



Mapping the River Ahead

Priorities for Action Beyond the Colorado River Basin Study



A Carpe Diem West Report in partnership with the Center for Natural Resources and Environmental Policy, University of Montana
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Foreword

The Colorado River has always been known for its superlatives – the most volatile supplies, the most iconic landscapes, the most dammed, the most litigated, and recently, the most threatened. The challenges of the past have been overcome with achievements that matched the scope of the difficulties - significant and much-emulated breakthroughs in engineering and deal-making. The challenges of the present and future will require an even greater degree of creativity and ability to see through immediate gains and losses to the greater and longer term benefits to river interests and communities. The leaders in Colorado River water issues have historically risen to the challenges, tackling tough issues as they arise, and the leadership engaged today is in the complicated and painful throes of doing so again.

This report documents the concerns of some Colorado River thought leaders and their ideas about potential solutions and paths ahead. It provides a useful compilation of perceptions and suggestions gleaned from one-on-one interviews, and points out consistencies of approach that may not be evident in more public discussions. These voices point to the flexibility within the existing Law of the River that can support creative arrangements and new types of operation resulting in a more efficient overall system. While not intended as a set of recommendations, the discussions described can be mined for practical pathways forward that might garner broader support and address both the ongoing and new pressures on this critical river system.

The urgency of the present situation cannot be overestimated, and no one knows the risks better than the water managers who will guide the actions and formulate the contingency plans of the future. While each has particular interests to guard, Colorado River experts also know that solutions will not be easy and will likely require adjustment to some heretofore jealously guarded positions and anticipated benefits.

One obvious example of the evolution of thinking on Colorado River management is the recognition that a broader spectrum of interests must participate in the construction of plans and policies. Integration of Tribal rights and values, environmental stewardship, regional cooperation, and international partnerships are all emerging trends - and rightly so. More and better education of the general public about the labyrinthine nature of the existing river plumbing and operations and the corresponding complexity of securing sustainable supplies is also a common theme. Both of these conclusions follow from an appreciation that building the broad-based public and political support necessary to implement difficult solutions will require a coalition of the knowing.

There are also myths and urban legends about the Colorado River's problems that must be dispelled before meaningful forward progress can be achieved. The foremost of these fables holds that there is a simple, silver bullet means of balancing the system. Despite well-meaning proponents who speak with conviction, simply turning off the fountains in Las Vegas or drying up golf courses in Phoenix isn't going to take care of the problem. Similarly, the unspoken assumption that any necessary water can be obtained by drying up irrigated agriculture fails to acknowledge the very significant economic and cultural disruption that would follow.

The stakes have never been higher, but the level of engagement and willingness to acknowledge all the elephants in the room are also at an all-time peak. This report gives voice to some important ideas for potential refinement and a peek into the evolution of thinking and broad-based education that will be essential in identifying practical and implementable solutions to our common challenges.

Anne Castle
*Assistant Secretary for Water and Science,
U.S. Department of Interior*



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Preface

RIISING TO THE CHALLENGE IN THE TIME OF CLIMATE CHANGE

In **Mapping the River Ahead**, we are proud to present the diverse and thoughtful perspectives of Colorado River Basin leaders on a path forward for the river. As the climate changes, critical challenges face water managers, farmers, public agencies and conservationists. As Anne Castle states in her foreword to this report, the urgency of the present situation cannot be overestimated.

Many complex and antiquated political and legal dynamics mark the Colorado River conversation now. Those dynamics, as many of the leaders we interviewed suggest, are slowing the pace of problem solving, particularly at the basin-wide scale.

We believe that a full and free discussion of these dynamics, along with a spirited and public debate about the smartest approaches, are essential to discovering and scaling up the type of solutions that will ensure water security for the coming century and beyond.

This report clearly demonstrates that despite their famed polarization, Colorado River leaders agree on many things. Water banking. Conservation. Governance reforms. By gathering their perspectives and organizing the themes they expressed, we hope that this report will help provide a map for the prioritization of the most promising, least expensive, and most easily scaled solutions.

