is the solution?

Restoration of drainage as a river in Mexico. Will it happen? Managers will respond how? As Mexico becomes more educated, they will have larger voice.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Quality and quantity of water from Mexico is an issue as well.

Any discussion of the Delta should also include Mexicali valley even though they are not geographically connected.

Coordination with Mexico in endangered species recovery efforts.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

Salinity is a basin-wide problem.

The Santa Cruz slough is an issue. What happens if the Bureau finds the funding to actually run the desalting plant?

Recreation deserves to be a separate topic.

PETER BUTLER

FRIENDS OF THE ANIMAS RIVER

DURANGO, CO

No specific comment

DAVID HARRISON

MOSES, WITTEMYER, HARRISON, AND WOODRUFF, P.C.

BOULDER, CO

No specific comment

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Mexico is getting the quantity they were promised, the issue is quality. The issue for salinity is how it's managed in the US and the cost.

If the delta ecosystem comes to the public fore, then the issue of endangered species and environmental protection in Mexico is high on the list. If it doesn't, it's not.

The issue is deliveries to Mexico in excess of treaty agreements. This is part of endangered species problem involving the creation of new wetland during in-operation of the Yuma Desalting Plant.

DUANE L. SHROUFE

AZ GAME AND FISH DEPARTMENT

PHOENIX, AZ

Issues involving Mexico are clearly outside the authority of this agency. We do recognize that the status of wildlife resources in Mexico can have an affect on conservation and compliance issues in the United States and in Arizona. Recognizing that the conservation status of some species, and potentially the recovery and de-listing of some species, may be heavily influenced by events and conservation actions in Mexico. In turn, assistance that can be rendered to Mexican authorities with regard to conservation of wildlife across the border can have positive effects in Arizona and reduce the regulatory burden on resource managers and users in Arizona.

ANDY WALCH

DOJ, GENERAL LITIGATION

DENVER, CO

Treaty compliance with Mexico for water quality in the future may be a significant problem, perhaps avoided by requiring more in-stream flow uses.

PHIL MUTZ

NEW MEXICO INTERSTATE STREAM COMMISSION

SANTA FE, NM

No specific comment

BUREAU OF RECLAMATION MEETING

DENVER, CO

Need to address recreation more plainly. Increasing demands on resources from recreation.

How much water do you release for all the new demands, including recreation.

D. LARRY ANDERSON

DEPT. OF NATURAL RESOURCES, DIV. OF WATER RESOURCES

SALT LAKE CITY, UT

The importance of non-consumptive water uses (e.g.; recreation, endangered species, wetlands, aesthetics) appears to be increasing, but assessments of actual value may be unduly influenced by legislative and regulatory factors. The issue could be clarified significantly with better estimation of willingness to pay for these values.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

JIM BROOKS

NEW MEXICO FISHERY RESOURCES OFFICE
ALBUQUERQUE, NM

Overall (ecosystem) perspective of resource held with respect to water management activities. You can't expect to be able to use water if you don't manage it properly and take care of the river.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Recreational demand for rivers are making them overcrowded

Salinity is a problem, especially high in the basin. What institution handles salinity?

JIM BURDICK

CHURCH AND DWIGHT CO., INC.
GREEN RIVER, WY

Similar to hydropower issues, a balance must be struck between environmental concerns and needs of the population - especially lower basin urban areas - will become very critical. The population needs industry a whole lot more than they normally realize to provide the life style they enjoy. I see no balance toward industrial needs in this whole study.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Need to organize environmental protection efforts into an organized comprehensive scheme for the entire basin.

Uncoordinated efforts ignoring other efforts is a hindrance. As dollars go away, there must be increased coordination to get things done.

Endangered species- Do we have any information from which to base decisions on and are we using it. Are people making opinions based on personal beliefs, is collected data used in the most effective manner? Issue of including science effectively in all decision making. How do we get the information used in decisions?

How can you tell if there is success in endangered species recovery efforts, and do agencies care?

Water quality/salinity.

Issue of filling of Lake Powell with sediment. Estimates vary widely, maybe an educational issue. But sedimentation is an issue. Lake Mead and Powell don't have any facilities to handle sediment. In a couple of generations, the sites are not really useful anymore.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Babbitt brought new scientific bureau, is there a place for a new bureau with a whole new mission, to bring people together to find a solution in a non-confrontational kind of way? Bureau can't get beyond its own parochial interests, perhaps no agency can get beyond itself.

We're inhibited by science in our efforts because we don't have it.

Endangered species recovery efforts and the compartmentalizing of state and fed efforts.

There is no strong statement of relative water quality e.g. bringing in wastewater. What are options in terms of reuse. Can you swap waters? If you try, you butt up against federal laws.

Endangered species, Sec. 7 proceedings. How are these to be included in lower Colorado River operations? What about the effects of operations of dams on those species.

Water development strategies must take Endangered Species Act into account.

Questions of science and technology?

We're not making choices on what parts of river should be saved and what part should just be a canal. Can't save it all with available funding. Don't waste money on lower priority areas, get the most bang for your buck. Find the areas that should be saved and put the money from the other areas there. Priorities are already used by Fish and Wildlife Service in e.g. restoring backwaters. Helps construction areas and wildlife areas out.

BILL BURKE

LAKE MEAD NRA
BOULDER CITY, NV

Taking water from natural flow systems impacts natural resources. To what degree can we allow this to happen? Need science to help guide water use management that will not significantly impact natural riparian communities.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

Endangered Species Act as a ghost mechanism for resource prioritization. It's not meant to be that, but it often acts in just that way.

There are missing issues of water quality other than salinity, e.g. from irrigation or oil and gas development.

"Native and non-native" is too broad. Perhaps this refers to native and game fish, but also needs to speak of exotic plants.

Endangered species and tribal issues are not separate, they are interrelated, especially in San Juan region.

ELIZABETH GARDENER

DENVER WATER
DENVER, CO

Federal law and its interpretation will impact us greatly.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Do environmental laws impede environmental protection? Some are so inflexible they don't allow resource managers to take actions. Or sometimes it's the way the law is implemented. Or, often a lack of dynamics within managing agencies.

Need for flexibility and adaptability in managing agencies. But also we need recognition by outsiders, e.g., environmental groups, that there needs to be flexibility.

Also include impacts on water delivery from resource protection.

BONNIE COLBY

DEPT. OF AGRICULTURAL ECONOMICS UNIVERSITY OF ARIZONA

TUCSON, AZ

Issues of population growth and development could be included under environmental protection.

THOMAS CONTRERAS

PINE VALLEY DISTRICT, DIXIE NATIONAL FOREST ST. GEORGE, UT

Analysis and understanding between ground water and surface water. Amount, quality, and infrastructure (geomorphology) is unknown or very little known. How can they be planned and managed alternatively.

Maintaining in-stream flows to perpetuate healthy renewable natural ecosystems as it relates to National Forests BLM lands and National Parks systems.

WAYNE COOK

UPPER COLORADO RIVER COMMISSION SALT LAKE CITY, UT

Impacts of Critical Habitat Designation on (1) Colorado River System Reservoir operations (2) Site-specific impacts on existing and future projects (3) Recovery efforts and their success in meeting future Section 7 Consultation needs (4) Potential conflict between protection/recovery and continued use of State water entitlements.

MIKE COWAN

WESTERN AREA POWER ADMINISTRATION GOLDEN, CO

Public and private incentives to conserve and preserve environmental resources.

NORMA COX

LEAGUE OF WOMEN VOTERS LAS VEGAS, NV

It appears to me that you have developed a comprehensive list which addresses most of the issues which would come to mind. However, I would like to suggest that some time be spent on addressing ways to enhance precipitation in the Basin. There is growing concern regarding the desertification process taking place in the United States which results from changing agricultural methods, mining of ground water supplies and flood control projects which are draining river basins. The loss of natural vegetation will effect precipitation

if the current trend is not reversed. Although we may not have exact scientific knowledge about all the relationship involved, we should begin to look for ways to increase precipitation such as harvesting storm waters to recharge groundwater aquifers instead of shipping out flood waters without using the water. Banking river water in groundwater basins can help in averting the loss of a valuable resource, the groundwater basin itself, as well as acting to minimize the loss of vegetation due to groundwater draw down.

JIM CURRAN

NEVADA DIVISION OF WILDLIFE RENO, NV

The emphasis and power of the environmental laws are having or will have a major impact on all users of Colorado River water. The public is generally in support of the environmental laws versus power, water, etc. unless they realize the impact of them.

JIM DEACON

ENVIRONMENTAL STUDIES, UNLV LAS VEGAS, NV

Environmental issues also lend themselves to comprehensive, integrated long term approaches to Basin problems. Systems approaches to Basin issues would be fostered by a focus on environmental issues.

JAMES DECKER

ENVIRONMENTAL EDUCATION DURANGO, CO

Environmental protection works best with ecosystem or river basin management. Difficulties are in the institutional framework of basin management. Problem is to convince power brokers of environmental necessities. At present 2% of economy uses 90% of water. Tail wags dog.

RICK GOLD

BUREAU OF RECLAMATION SALT LAKE CITY, UT

The changing values have and will continue to impact resource issues. What effective ways can basin managers understand basin values in real time? How can management strategies be designed to allow for and react to changing values in the future (e.g. the Nov. 1994 election).

JOHN HAMILL

COLORADO RIVER RECOVERY PROGRAM, USFWS DENVER, CO

Conflicts between management of native vs. non-native species.

Native fish of the Colorado River basin have suffered dramatic declines over the past 75 years. 8 of 12 native fishes in the UCRB are listed or candidates for listing. Most of the Virgin River fishes are listed. Most, if not all, of the native fishes of Arizona are facing extinction. Protection and recovery of these fishes under the ESA will significantly impact water use and management and sport fish management in the basin. Existing recovery programs in the San Juan and Upper Basin have and will be significant factors. Funding for these recovery programs will be critical if hope to avoid major confrontations in the future.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

E. RICHARD HART

INSTITUTE OF THE NORTH AMERICAN WEST
SEATTLE, WA

It's time to foster in cultural and natural resource protection in the equation. Money should not drive the whole process.

THOMAS HAVENS

AMERICAN WATER RESOURCES
COLORADO SPRINGS, CO

Someone must think for and protect the Rivers' right to survive. High public support to maintain natural river systems will only grow. Its a moral issue and will be powerful in local politics.

STEVE KREST

FARMINGTON, NM

Protection of our resources and environment for future generations should be our highest priority! Too long this issue has been secondary to development. The species remaining must be protected from further degradation.

TOM LINCOLN

BUREAU OF RECLAMATION, ARIZONA PROJECTS
OFFICE
PHOENIX, AZ

Historic perspective, human response to natural situations, cultural behavior, etc. all provide important clues on how the river might be better managed in the future. This topic could benefit from inclusion of impact issues relative to the human environment. How do we protect past human imprint? How do we better protect today's cultural systems and communities? How do we orchestrate better protective measures for the future? Integration of traditional cultural properties into management equation is important and should be an equal priority with traditional non-human species specific considerations.

DOUG LOFSTEDT

EPA-SALINITY
DENVER, CO

Integration of reservoir and facilities operating criteria with threatened and endangered species requirements.

Potential magnitude and duration of exceedences of salinity numeric criteria as federal salinity funding shrinks

Increasing demands for in-stream flows for public values/benefits.

Priority of federal funding for salinity control.

Rangeland management standards to protect riparian areas and stream health/water quality.

W.B. LORD

BOULDER, CO

Environmental protection issues are high priority because the eighteenth and early nineteenth century institutions which now dictate water management patterns emphasized and promoted consumptive water uses, to the almost total disregard of environmental quality in any of its many dimensions. The resulting severe imbalance must be addressed.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

From Boulder Basin downstream there is a serious and growing conflict between recreation and wildlife.

Fragmentation of jurisdiction and management of tributaries is a concern. For example, some portions may be managed as Wild and Scenic restricting management options for other sections.

There is the concern over extensive loss of riparian habitat, especially along lower river.

Water quality, in addition to salinity, is of great concern.

There is a need for prioritizing resource areas. Some sections of the river are essentially canals while others have great potential for restoration. With limited funds it would be advantageous to identify and prioritize.

Endangered species, especially fish, and efforts for their recovery are serious issues.

There is a need to integrate more effectively endangered species recovery efforts with the management objectives of game fisheries.

There needs to be better coordination between Federal and State agencies in resource management.

Sedimentation is a concern within some watershed. Coordinated land management practices are important in addressing the issues.

Remaining riparian pockets are of increasing importance to neo-tropical birds.

Unresolved federal Reserve Rights is an issue, especially in the Virgin River.

Water quality regulations, the Clean Water Act, and how EPA applies them to municipalities is a concern.

A recent EPA emphasis on quantity of water as well as quality

The need for better communication and coordination in endangered species recovery efforts is an issue.

The need to balance single species management (ESA) with other resources is an issue.

Wildlife, water quality, and other environmental concerns rise rapidly in the tributaries as water diversions reduce the amount of water in the stream.

Agricultural runoff is a water quality issue.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

PAM HYDE

AMERICAN RIVERS
PHOENIX, AZ

The environmental bill has come due for all the past manipulations and perturbations of the river system - in fact, it may be overdue. We need to start factoring in environmental costs for actions - past, present, future - on or involving the river system, and giving everyone partial responsibility for meeting those costs. Environmental protection may be the arena in which we need to be the most creative in finding solutions, since the institutional framework heavily favors existing rights and uses. But if we allow a default on the environmental bill now due, everyone loses.

TODD MACFARLANE

KANE COUNTY WATER CONSERVANCY DISTRICT
KANAB, UT

Resolution of federal reserve water rights is also a very important concern to us. The only place that issue is expressly addressed is under Item No. 6, involving Native American water rights. It is our position that the issue needs much broader treatment. In our particular situation, tribal water rights do not create as much concern as federal reserve water rights for other uses, including in-stream flow requirements in national parks, and other federal lands, including Forest Service and BLM.

In our particular situation, one of our most important concerns is watershed conditions and treatment, particularly on public lands in tributary areas. Although that issue is at least implicit under the Item No. 8 subheading coordination of water management with adjacent land management, we do not feel that category gives that issue the priority it deserves, and its characterization as an environmental protection issue, may not adequately reflect its full import. From our perspective it needs much more explicit and thorough treatment.

G. RICHARD MARZOLF

U.S.G.S., WATER RESOURCES
BOULDER, CO

Environmental protection issues. It's hard for me to say anything both brief and useful. To me this is a philosophically serious set of issues that underpins all decisions about the human condition. That's not captured in the bullets associated with your list and it is not uniquely a water resource problem set. Presently the rate of growth of the human population is of major concern for most environmental protection problems. Unfortunately these have become so politically charged and polarized that I cannot see them superimposed upon a discussion of water issues in the west without engendering either great misunderstanding and irritation or being trivialized. I suspect that many of these issues will emerge in discussion, but to label them environmental at this time is to light a fuse.

LARRY MACDONNELL

SUSTAINABILITY INITIATIVES
BOULDER, CO

Integrating ecological values of the Colorado River into the management and decision making processes.

JERRY MASON

UTAH WILDLIFE FEDERATION
BRIGHAM CITY, UT

Because Utah is lacking in land use planning, and water planning can't be done without the land, the environmental risks are significant.

DANIEL MCARTHUR

CITY OF ST. GEORGE
ST. GEORGE, UT

The Endangered Species Act is currently up for reconsideration by the legislature. We support the changes being proposed and feel that this act in the past has caused undue concerns about species that are not endangered. This act continues to cause the citizens in our community to be very concerned about the resources being spent to protect these certain species.

WAYNE MARCHANT

CRD-LAS VEGAS, USEPA
LAS VEGAS, NV

Environmental protection is a very important issue.

DAVID ONSTAD

LITCHFIELD PARK, AZ

Single purpose environmental programs often destroy several potential benefits of the current controlled river system because all beneficial uses are not allowed to compete equally for the resources that are available. Well-meaning agencies have a tendency to use the dams to control releases to specific criteria to protect one resource and harm or seriously limit the benefits to other resources.

Some programs have required changes in several parameters which don't even have a scientifically possible way of improving the ability of another resource to improve or recover. But the attitude that "something must be done" prevails with harmful effects on other resources while not improving the resource which has the most clout. One agency cannot have veto power over the other interests if meaningful results are expected.

Much progress has been made in getting people who represent the various interests to begin working together as a result of the Glen Canyon environmental studies. This cooperative process should continue in the future.

BILL PERSONS

AZ GAME AND FISH DEPARTMENT
PHOENIX, AZ

Environmental protection issues tie right in with hydropower issues and the institutional framework of management. I would add, in addition to river recreation, reservoir recreation. If we attempt to manage the basin we need to include those interests that use the reservoirs (Lakes Powell, Mead, Havasu, etc.) for recreation.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

We had the most effective salt removal program on the river but we have lost funding.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

LORI POTTER

SIERRA CLUB LEGAL DEFENSE FUND
DENVER, CO

Environmental Protection: What are the impacts and potential benefits of dam reoperation. Every dam has an effect on endangered fish species in the Colorado River. Restoration of aquatic habitats requires that we evaluate impacts to endangered fish. BOR has a schedule for reconsultation beyond the turn of the century, the schedule is subject to debate and discussion. There are other benefits to non-consumptive users (recreation for example) from reoperation of the Colorado's dams.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

Environmental protection is inherent in whole list, can't talk about others without talking about this.

Animas/La Plata project and its potential impact on environment, Native American rights, economics, etc. The project's impact is so large it should be on the list. It's a microcosm of a lot of the other issues, but discussion of specific projects will step all over a lot of other processes.

Polarization of discussion could cost some interest in project. But, complete absence from list implies that it is off limits for discussion.

Tamarisk needs to be mentioned, maybe implied in non-native species bullet. Maybe role of phreatophyte, effects on biodiversity, etc. Ties into earlier comment of riparian issues.