While the pace of adoption of new approaches can be frustrating to all concerned, there are bright spots to point to. Along with some regional projects, two major basin-wide agreements — the recent amendment to the treaty with Mexico (Minute 319) and the 2007 Accord — show that the states, the federal government, tribes and conservationists can work together to implement far-reaching solutions.

A far more collaborative, interconnected, flexible and conservation-minded river regime is possible. But, as Secretary Sally Jewell said in her recent comments at the Colorado River Water Users Association annual meeting, we must do more and we must do it more quickly. To which we add: No one succeeds unless everyone pitches in.

Kimery Wiltshire
Carpe Diem West



NAVIGATING A NEW ROUTE

There's a new way of thinking about water in the Colorado River Basin, and it's a lot more expansive than the state-centered battles of the past. This evolution is timely in light of the formidable challenges and uncertainties facing the 35 million people who depend on the Colorado River from Colorado to Calexico.

In November of 2012, the United States and Mexico signed an historic agreement for cooperative management of the Colorado River that builds upon the long-standing Treaty of 1944. Along with the federal officials who led the U.S. delegation, representatives of the seven Colorado River Basin states and environmental groups actively participated in the negotiation process, and are essential partners in its implementation. No one succeeds in this initiative unless everyone pitches in.



This is not the first agreement that grew from and counts on basin-wide cooperation. In 2007, the U.S. Bureau of Reclamation adopted Interim Guidelines for managing the operation of Lake Powell and Lake Mead, reflecting terms negotiated by the seven basin states to address potential shortages through a system of shared curtailments in response to specified hydrologic conditions. It did not contradict the Law of the River, but as one state official described the agreement, *"we stretched the hell out of [it]"*—referring to the collection of statutes, regulations, and policies that govern basin-wide water allocation and management.

In the coming years, such stretching will need to be done far more often, as pointed out by the findings in the U.S. Bureau of Reclamation's 2012 **Colorado River Basin Water Supply and Demand Study** ("Basin Study"), which was conducted in collaboration with the seven Basin states along with Indian tribes and a diverse list of other stakeholders throughout the region.

For this report we interviewed 32 Colorado River leaders to gather and assess their candid opinions about priority actions going forward following the Basin Study. Our interviewees—whose names are listed at the end of this report, but whose comments remained anonymous—included current and former employees of local, state, interstate, tribal, and U.S. and Mexican federal entities, as well as people at water supply organizations, conservation groups and other nonprofits, universities, and research institutes. Many of these individuals are actively involved in the Work Groups currently delving into the options highlighted in the Basin Study, with the support of the U.S. Bureau of Reclamation and the Basin states.

All of our interviewees agreed that time is short, the need for action is urgent, and the innovative solutions emerging throughout the Basin should be shared through more deliberate cooperation and partnerships.

This is a time of opportunity. As one leader observed, *“The drought ‘turned the light on’ for many people, so they are more open to the necessary steps to move ahead.”* Another stressed the importance of capitalizing on that sense of urgency: *“It’s important that you don’t take the foot off the pedal. Stay engaged. . . . Ultimately, [the Basin situation] will reach a crisis stage. Unfortunately, when things reach crisis stage, we don’t always make the best decisions.”* Several people conveyed a pressing need to *“act, not study.”*

Many people offered specific suggestions for priority actions, such as financial incentives for agricultural and urban water conservation and institutional changes to encourage strategic restoration of environmental flows. Others focused more broadly on policies aimed at encouraging movement of water to meet changing demands while maintaining lands in productive agriculture. Some emphasized the need to invest aggressively in new infrastructure to allow water to move between users and to develop new sources.