Non-native fish. There is a document in development for regulation of stocking.

Trend toward more natural hydrographs, e.g., annual spiking.

Recognition on rivers that biggest impacts from power and irrigation use are on riparian/floodplain habitats. Biggest trend worldwide is to restore those habitats.

Balancing resource protection and water use. And whether it should be balanced.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

If you are going to demand the data, put your money where your mouth is, it should be a shared thing, not an unfunded mandate.

Quality of water is not listed, having to clean water downstream.

Another issue is the inflexibility of the endangered species act. Some people say the spikefin minnow is in worse shape today than in 1972 because the federal government has not been proactive in involving the local government. They need to make it so local people can buy into it and not get clubbed for it.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

What is the role of science in decision processes.

There is often incomplete science which leads to disruptive changes in operations. Incomplete science creates uncertainty for resource users.

How do we define "best available science" for use in decision-making?

There are ramifications of making too hasty decisions.

We may never have "complete" science. There is a need to determine when science is complete enough.

REGIONAL STAKEHOLDER MEETING

SALT LAKE CITY, UT

Endangered species recovery efforts are clear out of hand. Dams are run to meet the needs of fish and power rates have gone up as a consequence. Ranches have been flooded to create habitat. They're hurting people with endangered species experiments.

Increasing demand caused by population growth is an issue here.

In Utah, increased demand from population growth is not as important an issue as the resolution of tribal water rights.

A big issue is impacts of endangered species programs on other resources, and the difficulty in finding balance with other resources.

Much of this topic relates to coordination between managers and users and the need to let people on ground know of the policies and issues and decisions.

Impacts of water management for natural resources in wetlands.

Salinity belongs under environmental concerns.

Compensation for takings and access to lands and waters for purposes of endangered species are both issues working way through legislation.

An example of recreation impacts on natural resources is jet boats in lower river that do a lot of damage to beaches from wave action, more so than peaking operations.

Salinity program was voluntary for farmers, and that was a concern, but farmers are standing in line to participate and improve their systems.

Loss of peaking power operations have been devastating to power users.

JOHN RITENOUR

GLEN CANYON NRA

PAGE, AZ

Biocontaminants, especially in surface and ground water, may have severe consequences. Also salinity.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

The lack of coordination in endangered species efforts, for example the multi-species RIP in upper basin, and other areas.

Habitat protection vs. species protection

What level of management will be involved in endangered species, heavy handed or simply putting the programs in place.

Impacts on state power allocations (availability) from endangered species recovery efforts.

Recovery efforts affect availability of water, not entitlement.

The issue is not just difficulty in establishing standards but in coming to agreement on goals, etc.

Salinity is also an environmental protection issue. Include selenium, effluent, etc. as well .

HAL SIMPSON

CO DIVISION OF WATER RESOURCES

DENVER, CO

- Funding sources for habitat management and acquisition.
- Prioritization of species recovery.
- Decrease salinity.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Endangered Species-how far should we go with trying to recover species (on and off site)?

Need to include recognized indicator species and the holistic nature of the system.

There is a need information that's consistent, for base-line data everyone can use.

There should be an economic factor incorporated in designating critical habitat.

Endangered Species Act enforcement falls disproportionately on Native Americans.

There must be priorities set in management of native and non-native species.

There is a tendency to poke fun at environmentalists and rush past environmental issues. Then it's too late to come back and recapture what has been destroyed.

JANET ROGERS

COLORADO RIVER COMMISSION OF NEVADA

LAS VEGAS, NV

Nevada, through its participation in the Lower Colorado River Multi-Species Conservation Program, hopes to keep its options flexible under the Federal Endangered Species Act so that existing water and power projects and activities, as well as future opportunities for development, can

continue. The Program and its subsequent implementation will provide an ecosystem-based approach for long-term coordinated compliance with the ESA and establish protection measures for the included species and habitats.

ROBERT SCHEMPMETROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
LOS ANGELES, CA

Metropolitan additionally shares the concerns indicated under issue number 8 (environmental protection issues). The Lower Colorado River is beset by myriad efforts to conserve or recover listed species and sensitive habitats. Concurrent with the Endangered Species Act Section 7 obligation for federal agencies to work to conserve listed species and their habitats, both State and Federal agencies pursue stocking programs for non-native species to enhance recreational opportunities. Programs that should have similar or complementary agendas often compete, or even conflict, with one another for the various limited resources. Additionally, few, if any, of the ongoing conservation efforts (even within the same agency) take the time to coordinate with each other, or become aware of the others' existence. The net effect of this piecemeal approach is an expensive, ineffective, and often contradictory set of regulations and management practices. As an example, the native fish recovery teams for the Colorado squawfish, razorback sucker, humpback chub, and bonytail chub did not identify recovery measures for these fish in the Lower Basin in the recovery plans, because they did not believe that this region could make a meaningful contribution towards the recovery of these fish. Despite this, the U.S. Fish and Wildlife Service designated virtually all of the mainstream Lower Colorado River as critical habitat for these fish, and further developed a draft management plan that proposed the reintroduction of all four of these species. The fundamental problem is the lack of a comprehensive management plan for the Lower Colorado River, that would provide an overall strategy, along with a vehicle for implementation and coordination of conservation efforts, increased cost efficiency, and additional benefits to the sensitive resources of the region.

Metropolitan is also concerned that the Grand Canyon Trust fully recognize the role played by non-indigenous species in the decline of native populations, particularly fish species, and the need to address this issue before meaningful progress can be made towards the recovery of these native species.

DUANE L. SHROUFE

AZ GAME AND FISH DEPT.

PHOENIX, AZ

Environmental Protection Issues are of importance to the mission of the Arizona Game and Fish Commission and Department, by nature of the legislative charge and mission of the Commission and the Department. Clearly, this is our rationale for involvement. Many of the examples that you have cited in this issue area are activities that the Department has been involved with in some fashion. The Department, in conjunction with the Arizona Department of Water Resources, our counter parts from Nevada and California, and the Department of the Interior, has been

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

actively involved in laying the groundwork for a lower basin Species Conservation Program that will address at least some of these issues as they influence sensitive wildlife species and sensitive habitats. I know that you are aware of these efforts, and I hope that you are supportive of them. We do not believe that uses of the Colorado River and development of one set of its natural resources need necessarily preclude the conservation of others. The Partnership that has developed among the Lower Division States with regard to this Program will hopefully set the stage for general recognition of all of the values associated with the resources of the lower Colorado River and a consensus based approach to utilizing and conserving those resources.

BILL SIMON

ANIMAS RIVER STAKEHOLDERS
DURANGO, CO

Water quality issues need to be addressed. eg. Point source effluents containing Nitrogen, phosphorus and organic chemicals; Non-point source contaminants such as heavy metals from mining, agricultural contaminants and riparian and in-stream habitat destruction.

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

The Glen Canyon spike flow will add cost to the average user across basin. He doesn't really realize what the costs to him will be if this becomes an ongoing program.

The final report for this project should include wildlife and not just water. It must look at states rights in regard to wildlife, not just water.

There is concern that system management is so focused on endangered species that other resources are hurt; not just agriculture, but game fish, etc.

Need for balance in management efforts, or dominance of one resource over another.

Wetlands. People are angry about designation of specific wetlands without consideration of historic use. Definitional aspect, how are they defined and managed?

Money is no object in species recovery efforts.

Is science truly being utilized in species recovery projects? True science needs to play a more important role, need unbiased, peer reviewed, standard methods.

How to integrate science effectively and consistently in decision making.

Water quality issues must be addressed. Eutrophication affects available quantities and salinity is a water quality issue.

In water quality, the more water taken out of the river, the worse the problem will be. We need to address water quality; salinity and others problems.

RODNEY SMITH

STRATECON
CLAREMONT, CA

Improving the Capacity to Address Environmental Issues. Perhaps the greatest obstacle to addressing environmental issues is the lack of clear understanding of what causes environmental problems and what remedies are most likely to protect, restore, or enhance environmental values at the least economic cost. One major problem is an underinvestment in scientific study, which I believe is only partly related to so-called governmental budgetary problems. More importantly, scientific studies often combine/confuse policy choices with the understanding of scientific questions. Developing institutional arrangements that erect a Chinese wall between scientific study design and policy choices promises to create the framework for state and local interests to expand their investment in scientific studies. A better scientific understanding of environmental issues alone will not be sufficient. Another major problem is the lack of mechanisms that reward parties for protecting, restoring, or enhancing environmental values. As long as environmental policy remains an exercise in cost-shifting, more resources will be devoted to arguing about rather than addressing the environmental issues related to the Colorado River.

JACK STANFORD

FLATHEAD LAKE BIOLOGICAL STATION, U OF
MONTANA
POLSON, MT

This one also relates to environmental protection as well - Coordination is required to re-regulate flows to mitigate damage from five decades of dam operations.

The most pressing issue is re-regulation of flows to allow seasonality (Spring Flood Peaks) and to minimize base flow fluctuations - See: Stanford, JA 1994. In-stream flows to assist recovery of endangered fishes in the Upper Colorado River Basin. USFWS Biological Report #21.

SAM SPILLER

US FISH AND WILDLIFE SERVICE
PHOENIX, AZ

We suggest the bullets given below will further clarify the issue.

- Reversing declines in native big river fishes and then attaining their recovery, followed by recovering other listed species and re-establishing those that were extirpated.
- Restoring and protecting native riparian/wetland habitats.
- Ensuring adequate water quality and quantity along river reaches most important for the above.

Environmental protection issues relate closely to Issue #7. Issues involving Mexico, since water quality and quantity, the Colorado River delta, and endangered species along the Mexican portion of the Colorado River are overlapping concerns on an ecosystem level.

ISSUES INVOLVING PROTECTION OF ENVIRONMENTAL AND CULTURAL RESOURCES

LEW STEIGER

GRAND CANYON RIVER GUIDES
FLAGSTAFF, AZ

Most important from Grand Canyon River Guides' viewpoint: Will the Glen Canyon Dam Fish and Adaptive Management prove successful over the long haul? Can the Bureau of Reclamation meeting re-define its own mission to include care of Grand Canyon National Park?

BILL SWAN

DOI, SOLICITORS OFFICE
PHOENIX, AZ

Issues of concern:

- Glen Canyon Dam operations, what it means to downstream resources?
- Lower basin habitat management and mitigation. Consequences of endangered species listing: (a) Will there be a habitat conservation plan worked out with water users, or will process be covered by Sec. 7? (b) Should there be a charge to water users for a trust to fund mitigation measures? Who else pays?
- Consolidation of USFWS water rights. It has installations below Hoover with individual water rights. Consolidate rights and move them around where needed. Controversial because of potential injury to downstream users, but beneficial because the more flexibility FWS has the better for ES mitigation, e.g. backwaters, the more flexibility FWS has with their rights, the better.
- Return flow in the lower basin. Issues of habitats created from irrigation return flow, e.g. Salton Sea, or slough in Mexico from Welton-Mohawk return flow.
- Bringing back the river delta.

LOUIS SORENSEN

CITY OF KINGMAN
KINGMAN, AZ

River recreation - This seemed to be the only reference to recreation. Recreation activities are very prominent along the river, particularly along the lower basin states. Recreation should not be limited to an environmental issue alone, it is also an economical and lifestyle issue.

RONALD THOMPSON

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT
ST. GEORGE, UT

Providing for endangered species:

- Habitat conservation programs
- Mitigation

KENT TURNER

LAKE MEAD NRA
BOULDER CITY, NV

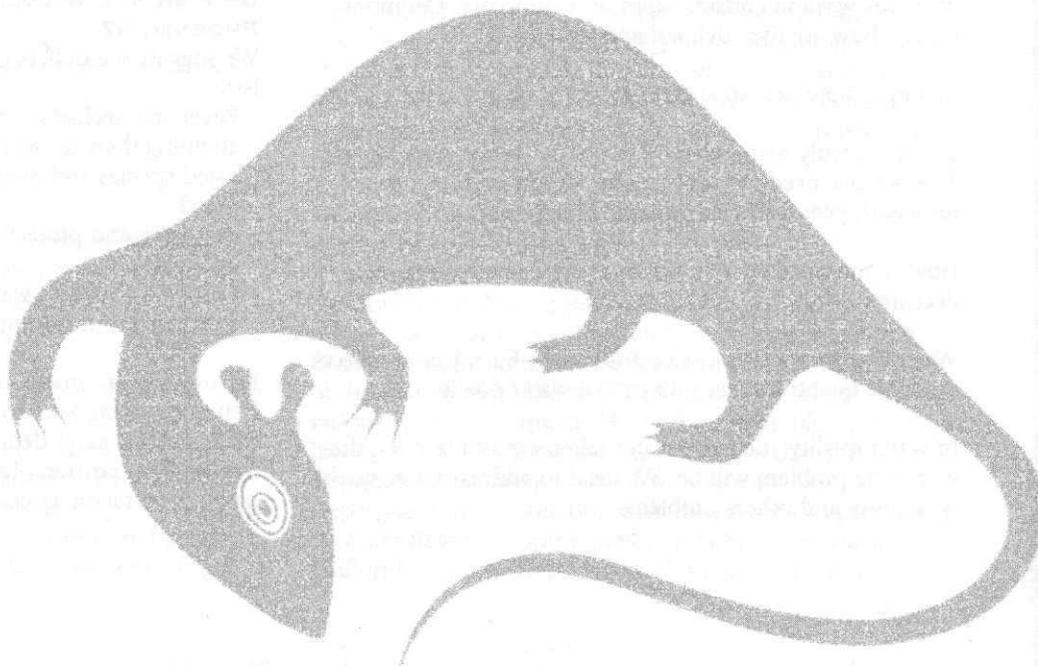
Resource decisions made on basis of unknown events or false science. It is unknown whether more water will assist in recovery of endangered species. If that is the case then more storage is needed. The 1 in 40 year flooding should be captured to use in other drier years but only when it is determined that the water can be used to recover the species and only after other non-water options have been developed.

The key to me seems to be the integration of the operational criteria with resource requirements. Resources need to be a higher criteria within the operating criteria.

PHILLIP WOODS

EPA, REGION 9
SAN FRANCISCO, CA

- Add a broader range of water quality issues, e.g.,
- impacts of water quality on in-stream uses (aquatic life)
 - impacts of water quality on municipal users
 - impacts of water quality on agricultural users
 - potential duration and magnitude of exceedence of salinity standards-impacts
 - selenium problems
 - benefits of improved range management
 - problems of reduced federal funding of salinity control.



ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

BUREAU OF RECLAMATION MEETING

DENVER, CO

Private or state rather than federal management of water delivery facilities, smaller almost single purpose facilities.

D. LARRY ANDERSONDEPT. OF NATURAL RESOURCES DIV. OF WATER
RESOURCES

SALT LAKE CITY, UT

The listing of issues should also include discussion of two major problems that relate to many if not all the specific examples--imprecise delineation of respective federal and state authorities and responsibilities, and public (and Congressional) unwillingness to cover full costs of achieving public purposes. Most residents of the Basin states are not in doubt as to the power of the federal government to manage and control the waters of the Colorado River system. Many are in doubt, though, about how the federal government will "use" that power, and what impacts will fall on their respective states and them personally.

The latter question of 'who pays' for popular natural resources-related niceties (wilderness, wetlands, endangered species recovery, wild rivers, clean water, clean air, etc.) is increasing in importance. These items are beginning to cost real money; the costs (often in the form of opportunities foregone) are impacting more and more private individuals, and are becoming more difficult to hide. Hard decisions regarding equity and 'takings' must soon be faced.

GEORGE BRITTON / BILL CHASE

CITY OF PHOENIX

PHOENIX, AZ

- Will Congress attempt to permanently change the basic apportionment of the Colorado River?
- How will Congress react when Nevada fully utilizes its current Colorado River entitlement in ten to twenty years and has no other water?
- How will Congress react when Arizona's increased use of Colorado River water causes the Metropolitan Water District of Southern California to either acquire water from California agriculture with senior Colorado River rights, or to cut back deliveries of Colorado River water to their customers?
- How will Arizona react if Congress decides to allocate more Colorado River water to California or Nevada?

While many of the other ten issues you had on your list are important, none are more important to Phoenix and Arizona than preserving our Colorado River water entitlement.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Won't do much without having someone standing up and cost-sharing. I think water belongs to the states. They should stand up and put up funding for fish, cultural resources, etc.

REGIONAL STAKEHOLDER MEETING

PHOENIX, AZ

The costs, pros, and cons of defederalization of water delivery facilities is very important issue. It was suggested that that would be a worthy issue paper topic.

The word "privatization" should be changed to "defederalization", because ownership may continue to be public in nature.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

Should Federal government capitalize on its resources, or should they continue giving it away. That's the issue in DC.

BUREAU OF RECLAMATION MEETING

BOULDER CITY, NV

Cost recovery for various BOR projects not mentioned. Nor is shifting the burden of cost to beneficiary.

Shifting the cost of operating and maintaining to current and future beneficiaries.

Case of national tax payers vs. users supporting projects. We're talking \$15 million per year. If someone pays, they have right to say on how money is spent.

The issue of property rights (or individual rights?) vs. public good. The key is compensation.

BUREAU OF RECLAMATION MEETING

DENVER, CO

Even if you come up with a better way of managing the river, people will say what's in it for us. No incentive for Colorado or other upper basin states to yield from that position.

States' rights in conservation efforts. How do you assure efficient water use if states aren't using all the tools they have the authority to? They need to use what they have if they're going to complain about federal involvement.

State water administrative bodies determining public values for beneficial uses, e.g., cultural, social, environmental values. The hard ones to value.

ROBERT GRIEVE

WYOMING STATE LEGISLATURE

SAVERY, WY

States abilities to develop water allocated under Compact.

BUREAU OF RECLAMATION MEETING

SALT LAKE CITY, UT

There should be separate category for state rights or use issues.

Need to talk about what are the implications of no change in structure, because that's more likely than a big change.

ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

MARGARET CARPENTER

CITY OF THORNTON

THORNTON, CO

The City of Thornton, Colorado, is not currently a direct user of Colorado River Basin water. However, the City is a major shareholder in the Water Supply and Storage Company (WSSC), which diverts Colorado River water to the Cache la Poudre River Basin as a significant portion of its water supply. The City acquired its ownership in WSSC as a future water supply, and is therefore concerned with any action in the Colorado River Basin which would impact this supply. The City is also concerned with actions in the Colorado River Basin which would impact the State of Colorado as a whole.

The City of Thornton's main concern is in regards to protecting its ability to use the City's (through its WSSC ownership) Colorado River Basin water. Any actions which would diminish the yield of these water rights, or increase the cost of operation of these rights is objectionable to the City of Thornton. These actions include: requiring existing water rights holders to dedicate any portion of their yields to endangered species recovery efforts, and; requiring the City to consider the value of non-consumptive uses (i.e., recreational uses), non-use (i.e., in-stream flows), or other extrinsic values in any federal permitting process which would tend to make the use of the Colorado River Basin water appear to be less feasible.

WAYNE COOK

UPPER COLORADO RIVER COMMISSION

SALT LAKE CITY, UT

Any attack on acceptability of future Upper Basin Development/Increased upstream depletions is unrealistic for the following reasons: (1) Validation of States' entitlements (2) Unrealistic hope that the Upper won't develop in light of population growth caused by out-migration of capital from the Pacific Coast (3) Unrealistic due to national value of yet undeveloped critical natural resources located within the Basin (4) Unrealistic outcome of conflict between preservation and economic demand.

ELIZABETH GARDENER

DENVER WATER

DENVER, CO

Your examples seem to ignore Colorado River Compact issues and the Compact's legal effect - As an upper basin state the viability of the Compact is the most critical issue - This also includes implications in other issues such as public involvement, Native American water rights, issues with Mexico, coordination between managers and users, but any issue needs to be framed with compact considerations as a primary focus.

JADE HENDERSON

WYOMING STATE ENGINEER'S OFFICE

COKEVILLE, WY

Recognition and respect for the existing laws that control the water of the Colorado River Basin. The Law of the River is not some arbitrary tradition of old water barons in the Basin. It is established law. It originates in 2 Interstate Compacts and an International Treaty, all ratified by the

United States Congress. Changes in River operations must be accomplished within the framework of these established laws and forums. Even the Bureau of Reclamation meeting as water master on the mainstem is subject to these established laws.

TODD MACFARLANE

KANE COUNTY WATER CONSERVANCY DISTRICT

KANAB, UT

We realize that many of our concerns are tributary-specific, and may not be as important to stakeholders involved only with the mainstream of the Colorado River, but if this is a basin-wide water management study, obviously, we are in the basin, and these issues are of vital concern to us.

FRED PARADY

RHONE-POULENC

GREEN RIVER, WY

Primary concern is for Wyoming's ability to control the development of an allocation under the Compact for the benefit of Wyoming people under Wyoming law as Wyoming needs dictate. This includes our need to make economic of mineral development decisions within our judgement as to maintaining as high quality environment.

REGIONAL STAKEHOLDER MEETING

DENVER, CO

Decision support system technology. If we make a change to the operation, what will be the consequences? That's a useful function for the Bureau of Reclamation. It's being worked on in Colorado, particularly in recovery efforts in the mainstem.

Since the Bureau of Reclamation instigated this, they need to say what type of monitoring systems they will have in the future.

MARGARET CARPENTER

CITY OF THORNTON

THORNTON, CO

The City of Thornton is also concerned with protecting the State of Colorado's right to develop water in the Colorado River Basin for use within the State under the Colorado River Compact. Any actions which would impact the State of Colorado's ability to develop these waters is objectionable to the City of Thornton. These actions include: endangered species recovery efforts which rely too heavily on the water flow solutions as opposed to other structural or non water-related solutions; promoting any discussions which would indicate that the use it or lose it principle applies to Compact entitlements; sale or marketing of the State of Colorado's Compact entitlement to users outside the State, and; promoting non-consumptive users to the detriment of the State of Colorado's ability to consume its Compact entitlement.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

Going to the list, regarding American Indian water rights — it seems that water rights between states is the major issue, how are you going to deal with that? Water rights between states is certainly one of the issues.

ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

REGIONAL STAKEHOLDER MEETING**PHOENIX, AZ**

The biggest issue is the Bureau of Reclamation itself. It lacks competency and the ability to communicate with others. It has ignored its responsibilities and been unproductive and unresponsive.

The Bureau lacks a consistent, continuing mission statement. It seems to change with each new administration.

The many changes in leadership have made the Bureau less effective.

There is a lack of follow through with the Bureau, a lack of support for its field staff, a paralysis of the agency.

Who exactly is the Bureau's constituency? It doesn't know and wants to control other's constituencies instead.

What are the motives of the Bureau with this project, to take water away from the present users?

There is a question whether or not the Bureau of Reclamation will even be around 5 or 10 years from now.

The changing federal role is an issue.

Declining Bureau of Reclamation meeting funding is a critical issue.

Need for Bureau of Reclamation meeting (and other fed agencies) to define their role clearly for all concerns for the future.

Permits; the issue is if you don't play ball in violation of states rights, you get blackmailed.

Having small irrigation districts write conservation plans when they may not have the expertise to do it effectively or they may lose their water is foolish when there are so many other more important issues.

WY was first state to claim ownership of water and wildlife in its constitution, and other states want it.

REGIONAL STAKEHOLDER MEETING**ROCK SPRINGS, WY**

Look to minutes from upper basin meetings to see what the role of the parties are in the Colorado River. Must include issue of development of unapportioned water in basin and the States' rights to develop that water. We shouldn't have any management plan without recognizing that the states have a right to develop that water.

States abilities to develop water allocated under Compact.

Remove roadblocks from agencies to allow water development to happen, and allow states to develop water when and how it wants.

Conflicts in lower river, we've already mentioned illegal diversions and how to deal with it, but what else? AZ vs. CA says mainstem water only when compact says tributary water also.

Start with a statement that the Law of the River may not be encroached upon. The stated issues imply that it can be challenged.

Issues should be discussed under the umbrella of the existing Law of the River.

Fed agencies need to talk to each other and listen to each other; they don't do it, (Also falls under environmental protection issues). This is the issue of greatest concern and any discussion of other issues is under this umbrella.

REGIONAL STAKEHOLDER MEETING**FARMINGTON, NM**

Government subsidized water projects is an issue. Projects should pay their way.

REGIONAL STAKEHOLDER MEETING**ONTARIO, CA**

Feds must be one of the parties bound by dispute resolutions, not just an outsider/spectator. States not really willing to do this because of sovereign immunity.

Inherent problem with secretary of Interior having such broad role in Colorado River. Conflicting roles of secretary is a problem. Feds are overpowering states, get them out of these areas, privatization is a tool for this.

There are two issues, Fed's dominant role and Fed's self-conflicting roles. How do you get better cooperation inter-agency.

What are the implications of changing Federal involvement in Colorado River.

There is a need for clarification and definition of secretary's role in Colorado River management.

HAL SIMPSON**DIVISION OF WATER RESOURCES****DENVER, CO**

Lower basin compact call.

LEW STEIGER**GRAND CANYON RIVER GUIDES****FLAGSTAFF, AZ**

Most important from Grand Canyon River Guides' viewpoint: Will the Glen Canyon Dam Adaptive Management prove successful over the long haul? Can the Bureau of Reclamation re-define its own mission to include care of Grand Canyon National Park?

EARL ZARBIN**PHOENIX, AZ**

The issues offered presume continued Federal directions. How about a priority of figuring the fastest means for removing Federal control over all these topics? Be bold! Shock Bruce Babbitt and other Al Gorelings by suggesting freedom from government direction!

ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

JIM BURDICK

CHURCH AND DWIGHT CO., INC.
GREEN RIVER, WY

Increased needs of urban areas in the lower basin will tax their state's allocations resulting in pressures on upper basin state's water allocations. The upper basin states allocation under the impact will receive pressure to give up water to support lower basin's overuse. We have a right to develop our water for our use at our pace.

NO NAME SPECIFIED

SANTA CLARA CITY
SANTA CLARA, UT

The demand for public involvement in the decision process is critical. This includes negotiations on water and power contracts and water management at local watershed levels.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

Potential for local vision, involvement in management process.

Discussions of new models for decision making other than traditional top-down model. My perspective of public involvement is locals should express their vision. How do we cause this to happen? No communication of what will be funded and how. Processes aren't in synch and locals have no clue. Not a very good institution. Coordinate budgeting process within Bureau, with other Feds, and heaven forbid with states. (also put under 3).

TODD MACFARLANE

KANE COUNTY WATER CONSERVANCY DISTRICT
KANAB, UT

Following extensive discussion of the list of ten (10) identified issues, it is the KCWCD board's position that local control of local resources is the single most important issue from our standpoint. This appears to fall best under the last point listed under Item No. 5, regarding public involvement in decision processes. From our standpoint, this means, among other things, that water-related issues should be governed and resolved under state water law, and state and local entities and agencies should have primary management responsibility for local water resources and related issues. It is our position that local water resources and related issues should not be managed, addressed and resolved by federal bureaucracies in Washington, D.C., Las Vegas, NV, Phoenix, AZ, etc.

While public input and involvement is important, when it relates to water rights and resources, the interests of primary stakeholders and water rights holders should be given priority consideration. Parties and entities who have no direct right or entitlement to use the water or dictate its use under state water law should not be allowed to distort management decisions and issue resolution.

REGIONAL STAKEHOLDER MEETING

ST. GEORGE, UTAH

In Kane County, public involvement is the most important — local control of local resources. We realize there are many other stakeholders, but we feel our issues are very important.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

Pay attention to local opinions. Big money talks. There needs to be a way to watchdog this. Denver and Washington, D.C. make decisions that we have to pay for.

Important to recognize that local officials are elected to represent all the people, yet they are often left out of decision process. Local government is where local control should reside.

In Colorado, water engineers have been calling the shots for so long (and have been totally insulated from issues) that there is no accountability. It is very hard for someone with a different point of view to be heard.

REGIONAL STAKEHOLDER MEETING

LAS VEGAS, NV

There is a need for watershed management at the local level.

GEORGE BRITTON

CITY OF PHOENIX
PHOENIX, AZ

No specific comment

PHIL MUTZ

NEW MEXICO INTERSTATE STREAM COMMISSION
SANTA FE, NM

No specific comment

JAMES DECKER

ENVIRONMENTAL EDUCATION
DURANGO, CO

Native American. Until water rights are quantified and settlement acts allow for interstate marketing, water management will be difficult. Sovereignty has good and bad aspect. Bad aspect is that Tribes choose wasteful use. NAPI will develop last three blocks despite the fact that the highest and driest. Once again they will prefer business to employment strategies.

RICK GOLD

BUREAU OF RECLAMATION
SALT LAKE CITY, UT

Native American rights and values must be recognized within the basin. The resultant resource availability mix will create huge challenges. Agreements with Tribes must be honored. Basin transfers seem likely, first, with Native American resources.

KENT TURNER

LAKE MEAD NRA
BOULDER CITY, NV

I don't see how you can produce meaningful long term planning without tribal involvement.

AMOS JOHNSON

DEPT OF WATER RESOURCES; NAVAJO NATION
FORT DEFIANCE, AZ

Much of the Navajo Nation's federally reserved water rights are unquantified and adjudicated. These rights represent

ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

a significant portion of the water supply on the Colorado, Little Colorado, and San Juan Rivers. Asserting these rights will have a significant impact to non-Indian interests.

Existing water compacts, agreements, and obligations do not adequately address Navajo water rights, sovereignty and tribal participation.

Establishing a tribal right through litigation is only the beginning of the struggle. Water projects must then be built to deliver tribal water. The phase out of federal programs that provided water to many western communities, makes it more difficult for Native Americans to benefit from successful litigation.

RUSSELL KASKALLA

BUREAU OF INDIAN AFFAIRS

PHOENIX, AZ

Department of Interior Secretarial Order No. 3175 - Departmental Responsibilities for Indian Trust Resources. Copy is attached. This Secretarial order should be mentioned specifically (see order).

JOHN KEANE

SALT RIVER PROJECT

PHOENIX, AZ

This issue is connected to the need to overhaul the current framework of management.

LARRY MACDONNELL

SUSTAINABILITY INITIATIVES

BOULDER, CO

Integrating tribes into the management and decision making processes affects the Colorado River.

SCOTT B. MCELROY

GREENE, MEYER, & MCELROY

BOULDER, CO

Your statement fails to capture the essence of the issue-how will the Tribes, as sovereigns, be integrated into the management of the River? The Tribes were excluded from the 1922 Compact with the result that there is now a great deal of uncertainty over their responsibilities. This issue encompasses many of the concerns that have been expressed because the Tribes should have an independent choice in deciding their own future.

BILL SWAN

DOI, OFFICE OF THE SOLICITOR

PHOENIX, AZ

Quantification of federal reserved rights below Glen Canyon Dam. Nothing has been done between Mead and GCD, e.g. claims of Hualapai, Navajo, and Grand Canyon NP.

Quantification of water claims in Little Colorado River for Grand Canyon NP and Tribes. In adjudication in AZ, the national park has claims for in-stream flows for endangered species.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

On 4th bullet, add lack of Federal funding to tribes for programs to develop Colorado River supplies.

Sovereignty of Tribes, their view of it, and the relation to Federal government.

DAVE WOOD

CANYONLANDS NATIONAL PARK

MOAB, UT

As the importance of this issue gets increasing recognition, dam promoters have discovered it as a novel new justification for new water projects. We need to look for alternatives to new pork barrel dams to provide for Native American water rights claims.

EARL ZARBIN

PHOENIX, AZ

Defederalization of the Federal government from so-called Indian Nations. Indians should be treated as all other citizens. Reservations should be apportioned to Tribal members as decided by the tribes, special privileges and treatment for Indians should be abolished. Past generations had no right to obligate their descendants to provide special treatment to Indians or anyone else.

JADE HENDERSON

WYOMING STATE ENGINEER'S OFFICE

COKEVILLE, WY

Salinity limit obligations to Mexico. The salinity limits in the Colorado River are a national commitment under treaty with Mexico, and NOT just an obligation of the watershed states. If traditional desalination and salinity control units are replaced by simply releasing more water for dilution, the entire obligation would inappropriately be shifted from the funding of the United States to the legally apportioned water amounts held by the Basin States.

REGIONAL STAKEHOLDER MEETING

ONTARIO, CA

There is the issue of the relative obligation of the Federal government and various water users to supply water to Mexico.

The issue of the Federal need to meet their statutory obligations for quality and quantity to Mexico. And any decision to augment water supplies in order to meet those.

The Feds have a dual and conflicting role of stocking game fish on one hand, and trying to protect endangered species on other.

Feds recognition of its obligations (re: \$) instead of allowing the responsibility for costs to flow down.

Economic impacts of endangered species protection, and Fed's fiscal obligation for those impacts.

ISSUES INVOLVING ROLES OF FEDERAL, STATE, TRIBAL, AND LOCAL GOVERNMENTS

REGIONAL STAKEHOLDER MEETING

ROCK SPRINGS, WY

Quality and quantity of water to Mexico has already been established, we will not renegotiate that.

Using stored water to dilute salinity down the river in order not to use the Yuma plant. Federal obligation vs. States in meeting treaty obligations. Treaties are a federal obligation. Need to consider the costs to the state when this stored water is used to meet the treaties. Concern is not enough attention given to alternatives other than dumping water when the feds really have no water to dump, its all apportioned to the states. Need to talk state compensation.

REGIONAL STAKEHOLDER MEETING

FARMINGTON, NM

An important issue is the relative responsibility of the states and federal government to meet water deliveries to Mexico.

BUREAU OF RECLAMATION MEETING

PHOENIX, AZ

The near term future of the Bureau is the Colorado River, Columbia, Sacramento, and these type issues. Need to bring Bureau into 21st century. How to reallocate costs and benefits of projects to changing values of the West. No major projects to do that within AZ, but not true in other offices. This will drive political leadership in the next 20 years. Feds won't necessarily bankroll these changes.

TELLIS CODEKAS

COACHELLA VALLEY WATER DISTRICT
COACHELLA, CA

With a change in focus by the Bureau of Reclamation from a dam-building agency to one emphasizing water management and conservation, doors are opening that allow working creative partnerships between the bureau and water agencies that can lead to stepped-up water conservation and conjunctive use practices.

In a first such partnership program with the Bureau, Coachella Valley Water District has developed an experimental recharge pond near the lower end of its agricultural water service area where water from the Colorado River via the All American Canal and its Coachella branch is spread to recharge underground basins whose levels have dropped substantially over the years.

The recharge experiment, if determined successful after testing has been completed, could lead to an expanded groundwater management program in the valley whereby growers would be encouraged to use canal water over well water. The practice would recharge the groundwater basin when water is plentiful and, in dry years, would offer farmers the option of relying on groundwater for irrigation purposes.

Other programs in the works include a water re-use program for fish farmers who, until now, have been pumping ground water for fish tanks, then disposing of it into the Salton Sea after a single use. Plans are now underway that

would see reuse of the water a second time in the fish farm operation followed by use a third time as irrigation water at nearby farms.

As these programs come into play, more water is saved.

BUREAU OF RECLAMATION MEETING

DENVER, CO

How much flood protection do you provide? Coordination between managers who allow building to occur in floodplain.

AMOS JOHNSON

DEPT OF WATER RESOURCES; NAVAJO NATION
FORT DEFIANCE, AZ

The impact of the Endangered Species Act falls disproportionately on Native Americans.