Virtually everyone emphasized the importance of engaging with one another beyond traditional boundaries, whether among user groups or across state lines and other political divisions. As reflected in our previous two reports on Colorado River management, many people are thinking about and pursuing cooperative solutions and would like to be part of a more deliberate, ongoing dialogue about such opportunities. Some credited the Basin Study with encouraging movement in this direction and are pleased to see a broader range of interests at the table now in Basin Study’s Work Groups and elsewhere, particularly representatives of Indian tribes and NGO stakeholder groups. Several people praised the Basin Study Work Groups for focusing attention on environmental flows and recreational uses of the river, as well as human and agricultural requirements, in its assessment of future water demands.

Even as people are working more cooperatively, they struggle with how to talk about the future of water in the Colorado River Basin. While most public discussions today focus on the projected imbalance of water supply and demand, several of the leaders interviewed for this report argued forcefully for approaching these issues through the lens of vulnerability, especially in light of climate change and increasing frequency of extreme weather events. They urge a greater emphasis on building resilience rather than augmenting water supplies to accommodate growth. Some say this conversation cannot occur without a fundamental reassessment of the Law of the River, although others point to the many ways in which this system of laws and policies has “flexed” over the years.

Just as this is a river basin noted for its complex legal and hydrological features, leaders' perspectives on how to move forward do not align neatly or consistently. All, however, shared an overarching desire to develop and build upon emerging solutions to address the changing hydrologic and ecological and social conditions in the Basin.

Addressing complex systemic challenges necessarily requires deeper and more nuanced analysis than is possible in any single study process or series of interviews. ***The Basin Study and our interviews revealed examples of a diverse portfolio of actions that will help address water challenges in the Colorado River Basin, including:***

- Administrative actions (such as transfers and leases of water)
- Technical approaches (modeling and integration of climate data)
- Ecological approaches (crop and soil management; ecosystem services)
- Engineering strategies (retrofitting and reoperating dams and other water facilities)
- Legal and legislative changes (ranging from small changes to broad policy reform)
- Conservation and efficiency measures aimed at freeing up water for other uses, including environmental flow restoration
- Coordination with tribes holding water rights in the Basin
- Broad educational initiatives aimed at raising public awareness

This report focuses on key themes, as represented by groups of solution options that received the most comments in this interview process. Most people framed their comments around the options identified in the Basin Study, though their underlying concerns were broader—for example, ecosystem integrity and sustainable agricultural economies. The discussion in the section below titled “Mapping Solutions” highlights solutions grouped within the following themes:

1. Voluntary and temporary water sharing transactions
2. Broad water transfer mechanisms engaging water users over larger areas
3. Urban water conservation and reuse
4. Physical approaches to augmenting and managing water supplies
5. Dialogue, coordination and education

Seeking to understand the implications of these responses, Carpe Diem West's Colorado River Water Basin Dialogue Group gathered in November, 2013 to discuss the results of these interviews. This discussion identified several broad pathways forward, which are discussed further in the section titled "Taking Broad Action":

1. Articulating a unified vision for the Basin that supports a sustainable water supply for both environmental and human needs, based on principles of equity, economics, and the environment.
2. Supporting implementation of the identified solutions by pursuing broad education about water issues.
3. Encouraging expansion of successful innovations emerging throughout the Basin, and looking for opportunities to share information, water, and expertise.



MAPPING SOLUTIONS

Just as the challenges facing the Colorado River transcend political boundaries, solutions require a broad perspective or, as we described in an earlier report, a willingness to think “like a river basin.” In fact, Colorado River leaders are increasingly engaging in basin-wide conversations and are approaching water management in a more unified fashion, as evidenced by the successful negotiations that led to the 2007 Interim Guidelines and the 2012 Minute 319 amendment to the 1944 Treaty with Mexico.

Reflecting this trend toward basin-wide solutions, leaders interviewed for this report identified several broad areas of action deserving attention now and in the near future. Listed below are key points and observations, including quotes to give the flavor of the diverse opinions. The **Options for Action** sidebars throughout this section highlight specific ideas and examples that interviewees brought up as ways of addressing Basin challenges. Many of these actions are already underway, or are relevant to particular locations within the Basin. Their diversity reflects the many ways in which solutions are emerging and could be shared throughout this region.