Due to tribal sovereignty the impacts of environmental regulation on State entitlements differ from the impact on tribal entitlements.

REGIONAL STAKEHOLDER MEETING

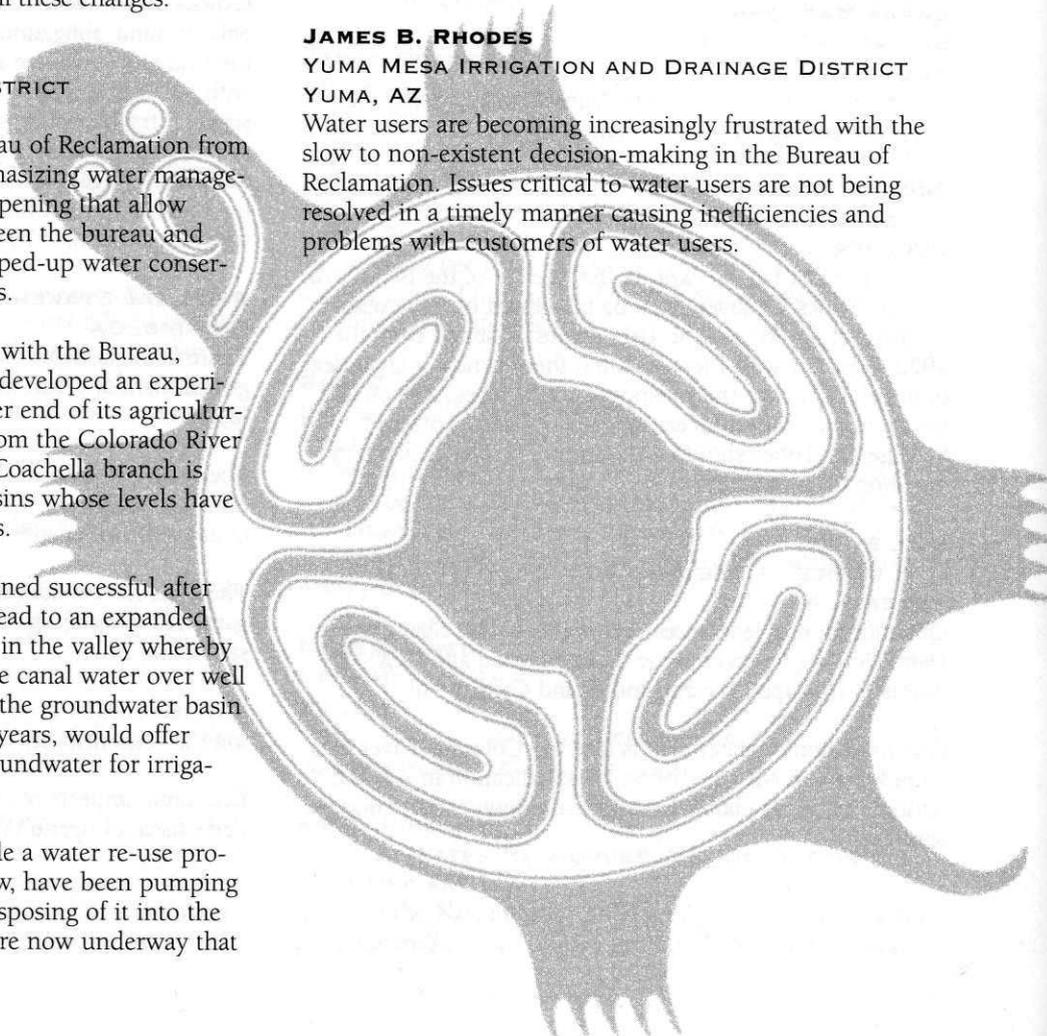
ROCK SPRINGS, WY

Interbasin linkages happen in Wyoming too, as well as in California. The water needs are the same. Need to look at linkages on a state by state basis to look at growth patterns. State's needs are the first consideration for development and use of water. Should be a matter of general concern to everyone in basin.

JAMES B. RHODES

YUMA MESA IRRIGATION AND DRAINAGE DISTRICT
YUMA, AZ

Water users are becoming increasingly frustrated with the slow to non-existent decision-making in the Bureau of Reclamation. Issues critical to water users are not being resolved in a timely manner causing inefficiencies and problems with customers of water users.





APPROACHES TO MORE EFFECTIVE BASIN MANAGEMENT

STAKEHOLDER PERSPECTIVES

Throughout the study it has been the view of Grand Canyon Trust that the solutions to basin issues resided in the basin stakeholders. The following perspectives of individual basin stakeholders were submitted in response to the question:

What new approaches would you offer to increase the effectiveness of the management of the Colorado River basin in the future?

INDEX OF CONTRIBUTORS

AUTHOR	ORGANIZATION
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62 Clay Bravo/Ronald Susanyatame	Hualapai Tribe
63 Dan Budd	none specified
64 George Caan	Colorado River Commission of Nevada
64 Steven Carothers	SWCA Environmental Consultants
65 Michael J. Clinton	Imperial Irrigation District
66 Michael A. Curtis	Arizona Municipal Power User's Association
67 James C. Decker	Taxpayers for the Animas
67 Jeff Fassett	Wyoming State Engineer
68 Chris Gehlker	Sierra Club, Palo Verde Group
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ROBERT L. ARNBERGER

GRAND CANYON NATIONAL PARK
GRAND CANYON, ARIZONA

The management of resources associated with the Colorado River basin has a significant relationship to the management of the National Park System (NPS). The Colorado and Green Rivers flow through five major NPS units. Between Dinosaur National Monument on the upper Green River and Lake Mead on the lower Colorado, the majority of the land adjacent to these rivers is managed by the NPS. Several other parks within the watershed contain important tributary streams. The thirty national park units on the Colorado Plateau provide a system of critical protected areas and cultural sites that is critical to maintaining the diversity of life, landscapes and cultures that defines the plateau as one of the world's most inspiring and fascinating places. Adequate river flow rates and good water quality are essential to the functioning of park ecosystems and maintaining park operations. In addition, these rivers support a wide variety of highly valued park recreation activities.

As the nation's leading government natural and cultural resource preservation organization, it is essential that the NPS have a role in determining the future of the Colorado River system. It is apparent that the many demands placed on Colorado River basin are leading to a crisis in water management. Resolving the crisis will require fundamental changes in how government institutions approach water management. Currently the emphasis is on the "legal rights" of upper and lower basin states in the allocation of water used primarily for agriculture and urban growth. These demands alone have outstripped the average annual supply, requiring those engaged in developing the Annual Operating Program (AOP) to declare a surplus so that existing lower basin needs can be met. Little emphasis or consideration has been given to meeting the growing demands for environmental protection and recreation, nor have the cumulative long-term implications of surplus declarations been evaluated and addressed.

We believe that several changes need to be made in the AOP criteria and in the overall process of defining needs, reducing consumptive use and setting priorities for water use. The goal must be system sustainability. One way to meet this goal is to implement true market based pricing for consumptive water use and to include environmental, recreation and other non-consumptive needs in the market equation. The ecosystem approach, which considers environmental as well as urban growth related society needs should be the basis for a new process that not only considers water allocation but also includes coordinated basin-wide water conservation practices, and a regional

approach to meeting the growing demands for river recreation while protecting the long-term integrity of critical ecosystem components and processes. The limits of supply have already been exceeded. Now is the time to focus on achieving a sustainable balance between consumptive and non-consumptive uses that will meet the highest priorities of our society now and into the future.

CLAY BRAVO & RONALD SUSANYATAME

HUALAPAI TRIBE
PEACH SPRINGS, ARIZONA

"Write something Clay or I'll never stop bugging you!!, Tom." Submissions have a 700 word limit. Clay's an orator whose never known the word "limit" when he gets to talking, if you know him, you know what I mean. And me! I'm just a spirit who'll try and put down as much as he and I've seen. We read the "Colorado River Workshop: issues, ideas, and directions" Tom sent us, yet opted to speak to you from the heart.

We were on the river just last week, I was there in spirit. One of those 24 hour cruises we do for people to try and have them understand what a lifetime on the river means to the Hualapai Tribe. I was standing in Spencer Creek sweating with Ronald Susanyatame, (we call him "Man,") as he explained it to us and this is what it meant to me. The water is a living, breathing thing. Man spoke of it as Grandfather who should be revered, respected, and most important, visited often. He took us back in time. Breaking through to the other side we saw the ancient ones with hooked sticks made of oak used to furrow gardens right where we stood. They would use these same sticks to climb out of the canyon leaving the elders and children to tend the gardens while they hunted on top. We saw them fashion other implements to capture fish which they'd trade with the Mohave down river. Man also showed us the cactus they used moisture from for making pots. With water all around, he explained, they'd climb the cliffs because the cactus moisture was like glue and worth it for the very best pots. He spoke with relish of the agave in this area and said it as if it was his favorite shopping spot.

Moving through time, he talked of how the Hualapai became good cattle borrowers when they met the new beast. It seems cattle could be traded to the Paiute across the river for guns. Guns that the Paiute got from the Mormons but couldn't eat. Hualapai used the guns to trade lead back to the ranchers for the cattle they borrowed and to chase away the Calvary who were intent upon moving the Hualapai away from Grandfather to La Paz, Mexico because at the time the only good Hualapai was a dead Hualapai and, standing there, I kind of think that's what

the Hualapai probably thought about the Calvary. We walked to the boats in silence but just before we left Man pulled it all together for us in a last little speech.

"Look upon this trip as a rebirth. Use what Great-grandfather has shown you through me to help you in your work if you can. Please remember to respect this place, all times and all things." I often don't talk about all I'm told but I think Man's message is clear. I think Clay, Man and all Hualapai speak this message in every meeting, conference, workshop, and story. It saddens us to think that before Grandfather water ever reaches the mother earth he is bought, sold, desecrated, and traded, for what? Please don't over exaggerate your significance while here on the planet Earth. Remember to view the Canyon, the Colorado River Basin, the world as a living, breathing, beautiful relative. Treat this relative with respect, reverence, and visit often and it will sustain you and yours for a Hualapai lifetime.

DAN BUDD

BIG PINEY, WYOMING

There have been many who, throughout the course of the Grand Canyon Trust's Colorado River Basin Management Study, have pronounced that the Law of the River (LOR) is "broken" and in need of significant modifications and changes. Much has been said and written during the study about the perceived shortcomings and limitations of past and current management of the water resources of the Colorado River. In a paper entitled "Rethinking Colorado River Governance" prepared for the February 1996 Colorado River Workshop, the authors suggested that, "... the next major step in the evolution of the 'Law of the River' may well be regional governance." In part II of that paper, the authors set out their reasoning that the "core policies" of the LOR need to be revisited and that "to implement new policies and reap the opportunity inherent in today's problems will take new institutions ... and a new governance mechanism established under a federal/inter-state compact."

I strongly disagree with this reasoning and with the general line of thinking that the underlying institutional structure and legal framework associated with the Colorado River is "broken" or in need of significant overhaul. I submit that the status quo (e.g., the existing institutions and the legal framework as it exists on the books) is serving the people and the resources of the Colorado River Basin quite well. Sure there is room for improvement. Yes, we can do a better job. I have great difficulty with the quantum leap to proposing major revisions and overhauls rather than prescriptions to make the existing governance and collaborations function better. My suggestion as to the "new

approaches ... to increase the effectiveness of the management of the Colorado River basin in the future" is that more people should accept the existing institutions and the Law of the River as it is. Rather than leveling potshots and proposing remodeling plans, these reform-minded groups, entities and individuals ought to consider how to make the existing mechanisms work more effectively and how water management can be improved and optimized within the current Law of the River. It is quite paradoxical to me that the current Administration and many aligned with it argue that the existing models of federalism embodied in the Clean Water Act and the Endangered Species Act can and should be made to work more effectively without statutory changes; but those folks seemingly take the opposite stand when it comes to the Law of the Colorado River. Many of those who argue that the "mandates" of the CWA and the ESA must remain intact so that the Federal Government can leverage the States and consumptive water users to "do the right thing" with regard to environment enhancement and restoration are the same people who turn right around and pronounce that we have to undo the Law of the River mandates that have carefully been put into place through the conflicts and compromises established on the River over the past 75 years. Why a similar focus on offering creative approaches that foster interagency cooperation and collaboration is rejected in the context of management of the Colorado River as being piecemeal and inadequate is not easily grasped.

As an irrigator in the headwaters of the Colorado River Basin who has spent most of my adulthood observing and participating in the wranglings over the Colorado River, I know that citizens across the Basin rely on the protections and certainties existing in the Law of the River. Let's also recognize that the "stakeholders" to this River are all who are provided with the critically important food and fiber and participate in the huge economy generated by Colorado River water use. The water managers and officials who preceded us were well able to look to the future with regard to providing for dependable water supplies for our benefit. They also understood the challenges that would one day (that day being the present) come to be. Those who espouse Aldo Leopold should remember the credo to be wise enough to not take it apart when we don't understand the pieces. Should this not also apply to the Law of the River?

GEORGE CAAN

COLORADO RIVER COMMISSION OF NEVADA
LAS VEGAS, NEVADA

Interstate water marketing is one of the more institutionally controversial issues surrounding a regional approach to balancing Colorado River water supply with the various water demands being imposed on the system. However, Nevada continues to view interstate water marketing as one of the more plausible mechanisms for managing the water resources within the lower basin. Additionally, we believe the creation of a lower division states' (i.e., Arizona, California and Nevada) bank and a commission to administer it would offer a viable approach to water marketing. It is against this backdrop that Nevada will briefly rehearse its conceptual approach to the implementation of an interstate water bank as it was formerly envisioned in 1994.

The water bank would be governed by a lower division commission composed of representatives of the lower division states. The commission and its staff would be funded by equal contributions from each state and by revenues from the imposition of charges upon the water stored and delivered through the water bank. The commission would enter into a cooperative agreement with the Bureau of Reclamation (and, as appropriate, other governmental and non-governmental entities) to coordinate the activities of the water bank with the reservoir operation, project management, and other responsibilities of the Bureau and other entities. Thus, the Bureau would continue to determine what releases could be required to meet its mandates, including releases for rights arising under the Mexican Water Treaty, decreed and contract rights in the lower basin, rights in the upper basin, mandated environmental flows, and power generation. Similarly, the Bureau would continue to make determinations respecting flood control releases, carry over storage, losses and their allocations, and the existence of excess reservoir capacity and its allocation.

The water bank would have certain administrative functions, such as accounting for water supplies, financial accounting, and planning for and projecting water deliveries. Tribal governments could participate as lessors or lessees in the water bank. In addition, we expect the working relationship that would exist between the water bank and the upper division states would be defined during the lower division states' discussions preceding the creation of the bank.

Additionally, the interstate bank would collect rights to water. Those rights would be purchased except where donated. The volume of water acquired would be driven by existing and projected demand in the lower division states for interstate water supplies.

Finally, the water bank could receive, store, and manage water covered by such rights. The purpose of collecting rights and water would be to provide short-term, long-term, and emergency water supplies. The emergency supplies would complement shortage-sharing and would be available to serve the needs of urban areas, sensitive environments and specialized perennial crops during critical events or periods.

Nevada is rapidly approaching the time when it will be fully utilizing its 300,000 acre feet per year consumptive use apportionment. At the same time the states of Arizona, California and Nevada appear to be crossing the threshold of full utilization of the lower division states' apportionment of 7.5 million acre feet per year. This is occurring when other needs of the river, such as recreational and environmental needs, are coming into clearer focus, and when the Indian tribes plan the beneficial consumptive use of their Colorado River water entitlements. While the waters of the Colorado River are over appropriated, prudent management of this resource can overcome the potential shortfalls confronting its stakeholders. From Nevada's perspective, an interstate bank could provide an important functional interface whereby the public good is best achieved.

STEVEN CAROTHERS

SWCA ENVIRONMENTAL CONSULTANTS
FLAGSTAFF, ARIZONA

CHANGING THE FOCUS IN ENDANGERED FISHES MANAGEMENT

The populations of federally listed endemic Colorado River fishes are declining, a trend which, unchecked, will likely result in extirpation of at least three of the four endangered big river fishes (bonytail, Colorado squawfish, humpback chub, and razorback sucker). Other native species may follow suite in the not too distant future. Throughout the Colorado River Basin, seemingly heroic efforts are underway as the allegedly best available scientific techniques are employed to remove threats to listed species. Financial expenditures directed toward fishery management throughout the Basin are expected to be in the hundreds of millions of dollars over the next 10 years. Indirect costs in lost power revenues and prohibited water development projects are impossible to estimate but are understood to at least equal direct costs.

Many stakeholders have begun to question the efficacy of the fiscal resources spent on behalf of the Basin's native fishery. If scientists and managers had at least some level of confidence that existing fishery management practices were reversing, or even arresting declines in native fish population, stakeholders might be mollified. But this is not the

case. Despite Herculean efforts, endangered species management of the Colorado River is in crisis. The battle is being lost.

Clearly, interrelated effects of two phenomena, Colorado River development and introduced non-native species, are responsible for the losses of native fishes were substantially reduced or removed from the system, native fishes would respond positively and significantly, even without altering other management practices. This is not to say that changes in systems operations are not needed to enhance environmental elements. Much can and should be accomplished to make reaches of the river physically more conducive to the reproduction and recruitment of native species (e.g., the 1996 flood flows in Grand Canyon). But gaining another 1,000 cfs of instream flow or restricting peaking power discharge fluctuations another 5,000 cfs will be meaningless in the long run if the declining native species a competitive edge, but historical evidence (anecdotal accounts of fishes caught in the predam Colorado and early scientific studies) suggest that non-natives very likely would out-compete natives even if the river system were returned to predam conditions (let alone a mere semblance of those conditions-which is all we can achieve). In fact, some warmwater non-natives, such as catfish and carp, could possibly gain competitive advantage.