1. We heard broad support for voluntary agreements to allow water to move between agriculture and other uses on a temporary basis.

Because the largest proportion of western water use is in irrigated agriculture, farmers have for decades felt the pressure to sell or otherwise transfer their water to meet the growing demands for urban growth, environmental flows, and other uses. As urban water providers face uncertain hydrological conditions and competition for scarce remaining sources, this trend is likely to continue. According to the leaders we interviewed, agricultural water transfers are most likely to succeed if they are voluntary, market based, and as flexible as possible.

Many reject the “buy-and-dry” method of acquiring agricultural lands for their water and leaving them permanently dry, emphasizing the value that productive agricultural lands provide to local economies, food security, landscape integrity, and cultural identity. Instead, most who addressed this topic favored temporary transfers linked to contractual arrangements, such as fallowing agreements and dry-year options. Such agreements help municipal water providers by ensuring access to water from alternative sources if their primary source (e.g. Colorado River water) is interrupted. They may also free up water necessary to achieve environmental flow restoration objectives.

“Our challenge is straightforward, even though the mix of solutions is not. We have to do more, we have to do it more quickly, to take on the challenges that are going to be harder than what we’ve tackled before.”

– U.S. Secretary of the Interior Sally Jewell, in a keynote to the Colorado River Water Users Assoc. December 13, 2013.

Some favored this approach because it reduces vulnerability in the face of changing conditions: *“The old approach of paying for a set quantity of water is less feasible as conditions become less predictable. The benefit of a dry-year option is that the parties can specify in their agreement what will happen when certain hydrological conditions occur.”* In addition, farmers may gain resilience from an added source of revenue using this approach.

Others see the value of investments in agricultural conservation that help farmers achieve better results while using less water: *“We need to reach out to farmers to understand and solve their problems—not just [giving them] a sense that there is a target on their back, but [offering] incentives for using water more efficiently. We need their help in coming up with solutions that also work for them.”*

Another leader drew attention to the fact that, proportionately, the difference between how much water agriculture consumes compared to how much municipal and industry (M&I) consumes means that *“a five percent reduction on the ag side is ... much greater than a five percent reduction on the M&I side.”*

Although the general opinion among these leaders strongly favored agricultural water transfers *“done right,”* some made a point of emphasizing that such transactions are fraught with complexity and surprise, and that it is important to look to existing transactions for lessons and best practices.

Several people recommended that policy decisions about water transfers should take place within a broader public conversation about the future of agricultural production and land use in the West, acknowledging that some marginally productive lands simply should not be irrigated or should be devoted to different crops. As one leader noted, temporary transfers may be of limited value if the “new normal” of climate change means less water available overall.

“Voluntary contractual arrangements for transferring water temporarily during dry periods is the next area of breakthrough.”



Importantly, some of the water saved through voluntary on-farm practices will be most valuable for restoring streamflows and aquatic ecosystems in critical tributaries and on the mainstem Colorado River. Some nonprofit groups are using market mechanisms to enhance flows through voluntary transactions with farmers, paying for changes in diversion and delivery structures to enable irrigation using less water. We heard that this environmental flow restoration needs to happen within a broad strategic framework: *“We need to know what our rivers need. . . . [Our challenge is] to convey the importance of rivers, the science of flow needs, and to build support for this approach.”* Some questioned whether temporary arrangements will be sufficient to address the long-term impacts of climate change.

2. There is a great deal of interest in creating opportunities and facilitating water transfers from agricultural to urban and environmental uses on a larger scale.

Currently, most agricultural water transfers occur through individual transactions. As one person described it: *“Farms are now being built into the water infrastructure—that is, [urban] water managers are asserting some control over farmers’ crop decisions.”* Most leaders interviewed for this study predicted that water transfers increasingly will be coordinated through more expansive market mechanisms. Some people described these in terms of “water banking,” though the arrangements described include a broader variety of transfer arrangements.