While the scientists and managers hotly debate the value of returning to a "natural hydrograph," the catfish and carp, the bass and sunfish, and the red shiners and fathead minnows have few real enemies in fishery management circles. If the fishery biologists and government interests assaulted these non-native species as assiduously as they did the "trash" fish (today's endangered and other native species) during the 1960s, our native fish might have a chance. I readily acknowledge the difficulties involved in removing non-native fish species from the Colorado River fishery, but I believe we need to start somewhere. An aggressive non-native fish control program should be part of every research and mitigation effort throughout the Basin. Such programs have not been attempted before because they fly in the face of popular support for sportfishing. The sad news for anglers is that controlling non-natives would require an end to many sportfish stocking programs, bag limits, seasonal restrictions, and other protective measures used to sustain and enhance non-native fish populations.

Right now, fishery managers find themselves in an impossible situation. On the one hand, they are required to provide great fishing opportunities for society-at-large, while on the other hand, they are charged with protecting listed native fishes-native fishes that are often threatened by the very species being stocked. It is time for society-at-large and federal and state wildlife and river management agen-

cies to officially recognize that these goals are not mutually supportable, and until or unless the Endangered Species Act is altered, its provisions and the public sentiment it represents must determine which goal is chosen.

MICHAEL J. CLINTON

IMPERIAL IRRIGATION DISTRICT
IMPERIAL, CALIFORNIA

The Imperial Irrigation District (District), as the last diversion point of Colorado River water before the International Boundary with Mexico, is a key stakeholder in the present and future management plans of the Colorado River. The District diverts approximately 3.2 million acre-feet of Colorado River water to approximately 500,000 acres of farmland in the Imperial Valley. In addition, the District relies on a portion of its present and future electrical power requirements and distribution from the generation of reasonably priced and reliable hydroelectric power from both Parker and Davis Dams.

The future management strategy for the Colorado River requires an understanding of past and present entitlements based on the various compact treaties, Congressional acts, agreements and court decisions known as the "Law of the River," the continued needs of all the stakeholders, and a desire to negotiate and offer allowable compromises to accommodate those needs. The District continues to join other California contractors in working with Upper & Lower Basin States, Indian Tribes, the Bureau of Reclamation and all other organizations, agencies, and local governments along the Colorado River. This cooperation will assure that future management strategies provide reliable water and power in the quality and quantities required, while preserving and enhancing environmental values and providing necessary recreation for both urban and agricultural users.

The District has been a participant with California agencies as California has worked with Arizona, Nevada, and Indian Tribal representatives regarding Colorado River management issues. These issues must be resolved first among the states with input and participation of the tribes. A strategy is necessary that involves improved river operations, water transfers, inadvertent overrun accounting to allow for uncontrollable variation in annual use, banking in Lake Mead, and river augmentation.

These elements are essential to assure optimum use of water supplies, minimum flood control or excess flows and augmentation to assure growing needs can be met into the future. Transfers are particularly important to facilitate water conservation, while assuring sustained

availability of needed agricultural water supplies. Conserved water can then be made available to meet urban demands with revenues available to accomplish the agricultural water conservation. These strategies must result in no shifting of water supplies from one economic sector to another, but must provide a transition to a future that results in more efficient river operations and augmentation using revenues generated from the population growth areas.

The District has nearly completed a cooperative 35-year water conservation program funded by Metropolitan Water District. Negotiations are in progress for the lease by San Diego County Water Authority of water conserved within the District.

During this transition period from excess supply to full use, sustaining and strengthening agricultural water supplies is of significant importance to the multiple uses of the Colorado River. During emergency conditions (drought, etc.), agricultural uses present a potential short-term emergency source of supply provided the agricultural economy is compensated, sustained, and benefited, while cooperating to address critical water needs.

A recent and significant issue specifically dealing with management of Lower Colorado River resources is the designation of critical habitat for four endangered native fishes. In keeping with the spirit of long-range future planning for management of the Colorado River, the District has embarked in a partnership with other agencies and organizations within California, as well as in Nevada and Arizona and the Department of the Interior, to develop a Multi-Species Habitat Conservation Plan (MSCP) for the Lower Colorado River. This cooperative effort will accommodate current water diversions and power production while optimizing opportunities for future water and power development on the Lower Colorado River. This water and power user initiative will proactively work toward the conservation of habitat and the recovery of numerous critical, threatened, and endangered wildlife species within and along the Colorado River.

MICHAEL A. CURTIS

ARIZONA MUNICIPAL POWER USER'S ASSOCIATION
PHOENIX, ARIZONA

Nature may very well decide to implement an ice age or a plate shift or earthquake which would cause a new Colorado River; causing an ironic destruction of moronic thought that increasing prices for life-giving water and electricity resources today will somehow restore or sustain Nature as we know the Colorado River. Affirmatively, we

should continue to develop the River using data from the Grand Canyon Environmental Impact Studies. It is said Man and Nature are not naturally in harmony; that any semblance of harmony is only evidence of a negotiated truce. Evolving from that statement, the violent impact upon Earth and against Man of the serpentine Colorado River is clearly etched in surrounding landscape, cluttered with ruins and saltine sea reminders of the River's regard for Man as a passing, insignificant irrelevance. Man is not irrelevant. Man is determined to survive amidst Nature and, if not to control the River, then to arrive at a truce with it. Nature and River treat Man with disdain; with no care for Man's survival. Daily it is Man who must engage, trick, and seduce the River into providing sustenance, while the River concurrently threatens Man's existence. Now is not the time to squander away precious dams providing flood control and nurturing water storage as well as recreation and life/labor-saving electricity in meaningless gestures of appeasement or surrender to a mindless python-River, uncontrolled for centuries gorging itself with victims while winding its way through the Rockies into the Gulf of California. Those who hold Nature to deity status or advocate River restoration to its former uncontrolled self are naive. And those who believe the River can be controlled without regard to the laws of unintended consequences are foolishly misguided. We should expand upon \$100 million of GCEIS science spent learning the River's dangers, values and meaning of its habitat for the sustenance of Man. GCEIS' unique data base and scientific results savaged dreams of naturalists committed to dam destruction, and simultaneously imposed economic realism on managers of stored water and electric consumers. Without further study, immediate commitment to altering Man and the River's uneasy truce is arrogantly dangerous. Adoration by an elite few of pristine earth not humanly befouled requires temperament by humanity's need in a desert for affordable water, electricity and survival. A powerless Man, horrified to learn there is no feeling person nor mind in Nature predisposing it for or against him, ascribes human characteristics to Nature and futilely creates names and faces, myths, idols and gods to no avail. Nature will do what Nature is permitted to be. Nature is existentialist. Man must acquire from Nature shelter, sustenance and protection. An evolving data base for the next quarter-century, GCEIS is a road map defining paths of mutual survival. Using GCEIS, Man enhances the requisite skills He needs for Nature negotiation as Nature manifests itself through the mighty River. We should not tear down dams nor disavow use of electricity and water priced at cost (cost not to be defined as the ridiculous expense of restoring nature to a humanly-defined pristine condition). Hydro-electricity should continue to be marketed to public and cooperative entities who risked its first development. Dams and irrigation were infrastructure created as belonging at cost to the

public thereby making available common benefits to develop the country and returning wealth to the Treasury. The philosophy of those who would charge a thirsty man for a drink at a communal desert water hole in accord with the depth of his pocket book is so obviously corrupt as to deserve no followers. To decry subsidies in a nation whose entire existence is characterized as one continual circle of regional and local "jump-starting" or subsidization is to reveal the ugly face of avarice gone mad upon losing its turn/place at the table of national bounty. The West does not deny or begrudge the East its rivers and harbors; nor the North or Midwest their seaways, dams and infrastructure; nor the South its similar gifts from the National Treasury. We should get on with the business of refinement of reclamation programs negotiated with Nature which have proven their worth.

JAMES C. DECKER

TAXPAYERS FOR THE ANIMAS
DURANGO, COLORADO

An important and helpful Colorado River Basin Management reform would be to accede to a Native American tribal objective, expressed by the ten tribes organization, to allow interbasin water leasing. This would increase flexibility in management, but should not be accomplished without certain concessions which require changes in federal law.

The Navajo Nation plans to complete the final blocks of the Navajo Indian Irrigation Project. These blocks represent the highest and driest of the entire Project, expensive in terms of San Juan River water consumption, power and federal funding. It is hard to believe that these uses are the highest and best, either for the Navajo or the San Juan River System. The Navajo claim they are entitled to this construction under law and because of promises made by the federal government. But problems of water supply exist and are presently being addressed within the constraints of the current Squawfish Recovery Implementation Program. Because of their concerns for the completion of their Irrigation project, the Navajos have not signed the Memorandum of Understanding for that RIP. The Nation might be better off looking at interbasin marketing alternatives, rather than persisting with their agribusiness projects.

The Navajo Nation issue is complicated by the Animas-La Plata Project, a massive federal water project proposed for Southwestern Colorado and New Mexico, which despite unsatisfactory economic benefits, is being propelled as an Indian water rights project under the Colorado Ute Indian Water Rights Settlement Act of 1988. That Act actually prohibits the Ute Indians from Interbasin water marketing! It

increases water consumption requirements on the San Juan system, such that, Utes are competing with Navajos, non-Indians and the native fish for supplies. Neither proponents nor opponents of the Project forecast the complete construction of the Project, due to finances and problems with endangered fish, in which case the highest and driest Ute Mountain Ute facilities will never be built.

The situation lends itself to new Institutional arrangements, involving the stakeholders in the San Juan River beyond those presently participating in the San Juan Recovery Implementation Program. Environmental Groups are not represented in the RIP because the major concerns of that Program appears to be removing obstacles to the construction of the Animas-La Plata Project. But, given institutional leadership, and a broader representation of stakeholders, they should be able to consider a more comprehensive arrangement of alternatives, including interbasin water marketing and, possibly, a San Juan Basin Settlement Act which would replace the existing obligations and settlements on the San Juan River system.

JEFF FASSETT

WYOMING STATE ENGINEER
CHEYENNE, WYOMING

During his February 26, 1996 opening remarks at the "Colorado River Workshop," David Getches offered his view that:

"... the history of resources management in the basin has followed three themes:

We have solved problems piecemeal, one at a time.
We have made commitments without enough information.
We have addressed issues in a spirit of competition rather than cooperation."

We in Wyoming believe that these three themes are insightful and generally on point. These themes can be discerned and recognized as one considers the historical events associated with the Colorado River and especially the legal and institutional framework that governs the allocation and use of the waters of the Colorado. That these themes have been replete in the history of the River is not surprising, given the political, legislative and judicial origins of many of the elements of the Law of the River.

Management of resources inescapably involves people interacting with other people. For this reason, the type and quality of the interpersonal relationships and interactions of those involved defines the effectiveness of the management that occurs. If the involved parties find that

their trust and respect for the positions and viewpoints of other managers or users of the resource is lacking, there will be impediments to cooperatively working together in the most effective manner. Cooperation thus requires a willingness to invest in understanding others' viewpoints and acceptance that their viewpoints are valid. While not a new approach, we suggest that increasing the quantity and quality of cooperation among the seven Basin States and their water users is a key aspect of efforts to increase the effectiveness of river management.

It is our view that the Basin States have for some time recognized the need to increase their cooperative efforts. The completion of the Central Arizona Project, the occurrence of the driest consecutive five-year period (1988-1992) on the River, the severe drought in California that began in 1991 and other factors all have contributed to the States' joint recognition of the need to more effectively "pull together." To that end, the seven Basin States, later joined by the ten-tribe Colorado River Tribal Partnership, commenced a dialogue in 1991 to assure that the junior priority users of Colorado River water in California continued to receive a full supply of water during the drought in California while resolving the long term issue of California's continuing reliance on annually diverting more than her basic apportionment of Colorado River water. While the drought has passed in California, the need to resolve those issues has not and productive dialogue between the states is continuing to occur on a monthly basis. As a part of those efforts, the Lower Basin States have actively been investigating potential water supply sources for California and Nevada through a staff-level Technical Committee and extensive discussions among their water resource officials as they attempt to develop Lower Basin solutions to these Lower Basin water supply issues.

Cooperation also necessarily requires sharing of information. Historically, commitments have been made without enough information, as previously noted. An information revolution is presently occurring on account of the widespread accessibility of the Internet and its tremendous and extremely powerful capability for sharing information in various formats, including graphically, on an essentially instantaneous basis. Through this medium, governmental agencies and entities are making available massive amounts of information concerning the Colorado River. As but one example, more than 60 people are receiving weekly or more frequent electronic mail messages from the U.S.B.R. detailing the current inflow and outflow conditions at Flaming Gorge Dam. More information about the Colorado River is available on a more timely basis than has ever been the case previously and the depth and breadth of the data are increasing daily! We in Wyoming believe that ready access to reliable data of all types con-

cerning the Colorado River is a great boon to increasing cooperation and understanding the dimensions of the Colorado River and associated issues and concerns. Further increasing the amount and detail of available information about the Colorado can, both directly and indirectly, improve the effectiveness of river management.

CHRIS GEHLKER

SIERRA CLUB - PALO VERDE GROUP
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ISSUES INVOLVING THE PROTECTION OF ENVIRONMENTAL, RECREATION AND CULTURAL RESOURCES. The environmental community is increasingly becoming a constituency in search of an agency that they can fully support. Reclamation made a half hearted attempt, which seems to have ended, to become a proactive environmental agency. Caught between an administration that is belatedly realizing that they need the votes of the environmental community and a western congressional delegation that remains firmly wedded to the extractive-developmental interests, Reclamation seems only to have alienated its traditional supporters. Its prospects for survival as anything more than a small fraternity of dam tenders are dim.

Meanwhile, the view from Arizona is of an environmental community that is becoming increasingly disenchanted with their traditional allies in the Fish and Wildlife Service (F&WS). It's a strange sort of rift. The environmentalists certainly will rally to defend the Service's budget. On a personal level, the relationship between agency staff and the volunteers in the environmental advocacy groups is more than cordial. Agency staff are frequent speakers at meetings of environmental groups and environmentalists tag along on agency field trips. Members of both groups share core values. And yet it is hard to find an activist member of any environmental group who will express unqualified support for F&WS. When the environmental organizations communicate officially with the Service, it is often to threaten a lawsuit.

It is unclear why this should be the case. I offer two somewhat speculative reasons to stimulate discussion.

One reason may be that the fundamental paradigm of Fish and Wildlife is no longer perceived as adequate. In this paradigm, call it ameliorative parasitism, the F&WS exists to siphon off a portion of the budget of more proactive agencies such as the Forest Service and the water resources development agencies. This tariff imposed on the budgets of the host agencies is spent first to maintain the F&WS and then to mitigate the adverse environmental impacts of the host agency's programs. In an era where the budget of

Reclamation, in particular, is shrinking and there are few new project starts, F&WS will not only shrink but it will devote an increasing portion of its diminishing resources to self-preservation and a decreasing portion to activities that directly further the recovery of any species. One need not be unduly cynical to believe that F&WS has a profound stake in the continuance of a water project construction program as well as in logging and grazing. F&WS likes to publicize that they have never actually stopped a project. Some in the environmental community think it's about time. The Service needs to have a role which is independent of the development agencies or it will simply become irrelevant.

To the extent that F&WS can transcend it's role as a parasite and develop a proactive agenda, it will recapture the complete allegiance of the environmental community. The tremendous popularity of the Mexican Wolf and California Condor reintroduction programs, not only within the environmental community but with the population at large, provides ample evidence. All the Service needs are some successes in these programs combined with better publicity for their one success, the light-footed ferret reintroduction.

The other, darker, reason that there is an increasing rift between the F&WS and the environmental community is ironic in light of the question that these comments are supposed to address. The F&WS is first and foremost a recreation agency and they can't be that and an environmental organization too. This is painful for the environmental community to acknowledge because it overlaps so much with the aquatic recreation community. Sportfishing is incompatible with the recovery of T&E species in the southwestern United States, period. Power boating is incompatible with environmental preservation in many places. Even river running is becoming incompatible with environmental preservation in some places. The F&WS staff knows this, the water buffalos know it and, despite some really creative denial mechanisms, we environmentalists know it in our hearts as well.

STEVE GLAZER

HIGH COUNTRY CITIZENS' ALLIANCE
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ISSUES THAT INVOLVE THE INSTITUTIONAL
FRAMEWORK

Basin of Origin Protection-Transbasin diversions from the headwaters of the Colorado River Basin is an issue of concern to everyone in the basin. Because of the reliance of state law to resolve issues of water allocation, those outside the state where depletions occur are excluded from participation in decision-making processes affecting them. We need to

have an interstate authority beyond the Compact that can deal with watershed issues that transcend state boundaries. There are currently conflicts between federal and state mandates that don't seem to have a forum to resolve these conflicts that also allows the public to participate. Without this larger forum where all interests are represented, conflict resolution will be slow with no guarantee that equitable solutions can occur without court intervention.

ISSUES INVOLVING PROTECTION OF
ENVIRONMENTAL, RECREATION AND CULTURAL
RESOURCES/ROLES OF FEDERAL, STATE, TRIBAL
AND LOCAL GOVERNMENTS.

These issues cannot easily be isolated. How we deal with the resource issues will be driven by what role each entity plays and vice-versa. If we employ thorough cost/benefit analysis that recognizes all direct and indirect effects, and let the water use migrate to its best and highest use, we will remove all subsidies, include environmental protection and provide water and include the recognition contingent valuation of our resources. Continued reliance on our courts to resolve our conflicts only produces winners and losers when in fact we are seeking win/win solutions.

TOM A. HINE

ARIZONA POWER AUTHORITY
PHOENIX, ARIZONA

In the discussion at the Colorado River Workshop, a representative of environmental interests suggested having power users pay all of the costs of environmental remediation of the Colorado River. The speaker reasoned since everyone pays a power bill this would be a reasonable way to distribute the costs to everyone. The only drawback that the speaker saw to such an approach was that the rates for Colorado River hydro electric might become uncompetitive if burdened with all of the environmental costs.

This position represents a departure from a long held principle of the environmental movement. For over twenty-five years environmentalists have advocate internalizing externalities. The concept is that by permitting industries to degrade the environment, the burden of a portion of the industries' activities is not born by the industry or its customers but rather becomes a cost to society. Society must either spend the money to remedy the degradation or must continue to suffer its effects. The offending industry gains an advantage over its competitors and places those competitors in a position where they are encouraged to externalize portions of their costs in order to compete.

In the recent past we have observed two events in the Grand Canyon area in which electric utilities were forced

to bear a disproportionate burden of environmental remediation. When the Navajo Generating Plant was cited as causing a portion of the visible pollution in the Grand Canyon on some winter days, the plant owners agreed to install expensive devices and reduce generation at necessary times in order to control emissions. They agreed to these costly measures despite the fact that other sources which were responsible for a far greater contribution, Los Angeles auto pollution and Mexican copper smelters, were not required to take similar steps. The principle that the electric industry was responsible for internalizing its costs was accepted despite arguments that the plant's emissions were insignificant if nothing was done about the other sources.

In the Grand Canyon environmental studies not only were the remedial steps which resulted, i.e. restricted generation and the loss of generation through the habitat/beach building release, a cost imposed exclusively on power users, the enormous cost of the studies were also imposed on the power users. It would be difficult to argue that power is the only cause of environmental problems on the river yet power bore the entire costs of these activities.

It is not clear whether the environmental community has found an easy target or whether it views electricity, in some Neo-Luddite fashion, as the cause of all the environmental evils of the modern world. Either way it appears to be abandoning the principle of internalizing externalities. The idea that power users should pay for environmental remediation regardless of who caused it sends the wrong signal to others whose activities impact the environment of the river. If hikers, rafters, fisherman, water users, farmers, recreationists, concessionaires and others are causing problems on the river, the burden should not be shifted to power users. Because they pay nothing for remediation, they have less incentive to alter their activities in order to reduce impacts. The fact is everyone pays a power bill. If spreading the cost broadly is an acceptable solution, then simply letting society bear the cost is acceptable.

The experience of the environmental interests in past few years that electric utilities are easy targets when money for environmental remediation is required, may be misleading. In the new world of deregulated competition in the electric utility industry, power producer will have to risk raising prices to uncompetitive levels. Convincing such producers that spending large amounts on environmental remediation will be far different than the experience at the Navajo Plant.

If the deregulation is successful in driving down the cost of electricity, the value of Colorado River Storage Project power will fall below its present price which has been significantly increased by environmental costs. If this occurs

the government will be forced to reduce the price and the power customers will no longer be available to fund even a fair share of the cost of environmental programs.

The environmental interests would wise to examine the unintended consequences of abandoning a long term principle.

PAMELA HYDE
AMERICAN RIVERS
PHOENIX, ARIZONA

Protection of environmental resources and restoration of ecosystem processes in the Colorado River basin must continue to be a growing priority in the management equation. In the past, the environmental impacts of development of the Colorado River were ignored, as the river was altered to store water for reliable year-round use, expedite delivery of water to areas of human need, and produce power. As the environmental consequences of these alterations manifested themselves in the form of species declines, management turned its attention to stemming the loss of species, thereby setting up a conflict between endangered species and human consumptive uses and ultimately treating the symptoms, not the underlying problem. Although preventing extinction of species is important, the more comprehensive goal of management should include a return to a functioning river system that supports sustainable human uses.

In order for the Colorado to sustain into the future the multiple resources and uses that it supports in varying degrees today, it must have the ability to function as rivers do naturally. One of the greatest losses to the river as a result of its structural alteration has been the loss of the processes that sustain and define the ecosystem. For example, the Colorado River system was strongly characterized by periodic disturbance in the form of flood events. Alteration of the system has reduced the size and frequency of those flood events, removing the very processes that the ecosystem depends upon. It is the loss of the natural processes that has caused environmental and endangered species problems along the Colorado River.

A functioning Colorado River can also support human uses, as long as they are at sustainable levels. Determining sustainability of these uses involves a balancing process, which requires full knowledge of the biological and ecological interactions of the river system and full quantification and integration of all costs and benefits associated with various levels of use of the river. Keeping human uses at sustainable levels may mean a long-term reduction in levels of use from current levels, but managing for sustainability will increase the likelihood that those uses can continue to be supported in the future.

A good example of ecosystem restoration that was process-focused is the March 1996 habitat/beach building flow in the Grand Canyon. In order to positively impact several elements of the Grand Canyon ecosystem, part of the natural flooding process was reintroduced into the canyon. Positive effects rippled throughout the ecosystem. Some human uses, especially hydropower production, were impacted, but it was proven possible to restore ecosystem processes without major disruptions in human uses. Management of the river should seek these opportunities in an integrated fashion throughout the basin.

The Colorado River has the potential to be both a great natural resource and a great human resource in perpetuity. But the key to reaching this potential is returning the river to a healthy, functioning system with natural ecosystem processes. This may take both a shift in the way we think about the river and its importance to us as a species, and some technological advances. However, we should strive to reach this ultimate vision. Cooperation will be critical, since all stakeholders in the basin must share this vision. But since the long-term benefits of a healthy river accrue to everyone, it is in the interest of all stakeholders to work toward restoring the river ecosystem. Management today should begin the challenge of bringing the river back to health, with the understanding that it will not happen overnight. There is a great deal that we can undertake in the near future that can begin to restore the processes that will heal this mighty river. It is time to get started.

BILL JACKSON & BRIAN CLUER
WATER RESOURCES DIVISION, NPS
FORT COLLINS, COLORADO

The storage, distribution and consumption of Colorado River water has a significant relationship to the management of the National Park System. The Colorado River and its tributaries flow through eight National Park Service (NPS) units. Three NPS units - Curecanti, Lake Mead and Glen Canyon contain large reservoir resources associated with major dams. Other parks such as Dinosaur, Black Canyon of the Gunnison, Canyonlands and Grand Canyon all contain free-flowing but regulated portions of the Colorado River system downstream from major dams.

The intent of Congress in establishing "natural-area" parks such as Grand Canyon National Park clearly is in conflict with the Congressional intent in authorizing the major water storage projects on the Colorado River system. There is inherent conflict between the storage, delivery and consumption of river water, and the conservation of native river landscapes and ecosystems.

While these conflicting mandates may never completely be resolved, we need to ask the question, "Do the laws and institutions which determine the allocation of the Colorado River work to reflect modern societies' values?" We agree with those who have argued that fundamental legal/institutional changes are needed to improve allocation of Colorado River water to meet the region's modern economic, social and environmental priorities.

Proposals to institute a more "market-based" system of water allocation would tend to maximize the economic benefits of Colorado River water. To the extent that water markets favored consumption farther downstream, there could be more water instream in National Parks and potentially more opportunity to manage streamflows for ecosystem conservation and recreation. Any mechanism for water allocation would have to be implemented within an institutional framework which allows for social and environmental values of the region to be reflected. Financing for environmental conservation and other non-consumptive uses of Colorado River water could potentially be achieved by dedicating a portion of Federal hydropower revenues.

While evolving the laws and institutions of water allocation may take decades, genuine progress can be made within the context of our existing institutions in improving the operation of dams for environmental and recreation values. Physical issues stemming from the construction of dams such as the elimination of downstream sediment transport, and altered (colder) water temperatures can possibly be addressed through structural modifications. Issues related to instream flows and reservoir storage can be addressed, at least in part, by changes in annual operating plans and the long-term criteria governing the operation of the Colorado River reservoir system.

Currently the Colorado River Annual Operating Plan (AOP) is developed in absence of any environmental criteria. Ecological criteria for such things as the frequency and timing of spills (for downstream environmental purposes), seasonal hydrographs (instream flows), and reservoir levels are needed. Environmental needs may be reflected in such things as increased risk of spills, strict limitations on "surplus" water consumption, and modifications of the upper/lower basin equalization criteria. To the extent that high-flow releases for environmental purposes reduce annual hydropower production, it may be possible to compensate in part by providing for greater flexibility in meeting daily power demands.

We believe that stringent standards for ecosystem sustainability must be factored into the criteria which govern the management of the Colorado River system. A basinwide

approach, which is responsive to environmental as well as cultural and economic needs of society should drive Colorado River water allocation and management. The approach needs to strive for a balance between consumptive and non-consumptive uses that meets current and future societal priorities and provides for the long-term sustainability of critical ecosystem components and processes in the United States and Mexico.

Planning for management of the river and related resources is best accomplished by an institution representing the range of stakeholders, including advocates for the river's national parks and protected areas. As a society, we will need to make a major investment in understanding the river system's natural ecosystems, the requirements for sustainability, and their response to water allocation decisions. Just as present water allocation decisions are based upon hydrologic models and consumption demand, future decisions will also have to be based upon a stronger body of natural resource science.

JAMES C. LATHAM

ARIZONA STATE LAND DEPARTMENT
PHOENIX, ARIZONA

Issues involving protection of environmental, recreation, and cultural resources are becoming increasingly more important in the lower Colorado River basin. For many years the areas along the Colorado River have been a haven for squatters, and often times the undesirable element of society.

I would like to see a concentrated effort by the combined Federal agencies and the States of Arizona, California and Nevada pool their resources and authority to clean up the river. The first task to be accomplished would be ownership of abandoned channel (sovereign) land. Arizona owns over 9000 acres in the Palo Verde Valley south of Blythe, California, as an example. In the past, sporadic attempts have been made to settle the sovereign land question, but nothing has been accomplished because the three states have been working independently instead of in a combined effort. It is my opinion that if the states would indicate an interest in improving the river, the Indian tribes would cooperate and lend their support, since the tribes have recently realized the importance of economic development.

There are many areas along the river not claimed by the states or the Federal Government due to the wild meandering of the stream thread or cut-offs. Examples of these can be found in the Palo Verde Valley/Ehrenburg areas. The Bureau of Land Management could lend assistance in deciding the ownership of these stretches of "no man's land".

In conclusion, the lower Colorado River basin has the potential of becoming the "gold coast" for Arizona, California, and Nevada with the proper management by the states involved.

MICHAEL LEWELLEN

DENVER WATER
DENVER, COLORADO

Report on the possible interaction of our PACSM Model with the Bureau of Reclamation's Big River Model
The development of Denver Water's new river model, PACSM (Platte and Colorado Simulation Model), has unlocked the door to more detailed analysis of Denver's raw water operating system. This daily planning model that simulates the time period of 1947-1991 allows Denver to model its complex physical operating system under Colorado's prior appropriations doctrine. Operating through a range of wet to dry water runoff years helps determine the availability of water the system can safely yield to supply its customers. Currently, the PACSM model simulates the Colorado River down to the Grand Valley area near Grand Junction.

The current Bureau of Reclamation's Colorado River model, CRSS (Colorado River Simulation System), was developed in the mid 1970's to simulate the operation of the river while abiding by the "Law of the River". The "Law of the River" consist of various laws, treaties, compacts and formal operating strategies developed for the river. This model simulates monthly time steps by combining demand data, hydrology input data and control data to analyze water supply, long-term operational effects, salinity and power generation. This model simulates the river from its headwaters to the border with Mexico.

In the near future the Colorado River Basin will be squeezed more and more for its limited resource, water. The lower basin states currently are using almost all of their entitlement and are looking outward for more water. The upper basin still has unused water but the day will come when this is needed within its borders. When this supply is needed by all the states in the basin, more accurate water simulation tools will be required. Anytime a water project is proposed, the effects of the project on the overall operations of the Colorado River will have to be studied.

To allow the models to work interactively, a common connection between the models must be identified. This point would be the reach on the Colorado River between its headwaters and Glenwood Springs since both models operate in this area. The CRSS model uses a set of developed hydrology at Glenwood Springs (Colorado River near

Glenwood Springs, CO) as upstream Colorado River input to the model with a set of assumptions on demands and operating patterns affecting this flow. The PACSM model operates many of the reservoir operations, water exchanges and diversions upstream of Glenwood Springs. Comparing the virgin flows at this site for both the models, CRSS has an average annual flow of 2,132,000 acre-feet for the 1906-1983 period while PACSM has an average annual flow of 1,970,000 acre-feet for its 1947-1991 hydrologic period. The difference here is attributed to difference in period of record.

The difference between the two models in their common operating area is that CRSS uses around 25 demand points in this reach compared to around 70 demand points in PACSM. CRSS does not model any of the reservoirs upstream of Glenwood Springs while PACSM simulates the operations of Granby, Willow Creek, Williams Fork, Dillon, Green Mountain, Wolford, Homestake and Ruedi Reservoirs in this area. This means CRSS cannot simulate the different water exchanges, transfers, substitution patterns and release schedules that PACSM operates.

To make a useful study involving both of the models the user would first setup and run PACSM with this model generating an output file of remaining flow on the Colorado River upstream of Glenwood Springs. This file would be converted to a monthly time step and inputted into the CRSS model hydrology generation program. This new input hydrology would then be used in the CRSS model to study the effects of upstream development and operation on the downstream reaches of the Colorado River. This combination of models does have some basic problems. Since the CRSS model deals with flows volumes in increments of thousands of acre-feet, the relatively minor flow changes resulting from PACSM could be hidden in the output. With more and more detail demanded in the modeling world it will be necessary that the next generation model, PRYSM, be capable of analyzing the big picture in much more detail.

ROBERT S. LYNCH
 COLORADO RIVER ENERGY DISTRIBUTORS
 ASSOCIATION
 PHOENIX, ARIZONA

The basic problem with this paper is that its initial suggestion for change is to change the Law of the River. Those of us who have spent considerable time dealing with that subject realize how embedded the Law of the River is in the economic, social and political life of the seven Colorado River basin states. To start with the suggestion that all this be disrupted immediately denigrates the credibility of the authors with the largest interest groups they are ostensibly attempting to reach, the beneficial consumptive users.

Their suggestions also automatically antagonize hydropower users by tagging them with the economic responsibility for bearing environmental costs in the basin essentially forever merely because they are a good source of money, not because they are the source of the impacts to be addressed.

They also attack agriculture by suggesting that economic markets govern water use, knowing that other economic interests can always outbid agriculture for water where water rights are ignored.

Finally, they commit the most unpardonable sin, in my view, by ignoring the opportunity for augmenting the basin water supply. In 1968, Congress promised that would happen. It hasn't. It can. All the problems identified have one cause: perceived water shortage. All of them can be resolved by one thing: more water. Instead of seeking their environmental solutions by tearing down the institutions embedded in Colorado River water use, the authors could have done a larger service had they focused on how the various interests they identify could work together in the future toward augmenting the basin's water supplies. It can be done. It can be done without federal funds. It can be done while protecting environmental values. It can't be done without cooperation.

There is no point in putting forth unrealistic and threatening proposals except to antagonize. Real leadership comes from putting forward proposals that might actually achieve solutions I would hope these authors would consider refocusing their efforts in that direction.

KENNETH MAXEY
 WESTERN AREA POWER ADMINISTRATION
 GOLDEN, COLORADO

APPROACHES FOR EFFECTIVE MANAGEMENT OF COLORADO RIVER BASIN RESOURCES HYDROPOWER PRICES/MARKETING/REVENUES

I recommend that the overriding objective for management of the Colorado River Basin is to create a framework of certainty within which resource management interests can set their strategic objectives and goals. In terms of hydropower, this would translate primarily into financial certainty. From the standpoint of the beneficiaries of Colorado River hydropower, the last decade has been one in which environmental and recreational stakeholders have successfully constrained hydropower operations to the detriment of hydropower users, and simultaneously maneuvered the power community into paying for the studies, experiments and reports associated with the Glen Canyon EIS and much of the Upper Colorado Recovery Program.

At the same time, serious issues of non-native predation on endangered fish and effective warming of the main channel waters have been set aside as inconveniently difficult problems to resolve relative to the ease at which hydropower operations can be manipulated.

Governmental agencies and stakeholders have ambitious plans for protection and restoration of environmental and cultural resources in the Colorado River Basin. Those plans take money to implement, and the primary sources likely will be Federal appropriations or hydropower revenues. As momentum gathers to bring the Federal deficit under control, appropriations for these purposes will become more scarce.

Provisions of the Grand Canyon Protection Act have mitigated some of the financial effects to hydropower users, but the prospect of continued operational and financial impacts looms with ongoing and new initiatives in the Green and Gunnison River basins. The tendency will be to look more and more to hydropower for support, and the power community's resistance will rise accordingly. The success of protection and restoration of environmental and cultural resources in the Colorado River Basin, and the stability of power operations and to support associated costs, will wax and wane with the political vagaries of the moment, and waste much scarce resources in the process. The creation of long-term certainty for stakeholders in the basin may be an attractive alternative given that those stakeholders can be on the winning or losing side of the political spectrum at any given time.

Recommendation 1: Create a long-term (20-year) strategic plan for environmental and cultural efforts in the Basin. The plan should clearly state the vision for the river basin, set objectives, and prioritize goals.