Many agreed that pilot projects developed in the Lower Basin could be applicable in the Upper Basin, although several noted that political opposition remains an obstacle. One leader captured the situation thus: *“We need to turn up the volume on water banking, including investments in time and energy to answer the numerous questions that seem to hold people back. I think the tide has turned on attitudes toward banking, but there needs to be a sense of urgency to make it happen. Overcoming those questions without a sense of urgency is going to be tough. You can argue about these issues for a long, long time. If we don’t light a fire, this could drag out for a decade or two.”*

Options for Action

Water Sharing

- Align federal subsidy and incentive programs with water efficiency priorities, possibly through signals coordinated through the Farm Bill.
- Address what some perceive as a current lack of understanding around water that may be available for transfer, to clarify price and how transfers in a particular area are affecting regional water use patterns. Programs that involve voluntary or mandatory disclosure of the location, volume, water rights validity, and transfer price (such as those being examined by the Basin Study Work Group) are great examples.
- Improve and standardize data collection to accurately monitor conservation savings.
- Where feasible and permitted, provide incentives for farmers who convert to drip irrigation or grow less thirsty crops.
- When designing dry-year options for temporary fallowing, link the “triggers” to specific hydrologic conditions.
- Where necessary, revise regulations to facilitate transfers, while taking measures to protect productive agricultural and riparian resources.

Options for Action

Water Banks

- Evaluate what Congressional action or changes in Bureau of Reclamation policies are necessary to facilitate the movement of water between federal water projects to maximize system flexibility.
- Include mechanisms in laws or regulations to control prices and ensure water availability for rural communities.
- Explore the need for expanded storage options to support transfers, including groundwater recharge.
- Establish “guided markets” to provide targeted incentives to reduce irrigation in areas where it creates pollution (e.g. high-selenium soils).
- Look to tribal water as a component of regional water transfers, settling unresolved claims to clarify how much water is available.
- Establish state-levied export or mitigation fees to address concerns about fallowing, to free up water for the system.
- Include measures in management policies or governing regulations to protect against system breakdown (e.g. brownouts in interconnected power grids).

The most frequently mentioned model for a larger-scale water transfer was the agreement between the Metropolitan Water District and the Palo Verde Irrigation District, which involves both short- and long-term fallowing of agricultural lands and the transfer of water to urban water users in Southern California. One leader speculated that this model could inspire a much more ambitious approach to water transfers in the Basin: *“The MWD-PVID program is successful, but it ends up fallowing highly productive lands. I’d like to see the opportunity to fallow less valuable agricultural lands [in other states] to free up new water for the system, not necessarily flowing to meet any particular water user’s demands.”*

Another person emphasized the value of water transfers on a basin-wide scale for reducing system vulnerability and enhancing environmental flows: *“I think eventually we’ll see urban areas in the Lower Basin pooling their money and paying for fallowing to avoid shortages, and the water just stays in the reservoirs. It doesn’t have anyone’s name on it, so it’s not technically a transfer, but it reduces demand for water so there’s more for everyone else. Maybe that’s an easier first step. It doesn’t go to ICS [Intentionally Created Surplus] in Lake Mead, but just becomes system water to protect all the Basin states.”*

Many cautioned that water transfers are still a new concept in many parts of the Basin and will need to be tailored for local conditions and concerns. One leader, who favors starting locally to highlight the benefits of such an approach, offered: *“It’s important that water banking is a voluntary option, and doesn’t feel like a black helicopter event.”* Another noted the value of diverse approaches: *“Each of the Basin states is like its own little laboratory, and this is one of the advantages of having states—we can each try something different and learn from one another.”*

“We aren’t going to find easy consensus; it will be grudging deals that get cut to make this work. That’s not going to happen without pressure.”

3. Many see substantial opportunities for urban water conservation and reuse.

Most of our interviewees put urban water conservation high on their list of priorities, even as they noted that many cities have already achieved substantial gains from existing conservation programs. Several shared the opinion that, for political reasons, urban areas *“should get their house in order before they start demanding water from other sectors.”*

As illustrated by the variety of suggested actions, many people provided examples of specific steps that would help improve urban water efficiency—most of which are based on existing initiatives that could be replicated elsewhere. Some people noted that going beyond current levels of conservation will require broader public choices reflected in legislation, such as requirements of denser development or baseline water-use targets. Several leaders agreed that it would be appropriate to aim for a more standard target of per-capita water use throughout the Basin.