Recommendation 2: Create an explicit business and financing plan for executing the strategic plan. The business and financing plan would cover: Financing of annual costs (scientific studies, short-term power replacement, administrative costs, etc.) would take place with a combination of Federal appropriations, power revenues, contributions by basin states, and user fees (recreation, access, etc.). There would be a specific formula and absolute limit on the annual contributions from each source. Financing of construction or acquisition costs (structures, water rights, land, etc.) with a combination of Federal appropriations, power revenues, and bond financing backed by power revenues. There would be a specific formula and absolute annual and bonding limit on the contributions from each source. The plan would need to ensure rate neutrality to the power users; i.e., the financial plan will cost them no more than what they would pay under current rate assumptions. More so, further operational con-

straints placed on hydropower would need to be explicitly recognized and compensated for through adjustment in the direct financial contributions by power users. The plan would need to ensure Federal financial neutrality. The Federal government will be looking for short-term financial neutrality (PAYGO) as well as long-term limits on appropriations and revenue impacts. The primary vehicle for effecting such neutrality will need to be the explicit shift of power repayment support from irrigation projects to environmental support projects.

Recommendation 3: Create an Advisory Board. The development of the strategic, business and financial plans should be vested in an advisory board reporting to the Secretary of the Interior. Ideally, the advisory board would be relatively small representing the value oriented interests in the river basin; e.g., environmentalists, Native Americans, recreation, power, States, etc. In all likelihood, the board will not be able to remain small since history has proven that (1) there is limited homogeneity even among interest groups with similar value bases and (2) few agencies, interest groups or stakeholders will hand their proxy over to someone else to exercise.

The opinions and recommendations expressed herein represent the author and should not be interpreted as the position of the Western Area Power Administration or the Department of Energy.

JASON MORRISON

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A rethinking of Colorado River management is necessary not only because the river is grossly "over-apportioned" in terms of consumptive uses, but also because many values for water, such as non-consumptive uses, are not explicitly recognized in the current approach. Environmental and recreational values have recently been acknowledged as legitimate contenders for the use of the river's water, but as of now, hold no explicit, quantified rights to the waters of the Colorado River.

When the waters of the river were divided over seventy years ago, no water was explicitly dedicated to maintain instream flows for healthy aquatic ecosystems. One could argue that instream flows were accounted for by the 1922 Compact signatories when they apportioned only 15 maf of a river they believed to have an annual average flow of 18 maf. Unfortunately, that 3 maf cushion was based on inaccurate assumptions about the long-term average flow of the river. Despite the fact that the river's flows were grossly

overestimated, subsequent laws and decrees have been based upon the original Compact apportionments.

Up until the present, any "minimum flow requirements" have been provided from unused entitlements. In this sense, the environment is living off of "borrowed" water. As all the legally apportioned water for human uses is eventually utilized by basin states, important questions arise as to what will happen to the aquatic ecosystems of the river. Unless a mechanism can be established that provides water for the environment, water will most likely be taken from the most junior water rights holders in order to meet Endangered Species Act and National Environmental Policy Act requirements as they currently exist.

Any environmentally sustainable "regional solution" will have to address the need for additional water to prevent species extinction and habitat protection. The first step to incorporating ecosystem values into a comprehensive management plan will be to reach consensus on what the river should look like in twenty or a hundred years, with specific information about the water requirements of particular environmental scenarios. Decisions will have to be made about which portions of the basin can, or should, be restored and maintained at what economic and social cost. These decisions will have to be agreed upon by a reasonable majority of stakeholders in the basin. Once a consensus "vision" is established and aquatic ecosystem needs quantified, attention can then focus on finding ways of freeing up the water to meet those needs. Conservation, increased efficiency, recycling, reuse, changes in the agricultural crop mix and the retiring of agricultural land are among the strategies that can be combined to save and reallocate water cost-effectively.

If the institutions that are being put in place now for the long-term management of the river do not address the issue of water for environmental values, it will be nearly impossible in thirty years when demands have caught up with what are now surplus flows and when scarcity will be even more an issue. It will be a tremendous failure if the needs of aquatic ecosystems are not explicitly addressed at this transitory period in the river's management when institutions are being restructured to meet future challenges.

PATRICIA MULROY

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WATER MARKETING

In Southern Nevada, we believe that one of the most effective management tools for reconciling supply and demand in the Colorado River basin is water marketing.

Institutional and administrative barriers should be removed in order to allow supply to meet demand, when there are willing sellers and buyers. The various marketing approaches that have been suggested generally describe lower basin, interstate transactions. These approaches have focused on short-term water—conserved water, unused allocations or stored water, not the reallocation of water rights.

NEVADA

Southern Nevada is the fastest growing metropolitan area in the country, and one of the driest, averaging less than four inches of rainfall per year. Intense water planning efforts have been underway since 1990. Artificial lakes are banned, water waste ordinances are in place, and lawn watering is restricted during the day. "Cash for Grass" studies, retrofit programs, and public education programs are underway. To achieve water-conserving rates, local water agencies have switched to increasing block rates and are steadily raising their rates.

All of the region's Colorado River water supply is reused - either directly by power plants and golf courses, or indirectly through "return flow credits." (For each quantity of treated Colorado River wastewater returned to the river, we can divert that much more river water; this is already factored into our supply.) In addition, water agencies are beginning to use the local shallow aquifer. Furthermore, Southern Nevada has the largest recharge program via deep well injection in the country, its primary purpose to store water in the local aquifer as a "bridge" between future supplies.

With all of these programs in place, Southern Nevada still needs water. A key, publicly-supported resource policy is to pursue more Colorado River water. Forecasts show that approximately 60,000 acre-feet per year of additional water is needed to meet demands through 2025. This volume is less than one-half of one percent of the annual Colorado River flow, while Nevada's original allocation is only about 2 percent of the annual average flow of about 15 million acre-feet per year.

Southern Nevada would be happy to purchase reasonably-priced water or pay for interstate water banking. Nevada's primary desire is for some form of interstate marketing. Virtually all of Nevada's Colorado River water use is in cities, there are no in-state agricultural Colorado River users from which to transfer water allocations or conserved water. Therefore, Nevada needs barriers to interstate marketing removed. If Nevada could pay for conservation in another state or pay for intrastate marketing within another state, then that water could be made available to Nevada.

BUREAU OF RECLAMATION

In May 1994, the Bureau released its "Draft Regulations for Administering Entitlements to Colorado River Water in the Lower Colorado River Basin." The draft regulations are an attempt to correct the current supply-demand mismatch by allowing the interstate leasing of conserved water. The water would be banked in Lake Mead and then marketed. These regulations are on hold, with the hope that the three lower division states can arrive at some mutual solution.

ARIZONA WATER BANK

In July 1994, Arizona recommended its approach to lower basin river management in a paper entitled, "Arizona Water Bank Proposal," whereby each state would have its own bank. The state banks would control both intrastate water transactions and the state's interests in interstate banking. Water stored in Arizona's bank could be made available to California and Nevada for a price. Arizona has moved forward with the creation of the Arizona Water Banking Authority in 1996. The legislation that created the Authority provides for interstate banking off-system of up to 100,000 acre-feet per year. Nevada is very interested in Arizona banking and is participating in discussions to develop regulations or amend the Decree to ensure banked water returns to the state that funds the banking, exempting such water from the existing contracts for unused apportionments.

Nevada's population continues to grow. While Nevada sees a need for many elements to be included in a complete regional solution, Arizona's water bank provides an important element in reaching a solution. All Colorado River stakeholders are challenged to achieve a united approach in management of the system, to meet the water supply, hydroelectric, recreation, and wildlife needs.

JOE MUNIZ & JESSICA ABERLY

JICARILLA APACHE TRIBE

INCREASING THE EFFECTIVENESS OF
THE MANAGEMENT OF THE RESOURCES
OF THE COLORADO RIVER BASIN

It is imperative that all stakeholders in the Colorado River basin begin to think of River management in terms which fully recognize and incorporate both the sovereign status of the thirty-three Tribes located within the basin and the trust responsibility of the United States government to those thirty-three Tribes. Ten of those thirty-three Tribes, including the Jicarilla Apache Tribe, occupy Indian reservations with claimed or vested water rights to the Colorado River. The framework for decision-making within the Law of the River needs to be altered to account for

the fact that the Tribes within the basin, although excluded from the 1922 Colorado River Compact, typically have or will have the senior water rights on the River.

Two issues of primary concern to the Jicarilla Apache Tribe which are integral to any discussion of management of the Colorado River basin are the implementation of the Endangered Species Act and the emergence of water-marketing.

Implementation of the Endangered Species Act provides a prime example of the problems inherent in the present management structure wherein, as noted in MacDonnell's and Driver's discussion paper, "Rethinking Colorado River Governance," the Federal agencies are primarily responsible for managing non-consumptive uses, the States are primarily responsible for managing consumptive uses, and the Tribes are disregarded until a crisis arises. As a result, in part, of the conflicts inherent in such a structure, Tribes in the San Juan River basin are now required to shoulder an unfair share of the conservation responsibility to protect native fish endangered by non-Indian water development. Tribal reserved water rights should not be treated as unperfected state appropriative rights subordinate to existing state water uses in the recovery process. Recognition of reserved water rights in the Section 7 process is one possible new management approach. The Jicarilla Apache Tribe, which practices ecosystem management on the reservation, not species-by-species protection, also advocates a framework for endangered species protection which, through memorandums of agreement with pertinent agencies of the United States, recognizes and defers to Tribal environmental and natural resource laws, traditions, and customs.

Although the Jicarilla Apache Tribe advocates changes in the framework for decision-making of management of the Colorado River basin, the Tribe also believes such changes can occur within the framework of the existing State compact allocations. Protection of vested Tribal water rights does not preclude protection of State compact allocations. Indeed, "Arizona v. California", 373 U.S. 546 (1963), ensures that Tribal water rights are to be fully protected and recognizes that the United States has been granted by Congress the responsibility for administering, regulating, and developing the waters of the Colorado River for the benefit of both the States and the Tribes.

The Jicarilla Apache Tribe believes that intra- and interstate water marketing of the waters of the Colorado River is consistent with the Commerce Clause and can be structured so as not to undermine the Compact allocations. One possible structure which the Tribe advocates includes allowing water-short States to privately negotiate leases from the Tribes and the water-surplus States, with each lease subject to approval by the Seven Basin States and the

Secretary of the Interior. The Tribe also envisions the creation of a Colorado River inter-tribal water bank which could act as a clearinghouse for the water leasing for those Tribes with vested water rights. This for-profit entity would be an Indian-chartered corporation organized by the Tribes which could handle the accounting and technical matters associated with leasing. The water bank could provide financial assistance to the individual Tribes, but the Tribes would still negotiate their own lease agreements. The Jicarilla Apache Tribe also is willing, on a case-by-case basis, to explore other water-banking options.

The Jicarilla Apache Tribe believes that the future management of Colorado River water resources will necessarily involve changes in policy and use that will be significantly different from past practices. Full Tribal recognition and Tribal participation in all stages of planning are key. Only through sustained, meaningful government-to-government consultation with the Native American Tribes of the Colorado River basin can lasting decisions and beneficial utilization of Colorado River water resources occur.

ANDRE POTOCHNIK

GRAND CANYON RIVER GUIDES

FLAGSTAFF, ARIZONA

LET THE RIVER RUN FREE: ON THE DESTINY OF COLORADO RIVER DAMS

The Colorado River serves many functions for humankind; agriculture, water supply, recreation, electricity, spirituality and others. By building dams and diversion works along its path, we have demonstrated mastery and control of the water. This control is short term, however, and will certainly be relinquished in just a few generations.

The Colorado's primary function in nature is geologic, it moves water and sediment from the uplifted continental interior to the sea. Our dams can manage the water, but not the sediment. Great annual pulses of sediment will continue to move irresistibly toward the sea. All future management of the river must include sediment flux in the equation. If we continue to ignore this locomotive barreling down the track toward us, then we are destined to become road kill in its path.

Consider this hypothetical scenario; it is September 29, AD 2099. The Commissioner of Reclamation is pacing the floor, cursing those who didn't see this train wreck coming. She holds a document entitled Approaches to Basin Management, 1996. "The ideas are here; they had the knowledge, the expertise. Why didn't anyone speak up? How could they be so shortsighted?". She assesses the situation...

In the past century, three multi-year wet climate cycles in the southwest have mobilized enormous amounts of sediment from thousands of small tributaries across the Colorado River basin. The effect has been to nearly double the predicted rate of sedimentation in Lake Powell. Now that the reservoir is almost half full of sediment, it can barely store the average annual flow of the river. Lake Powell is drained dry each winter in order to prevent unplanned clear-water floods from coursing through the Grand Canyon, floods which would scour the remaining sand and vegetation from the riverine habitat in this treasured National Park and International Heritage Site. The advancing sedimentary deltas of the San Juan River and local tributaries near the dam have silted-in the original intakes for the turbines. Due to greatly fluctuating lake levels, Glen Canyon Dam produces relatively small amounts of dependable electricity and only then because of the multi-level intake structure, originally built to protect the endangered native fish in Grand Canyon. Worldwide oil and gas shortages have prohibited recreational power boats on Lake Powell.

The Commissioner must submit a recently completed EIS on reservoir operations to the Secretary of Interior by Jan. 1, 2100. There are three proposed alternatives:

- 1) allow clear water floods to bypass the turbines, eventually scouring all remaining sand and vegetation from the river corridor in Grand Canyon (no action alternative),
- 2) initiate massive sediment slurry pumping from the reservoir into the Grand Canyon (highest long-term cost alternative), or
- 3) disassemble the dams, allowing the river to slowly reclaim its ecologic and geohydrologic heritage (high initial cost alternative).

The U.S. Treasury is nearly bankrupt and there is no political will to support costly federal water projects. In the previous several decades, "long-term sustainability" has become the governing concept for all public works projects, and is also the new societal paradigm which replaced the old paradigm of "limitless growth". Local food production has largely replaced industrial agriculture, with its attendant high transportation and environmental costs. The Imperial and Coachella Valleys have mostly returned to desert conditions due to soil salinization and water transfers to thirsty urban areas.

The Commissioner thinks to herself... "it may have been considered inconceivable 100 years ago, but there can be only one preferred alternative, ...remove the dam. The public would be wildly enthusiastic about the 'reclamation' of Glen Canyon to its natural state at little cost to the treasury. It's the bold, visionary approach. It's the politically

expedient alternative. The Bureau of Reclamation will live up to its name. Yes, the President will like this... "

"Unless we change direction, we are likely to end up where we are headed."

-ancient Chinese proverb.

JOHN P. RITENOUR

GLEN CANYON NATIONAL RECREATION AREA
PAGE, ARIZONA

THE NATIONAL PARKS: A RIVER RUNS THROUGH THEM
Originating in Rocky Mountain National Park, the Colorado River and its major tributaries, the Green, Gunnison and San Juan rivers, traverse Dinosaur National Monument, Curecanti National Recreation Area, Black Canyon of the Gunnison National Monument, Canyonlands National Park, Glen Canyon National Recreation Area, Grand Canyon National Park and Lake Mead National Recreation Area. The purpose and significance of these 7 units of the National Park System are related to the river, its shaping of the land and its relationship to the visitor's experience.

Single and cumulative actions taken outside the parks to protect, manage or use the river affect the ability of the National Park Service (NPS) "to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The converse is true. As an agency with mandates and responsibilities affecting 1,000 miles of rivers and lakes, NPS decisions affect all other stake holders. The role of the parks in basin management cannot be ignored.

More than 20 million people visit these parks each year. As stake holders, these visitors from all over America come predominately from California, Nevada, Utah, Arizona and Colorado. The parks are important to the citizens of the basin in providing opportunities for outdoor recreational activities. Tourism, with a dominant place in the world economy, requires that we consider the role of the river in annually attracting over 3.3 million foreign visitors to the basin.

These parks generate \$1.6 billion in local and regional economies. In some cases they provide the major employment and tax revenues for surrounding communities and counties. The river affects the visitor experience. It has value to people in just knowing it is there, even if one cannot visit it or participate in activities associated with it. Many of the 20 million visitors only view the river from a

rim or marvel at its effects on man and the environment. But of those 20 million who visit these park units over one half, 12.3 million interact with the river and lakes as river runners, hikers, boaters, fishermen, campers, sightseers, tour boat riders, waterskiers and swimmers.

Boat lakeshore campers and river runners spend approximately 3.3 million nights annually camped at the water's edge. Lakes Powell, Mead and others provide 360,000 acres of lake surface for boating and thousands of miles of shoreline for camping and other activities. Each year in these parks almost 70,000 people run the Green River in Dinosaur, the San Juan River in Glen Canyon or the Colorado River through Cataract Canyon in Canyonlands or the Grand Canyon.

Basinwide management and coordination efforts would not be complete without an understanding of how these park units affect the basin and how basin decisions affect the parks. The great diversity of recreational opportunities and activities encompassed within these river related areas explains the complexity one faces when trying to define who is a shareholder as it relates to park issues on the Colorado River. Each issue, whether it is economic, environmental or social, may create new partnerships or attract new stakeholders. Early recognition that there will be some level of interest in any issue should be considered.

The presence of these NPS managed areas, their distribution through the basin, their economic impact and the high value the public places on them are integral parts of basin management. Approaches to basin management must insure that future generations are able to enjoy them for the purposes that led to their establishment. This is not a short term proposition. It requires long term commitment by all those involved.

GEORGE V. SABOL, PHD, PE

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THE ROLE OF THE LITTLE COLORADO RIVER
IN THE COLORADO RIVER BASIN MANAGEMENT

The Little Colorado River Basin encompasses an area of about 27,000 square miles at its mouth with the Colorado River, and it enters the Colorado River in Marble Canyon downstream of Glen Canyon Dam. It is a major source of sediment supply to the Grand Canyon.

The Little Colorado River valley through Navajo County, Arizona, is a major east-west transportation corridor in to the nation. Interstate Highway I-40 passes along the river from Holbrook to Winslow and crosses the river near

Winslow. I-40 is not only a major east-west transportation and commerce route to the nation, it also ushers in major tourist traffic to the Grand Canyon National Park, Petrified Forest National Park, the Painted Desert, and other national tourist destinations. Additionally, the AT&SF Railroad follows the path of the Rio Puerco and the Little Colorado River from New Mexico to Winslow. The Little Colorado River basin has a rich environmental, recreational, and cultural resource. It contains Navajo, Hopi and Zuni Indian communities; it contains the area of some of the earliest Spanish explorers to the New World; Franciscan missions in the region date back hundreds of years; it was settled in the 1870s as a result of the Arizona Expedition of the Latter Day Saints; has a long tradition of the American westward movement; contains historic Route 66; and it is the transportation corridor connecting the Grand Canyon National Park and the Petrified Forest National Park.

The Little Colorado River Basin, being sparsely vegetated, having steep land surface slopes, and consisting of highly erodible soils, is subject to extreme rates of soil erosion—a characteristic responsible for its unique landscape. The Little Colorado River, being the outlet for runoff for the Basin, is a major contributor of sediment to the Colorado River and the Grand Canyon. Because of this geologic setting, the management of the water resources and flooding problems of the region cannot be separated from the management of the sediment and "geomorphic" processes in the river and the Basin, as a whole.

Although the Colorado Plateau is noted for production of geomorphic studies, little data are available on the hydrology, geomorphology and sediment characteristics of the Little Colorado River Basin. In a recent geomorphic study of the Little Colorado River, it is noted that flood control cannot be achieved without a system-wide management of the regional sediment problems. To achieve that system-wide management goal, there is the need for a strong local and state coordinating organization to direct the management plan and to call upon various federal agencies for assistance with work tasks that fall within the overall management scheme. It was also noted that a major deterrent to basin-wide planning is a lack of hydrologic data and that efforts must proceed to collect the necessary data to reduce decision uncertainty.

Presently, the U.S. Bureau of Reclamation, the National Park Service, the U.S. Army Corps of Engineers, the Arizona Department of Water Resources, the Arizona Department of Emergency Management, and the Navajo County Public Works Department have initiated planning efforts to explore Task Force Based Floodplain Management Planning for the Little Colorado River. In addition, Navajo County has undertaken a basic data collection program

that will have long-term resource management implications. That data may be valuable to others interested in the management of the Colorado River Basin.

It is recommended that the role of the Little Colorado River be fully considered in any management planning for the Colorado River Basin and the Glen Canyon Environmental Studies. There may be opportunities to share resources, data, and planning efforts to jointly address the needs of both the Colorado River Basin and the Little Colorado River Basin.

ROBERT SCHEMP

METROPOLITAN WATER DISTRICT OF SOUTHERN
CALIFORNIA
LOS ANGELES, CALIFORNIA

Much has been written in the past regarding the overallocation of the Colorado River. That viewpoint reflects the fact that at some point in time in the future, the average supply of Colorado River water will cease to exceed the need for water from the river and its tributaries. Fortunately, that point in time has not yet arrived and it may not for a number of decades to come. Comparison of decades-ago projections with the needs of today bears that out from a Colorado River Basin-wide perspective. Until then, the Metropolitan Water District of Southern California believes the water resources in the Colorado River Basin can be managed in a way which would meet near-term needs without jeopardizing future uses of Colorado River water. This can be accomplished through voluntary actions within the current legal framework.

Metropolitan has a great interest in the Colorado River as its waters provide a vital source of supply for Southern California. These supplies meet over 50 percent of the needs of 16 million people in Metropolitan's 5,200 square mile service area on the coastal plain ranging from Ventura to San Diego County. Metropolitan's mission is to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

One of Metropolitan's priorities with regard to its resource planning is to ensure that the Colorado River can continue to provide 1,300,000 acre-feet per year, which our service area depends upon, in accordance with our contracts with the Department of the Interior. Metropolitan diverts water from the Colorado River from Lake Havasu into the Colorado River Aqueduct.

As a junior priority user of Colorado River water in California, Metropolitan has undertaken conjunctive use,

water conservation and land fallowing programs outside our service area to increase the reliability of our Colorado River supplies. For example, through agreements with the Imperial Irrigation District, Metropolitan is providing funding to conserve 100,000 acre-feet of Colorado River water by 1998.

In 1992, Metropolitan entered into an agreement with Palo Verde Irrigation District and 63 agreements with landowners and lessees in the Palo Verde Valley to fallow 20,215 acres of irrigated farmland in exchange for monetary compensation. The water saved by the test land fallowing program, a total of 185,978 acre-feet over the two-year period, is being stored in Lake Mead for use by Metropolitan.

Combined conservation and land fallowing programs have cost Metropolitan over \$145 million since 1990. Yet the Colorado River reservoirs would have been 86 percent full at the end of July 1996 had those programs not been undertaken. Instead they were 87 percent full.

Considering the expensive nature of extraordinary conservation measures and land fallowing arrangements, reservoir management is an integral component for the future. Optimizing the beneficial use of the available and projected water supplies without unacceptably increasing the risk of future shortages is necessary and would permit additional needs for Colorado River water to be met in the next few decades. Specific criteria for declaration of surpluses should be implemented by the Bureau of Reclamation which would provide certainty in planning for acquisition of the remaining water supplies required. One step has been taken with Reclamation concluding that sufficient water was available to meet all reasonable requests for beneficial consumptive use of water in 1996, with the need for Colorado River water projected to exceed 7,500,000 acre-feet in Arizona, California, and Nevada.

In addition, flexibility in the timing of diversions is necessary to allow entitlement holders, in particular those holding junior priorities, to optimize use of available water supplies. However, use of water in excess of an agency's entitlement may require repayment to indemnify others from harm, that is, to not increase shortages or limit surpluses; unless flood control releases are subsequently forecasted.

Finally, banking of water, in Colorado River reservoirs as well as offstream in groundwater basins, is an appropriate way of managing both available and to be acquired supplies. Banking water could involve both intrastate and interstate transactions. A water bank which uses the unutilized capacity of Lake Mead, bearing its incremental share of evaporation losses and flood control releases would be an extremely judicious use of the regional infrastructure.

ROBERT SCHEMP

**METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
LOS ANGELES, CALIFORNIA**

Representatives of water, hydroelectric power, and wildlife management agencies in the States of Arizona, California, and Nevada, along with the U.S. Department of the Interior (Bureau of Reclamation, Fish and Wildlife Service, National Park Service, and Bureau of Land Management), Lower Colorado River Tribes, and environmental organizations, have initiated a proactive regional partnership to develop a comprehensive multi-species conservation program over the next 35 years.

Metropolitan is participating in this significant environmental initiative. This ecosystem-based plan, which would be implemented over a 50-year period, is intended to address the needs of over 100 species found within aquatic, wetland, riparian, and upland habitats within the 100-year flood plain of the Lower Colorado River from below Glen Canyon Dam to the Southerly International Boundary with Mexico.

Through modeling of the Lower Colorado River ecosystem, the participants of the Multi-Species Conservation Program seek to identify key parameters determining ecosystem function and community structure. Parameters to be considered include presence of non-native predators and competitors, hydrology, geomorphology, temperature regimes, historic and present habitat and species distributions, pollution, parasites, land ownership, uses and management, and physical barriers. These have all likely played a role in defining the environmental baseline. The participants seek to work toward the recovery of listed and sensitive species through habitat and species conservation while accommodating current water diversions and power production and optimizing future water and power management opportunities. These conservation efforts are expected to reduce the need and likelihood of future species listing under the Endangered Species Act.

Another program in which Metropolitan participates, the Lake Havasu Fisheries Improvement Program (Program), is the largest and most comprehensive warm water fisheries project in the United States. Its purpose is to enhance both the warm water recreational fishery and the endangered native fish populations in Lake Havasu. The Program is a partnership among the Bureau of Land Management, Reclamation, the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, California Department of Fish and Game, Anglers United and Metropolitan. The Program will be accomplished through efforts to improve fish habitat for game fish, increase endangered native fish populations, and boost recreational fishing and access at Lake Havasu.

SAM F. SPILLER

U.S. FISH AND WILDLIFE SERVICE
PHOENIX, ARIZONA

Presently, a myriad of governmental agencies and levels deal with complex and overlapping issues along the Colorado River. The roles of Federal, State, Tribal and local governments are likely to shift to some degree in the foreseeable future, yet the degree of shift cannot be anticipated. Regardless of the changing roles, the major players are not likely to change. The Colorado River is an ecosystem, one that has been modified greatly and is in need of intensive active management. The ecosystem recognizes no man-made physical or political boundaries. No single agency and no single governmental level can manage it alone. A host of Colorado River coordinating groups has arisen to attempt some kind of overall management strategy. Though they have recognized a need to cooperate, past groups have often had a limited focus. Both the artificial boundaries and limited focus have not been successful.

We must find ways to look at the river as a whole, manage for the ecological "health" of what remains, and be careful stewards of the beneficial uses the river can provide, realizing what we do in one area can have profound effects in another. To do this, we must pool our resources and blend our roles.

Although every Federal agency is charged with using its authorities to conserve threatened and endangered species and each State has agencies whose mission is to conserve or promote fish and wildlife, this ecosystem is suffering from a legacy of piecemealed actions. Riparian vegetation continues to diminish, more shoreline continues to be artificially modified, nonnative aquatic life flourishes at the expense of the natives, and some native aquatic and wetland plants and animals are becoming increasingly scarce.

Our hope is that the various governmental and nongovernmental groups and other partners can establish cooperative goals and management covering the river ecosystem, bringing all the needs and uses together. Our hope is that this coalition would stay together and help manage the Colorado River's ecosystem as a whole, for all these groups and governmental levels are part of that ecosystem. Its health is its sustainability and we need to sustain the living entities dependent on the river and the products that can be derived from the river.

One such ray of hope lies with the proponents of the Lower Colorado River Multi Species Conservation Plan. This private-State-Federal-Tribal coalition is attempting to build an overall plan for river use and conservation. The artificial boundaries and limited focus have broadened

more than others thus far. All users and potential partners have yet to come to the table, but it is the best attempt so far to look at the "big picture" in the lower Colorado River. We hope to see the day when the "big picture" includes the Colorado River from its headwaters to the Sea of Cortez. Where natural resources are concerned, the "big picture" is seriously needed on the Colorado River.

JAMES V. TRANGSRUD

SALT RIVER PROJECT
PHOENIX, ARIZONA

Hydropower generation has been depended upon in the past to provide revenues that support a number of activities and expenditures associated with management of the resources in the Colorado River Basin. As a result there have been significant increases in the price as well as a reduction in the value of federal hydropower from the Colorado River Storage Project; at the same time competition in the electric utility industry has driven downward the price of other wholesale electricity in the region. If these two opposing trends continue (and all indications are that they will), the price of federal hydropower will very soon become uneconomic to not only the current purchasers of such power, but also to any other potential purchasers of the power. It is clear to those of us in the electric utility business that hydropower generation cannot continue to be a limitless cash register in support of the numerous management programs that have been identified and discussed in the course of this Colorado River Basin Management Study. Stakeholders must realize funding from the sale of hydropower generation is limited (and has reached its limit), and that other means of funding such programs must be identified, explored and developed.

It is ironic that a criticism leveled at the sale of federal hydropower is that it is unfairly subsidized, when in reality it is the sale of federal hydropower that has been subsidizing not only aid to irrigation, but aid to environmental, recreational and ecological programs.

This statement is not one in argument against such subsidy through sale of hydropower generation, but one meant to recognize the role of federal hydropower generation in the management of the Colorado River Basin and to alert stakeholders that there are limits to that role and that the limits have been reached.

DAVE WEGNER

GLEN CANYON ENVIRONMENTAL STUDIES, BOR
FLAGSTAFF, ARIZONA

THE ENVIRONMENT, WATER MANAGEMENT
AND SCIENCE: FOCUS FOR THE FUTURE OF
THE COLORADO RIVER

The Colorado River has been the key to the Southwestern United States since settlers first arrived. Today the peoples of the seven Colorado River basin states depend upon the waters of the river directly and indirectly for their domestic, recreation, and municipal needs. The future of the remaining natural and cultural debate rages over what the next 100 years of Colorado River management.

Historically, management of the Colorado River has been decided by how to control and manage the flow of water and the generation of electricity. Now that management is being redefined through negotiations and discussions on how the limited supply is to meet the needs for an expanded group of stakeholders that includes recreationists, environmentalists, Native Americans and as empowered and educated public.

The Colorado River plumbing system is controlled by over thirty Federal, State, Tribal and private dams, irrigation diversions and pumping plants. The majority of these plumbing tools were approved by Congress and built prior to the initiation of the National Environmental Impact Statement, Native American water right settlements and enforcement of the Endangered Species Act. Development of the water resource without these procedural and legal guides has resulted in extensive fragmentation of the riverine system and a loss of unique species and the ability for the natural river ecosystem to evolve normally.

Over the last six years Glen Canyon Dam has been the focus of an important test. A test to see if a new balance can be negotiated that will allow for the maintenance of the historic social commitments for water development and provide the means for protecting and, if possible, restoring critical parts of our environmental heritage in the Colorado River. Through the Glen Canyon Dam Environmental Impact Statement process, an approach defined as the Adaptive Management has been proposed.

The Adaptive Management process is evolving at Glen Canyon Dam and is being looked upon as a template for the future. Critical to meeting the challenge of being something more than words on paper is understanding the roles and responsibilities that go along with it. There are three critical roles that must be equally implemented in this template; those of the decision-makers, the public and the scientists.

Historically decision-makers have used as their guides the defined laws and agreements that have directed Colorado River management. These Colorado River water laws have provided the framework for negotiating annually the short-term operations of the dams and long-term management objectives for the river. The social obligations remain the same-people need water and electricity. The decision-makers must be educated and empowered to include the expanded spectrum of management and public concerns into their historic decision spectrum. Secondly, the public. The public is now intimately involved in the management of the Colorado River. Today's information age provides the public with the data and knowledge necessary for guiding the decision-makers as to the important issues of today and for tomorrow. Clearly the public's input in the Glen Canyon Dam EIS and the involvement expressed in the symposium identified the role that the public wishes to play in the future.

The scientists play an equal role in that it is up to the them to provide the unbiased information basis that will be used by the public and the decision-makers in determining the impacts of existing management and outlining the future objectives for Colorado River system. Data, information management and analysis is critical as the management issues and tradeoffs become more complex and the environmental and social stakes higher.

To have Adaptive Management work, three primary actions must occur. The first is commitment. Commitment to the process and to the resources necessary to allow the scientists and the public to meaningfully participate. The second is empowerment. The public and the scientists must be empowered to participate, contribute and speak freely. Lastly, Flexibility. For Adaptive Management to be successful the decision-makers, the public and the scientists must be flexible as new information is collected, responses identified and options developed. We need to look beyond the focus on the short-term and integrate into our decision sequence the knowledge that the environment is dynamic, the process is dynamic and the needs are great. The challenge is ours.

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Sections of the United States and Mexico relying on the Colorado River would be served better as part of a single geopolitical and economic unit.

For imagining purposes, I call the area the Colorado River Basin Republic (CRBR)--yes, a nation separate and independent of the United States of America, the Republic of Mexico, the seven basin states, and the Indian tribes.

To establish the CRBR, Mexico would be asked to voluntarily cede the portion of the Colorado River Basin in that country so that the river no longer would be subject to international dispute.

The CRBR would have several tasks with respect to the river. First would be cataloging existing "rights" to the river; second would be developing a means for auctioning dams and water conveyance facilities to entrepreneurs; and third would be auctioning the water and hydropower.

Auction proceeds (and, if needed, a share of profits from future rents and sales) would be used to compensate holders of present rights and the U.S. for unpaid debts. Distribution of water and power would be left to the competitive market place. Individuals or groups seeking water for environmental or other purposes would buy in the free market like everyone else.

As things are now, peoples of the Colorado River Basin are divided by arbitrary state, international, and tribal boundaries that result in waste of resources in intrastate, interstate, and international bickering.

That kind of contending would end if the competitive market place replaced politics as the basis for resource allocation.

Before something like the CRBR could occur, the basin's peoples would have to appreciate what brings them together. In common are the region's arid lowlands and the rivers.

Our predecessors struggled to harness the Colorado and smaller rivers by damming them to store water. Few of these people were interested in the effect upon vegetation, wildlife, and aquatic creatures.

People needed water to irrigate the land and, they hoped, to prosper. Survival for them and for their families was more important than considering what would happen to flora and fauna.

This does not mean they were unaware that they were bringing changes to the habitat. When Granite Reef Diversion Dam was dedicated on the Salt River northeast of Phoenix in 1908, people in attendance noted fish in pools of water immediately below the dam. They knew the fish were going to die, and regretted it.

But they considered the need to divert water to the thirsty lands south and north of the river more important than the fate of the fish. It is easy today to rue the general indifference to the fish, but human survival was paramount to those who built the dam.

What applied to Arizona farmers and families was true through much of the Colorado River Basin. Ultimately, the needs of the region's peoples for more stored water and electricity led the U.S. Congress to authorize harnessing of the Colorado River.

No one could foresee that the federal and state governments would produce a regulatory quagmire. That is one source of discontent. Another is the failure of government bureaucrats, lacking proprietary or actual interest, to comprehend or to accept the needs of the basin's peoples.

The question to be answered is this: Do the basin's peoples continue along the troubled and desultory course started in the 1920s and perpetuated by existing governments, or do they try something different?

It is impossible within the existing political framework to develop a program to attend equitably to the river as a whole. Many people consider fairness unattainable if the river continues divided into Upper and Lower basins with water reserved arbitrarily for Mexico and Indian tribes.

There also are fringe groups--people who would dismantle the dams on the Colorado River, and people who would fill the river canyons with additional hydroelectric dams.

Decidedly, the Colorado River today is a river corrupted, defiled and polluted by inadequate politicians and by fumbling government. The demands placed on it cannot be met fairly either by politics or by government capriciousness and intrusion.

It is a question of means--the competitive market place has promise, while government is a dead end except to bureaucrats and their special interest dependents.



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