Many people mentioned water reuse, citing Aurora, Colorado’s Prairie Waters program as an example to be emulated. One comment captured the broad interest in expanding the practice like this: *“I’d like to see an assessment of reuse opportunities throughout the Basin, identifying hurdles to be overcome. We haven’t really looked at reuse the same way [we’ve looked at] pipelines. A basin-wide assessment may identify policy changes necessary to encourage reuse on a larger scale.”*

Leaders emphasized the need for substantial investment in new infrastructure to facilitate efficiency improvements and help cities expand water reuse programs. One person noted that investors and credit rating agencies do not always appreciate the long-term value of investing in assets that utilities don’t own, such as paying for upgrades to homes and businesses to help reduce water demand. Both a broad commitment to infrastructure investment and a deeper understanding of what that commitment entails may be necessary to achieve savings on the scale necessary to address the challenges at hand.

“This is about the best time I’ve ever seen for ideas about water reuse, recycling, and conservation to come to the fore and become significant parts of the solution...Urban water managers say that they are already doing this, and they are, but none has really embraced water reuse and recycling in a fully committed way.”

Options for Action

Urban Water Conservation and Reuse

- Establish conservation goals and related outreach efforts tailored to educate and empower the public to achieve specific conservation targets, as has been done in places such as Utah, Oklahoma, and California.
- At the local level, expand and share lessons from incentive programs aimed at turf replacement and upgrading indoor plumbing fixtures, as well as tiered pricing structures.
- Share information about successful urban water conservation innovation grant programs.
- Enact ordinances limiting front-yard turf in new development and forbidding homeowners' associations from mandating bluegrass lawns.
- Include information in water bills telling consumers how their use compares to their neighbors'.
- Provide water customers opportunities to direct saved water to restoration projects.
- Enact legislation allowing only EPA WaterSense-rated appliances to be sold in all Basin states.
- Enact local codes requiring efficient appliances in all new construction.
- Encourage governors to lead by auditing water use in state facilities and requiring efficiency.
- Encourage public-private financing for municipal projects such as stormwater management.

Several people cautioned that water conservation should not be used simply to stretch supplies over a larger user population because that practice increases vulnerability: *"Efficiency is a double-edged sword, and 'hardening demand' is a real issue."* Others cautioned about geographic constraints on reuse, particularly when it affects other water right holders or when environmental concerns exist about return flows being altered. As one leader concluded, *"There is a difference between reusing water in southern California shortly before it flows into the ocean versus reusing water upstream, where there are downstream needs and obligations to consider."*

4. Among physical options for managing water supplies, desalination earned the most consistent support. Opinions are decidedly mixed on augmentation using imported water, and several people emphasized the need to address water in the context of the whole landscape.

Even with aggressive measures to encourage more efficient use of existing water supplies, many believe there will be a need to augment those supplies. Among the options laid out in the Basin Study, desalination was mentioned often by the leaders we spoke with. They cautioned, however, that it is appropriate only in certain areas and brings with it a number of costs and environmental impacts to be addressed. As one person concluded: *"It is expensive and takes large amounts of power, but it is reliable as a supplemental supply of water."*

With long lead times for developing and approving desalination projects, some expressed a need to move these forward now, while pursuing shorter-term strategies. One person remarked, *"I am concerned that without a more specific focus on augmentation ... we'll get into a crisis and then bad things will happen. Why not get those programs started now, instead of waiting?"*

"Institutionally, we need to get to where we can wheel water and make deals across state lines and up and down the river."

Weather modification was another augmentation option that garnered some support. It is relatively inexpensive and some believe it does not appear to have negative downsides. A typical opinion on this option: *"I don't see evidence that it works, but it doesn't harm anything."* Importantly, we also heard from those who worry that weather modification using silver iodide and dry ice may accelerate climate variability and have a variety of negative impacts.

We heard far stronger and more diverse opinions about the importation option: taking water from outside the Basin to augment Colorado River water. Those who favored a closer look at imports emphasized a need to keep options open for the long term:

"Imports from the Mississippi River would only happen if there were a major paradigm change, resulting from serious climate change impacts. I don't advocate this approach, but it should be considered. . . . At least leave it on the table."

"Someone's got to find some major water somewhere."

"You can't milk a dry cow, and that's what the Colorado River is going to be."

Those who opposed them described imports as distracting from the need to live within limits and use existing water supplies more efficiently:

"If we go down the importation path, it will just soak up the social and political capital, and nothing else will get done."

"Import proposals reflect an effort to live above our means. We're looking at the limits of this basin's carrying capacity."

"It's ironic that the Colorado River Basin states are looking at importing water from elsewhere at the same time that they are assuming continued (or increased) exports to the Front Range and other areas of use. I know this isn't a popular opinion, but shouldn't we be looking at limiting our exports before we consider new imports?"

Several opponents of importation remarked that the proposals currently under discussion have a slim chance of becoming reality due to considerable legal, environmental and financial challenges. As one leader noted, *"the Mississippi or Missouri River states would vehemently oppose any efforts to send water to the Colorado Basin. Also, given the high cost of the infrastructure needed to import these supplies, there are likely cheaper and more feasible in-basin alternatives than most of the importation proposals I've seen."*

"The sky is falling. We've got to face up to the fact that we just aren't going to get the supply off the Colorado River that all the states are entitled to."

Options for Action

Physical Approaches to Augmentation & Managing Supplies

- Pursue brackish water desalination in places such as Yuma, AZ, Imperial Valley, CA, and inland southern California.
- In evaluating ocean desalination, take into account the higher energy costs and potential environmental impacts, by carefully planning to ensure proper management of waste brine to protect sensitive estuaries and other ecosystems, for example.
- Address physical solutions in the whole-landscape context, exploring lessons from initiatives that address land management measures affecting water supplies, such as dust on snow, exotic species, and watershed protection.
- If deemed feasible, approach large-scale augmentation projects as you would an interstate highway system: assume a long time frame with substantial federal investment and a broad overall vision.

Several people mentioned that the Basin Study could have given greater emphasis to the larger context within which the Colorado River Basin's water supply exists and felt that this was missing in the physical solutions highlighted in the Basin Study. Several people noted that regional patterns of land use result in dust deposits on high-mountain snowpack, resulting in heat absorption and earlier runoff. As for forest and landscape manipulation, one person interviewed noted that, "*Any attempt to move in this direction has to acknowledge that climate change and insect infestation have already shifted our forest landscapes dramatically,*" and thus the assumptions of enhanced water supplies based on past practices may not be reliable.

5. Nearly everyone emphasized the importance of dialogue, coordination, and broad public education in implementing these solutions, and many felt this did not receive the emphasis it deserved in the Basin Study.

In Carpe Diem West's previous Colorado River Basin report interviews, leaders emphasized that the actions necessary to address the Basin's challenges would require cooperation on an unprecedented scale. In this round of conversations, we heard that the Basin Study and its subsequent Work Groups have encouraged dialogue across state lines and among interest groups. Several described this process as a positive move toward more inclusive governance in the Basin, noting that nongovernmental organizations and tribal nations are part of the conversation in ways that would not have been the case even a decade ago.

However, some leaders worried about the tone of the conversation. They feel that many people still approach Basin management as a competition for limited resources, instead of "*with an attitude of partnership and cooperation.*" Some believe that a shift in tone will require a more formal institutional structure, while others argued for smaller changes to ensure inclusive conversation and participation. (See Carpe Diem West's 2011 report, "**Governing Like a River Basin**," which addresses this issue.)

Several people mentioned the successful negotiation of Minute 319 between the United States and Mexico as a model for cooperation that might be emulated on a larger scale in the Basin. One person urged the adoption of *“rules for negotiation among western states, the U.S. federal government, and Mexico so that everyone understands the framework for negotiation.”* And, just as the 2007 Interim Guidelines reflected a mutual effort to avoid harsh consequences of strict Compact enforcement, one person expressed this commonly shared opinion: *“We have to start talking now to avoid the train wreck of litigation. ... People have to learn to talk about difficult issues in a way that doesn’t make everyone freak out.”*

Although perspectives vary on the appropriate role of the federal government in leading or catalyzing basin-wide actions, this question remains a focus of concern and expectations. While several people urged the Secretary of the Interior to step in more aggressively to encourage states to *“come to the conversation,”* others want to see the federal government *“build a new model for working out regional issues based on authentic partnerships with the states—not paternalistic, and not treating states like stakeholders.”*

We heard a stronger message about the need for public water education in this round of interviews than in our past reports. Education may take many forms, including simple awareness of the value of water and the importance of conservation. Several people pointed out that droughts and other crises provide valuable opportunities to gain public attention for water issues: *“A lot of these options are going to require some type of cost or sacrifice on the part of the average water user, and unless they understand what sort of challenges we’re facing, they aren’t going to be willing to do those things.”*

Moreover, as several people pointed out, elected officials are unlikely to support investments or bold actions without a public constituency demanding it: *“The general voting public just isn’t that familiar with water. Until the average voter cares about water, the average politician isn’t going to either.”*

Options for Action

Dialogue, Coordination, and Education

- Continue to convene and expand opportunities for regional or basin-wide meetings to share successful strategies and identify priorities for action.
- Encourage agencies to pull together to address immediate shortage threats, modeling their coordination after major natural disaster response mechanisms.
- Create a basin-wide trust fund based on comprehensive water user fees to address basin-wide problems.
- Consider creating a new basin-wide entity, such as a Colorado River Commission or something less formal, to facilitate dialogue. (See Carpe Diem West’s “Governing Like a River Basin” for examples.)
- Include a governor’s representative at all interstate river discussions to ensure a broadly representative public voice.
- Explore further opportunities to change the accounting for water, working within the flexibility of the Law of the River.
- Continue to engage tribes and NGOs as partners in developing and implementing solutions.

TAKING BROAD ACTION

The Carpe Diem West Colorado River Basin Dialogue Group reviewed and discussed the results of the report's interviews and identified three broad areas of opportunities for action based on cooperative efforts already underway in the Basin:

1 Articulate a unified vision for the Basin that supports a sustainable water supply for both environmental and human needs, based on principles of equity, economics, and the environment.

- Emphasize and include a statement of shared vulnerability and shared responsibility for developing solutions.
- Acknowledge and address issues related to food production and environmental water needs.
- Engage leadership from different organizations in articulating the components of a basin-wide vision.
- Build upon the foundation of successful basin-wide efforts, such as the 2007 Interim Guidelines, Minute 319, and the Basin Study.
- Look beyond the Basin for examples of broad regional vision statements (e.g., the Great Lakes Charter).

2 Support implementation of the identified solutions by pursuing broad education about water issues.

- Start by building and educating a broad water-user constituency, many of whom are unaware of where their water comes from or what sorts of trade-offs are implicated by major water policy decisions.
- Focus also on elected and appointed policy leaders and other decision makers, highlighting the need to cooperate and the benefits of working beyond political boundaries.
- Create a safe place to talk about difficult issues, especially those related to state water allocations. Reduce the risks and increase the benefits for those who pursue cooperation.

3 Encourage expansion of successful innovations emerging throughout the Basin, looking for opportunities to share lessons learned and best practices.

- Seek out and share lessons from innovative practices that address the challenges highlighted in the Basin Study, encouraging replication and scaling up where appropriate, as is currently underway with the Basin Study Work Groups.
- Identify policies that present obstacles to promising solutions, and explore opportunities to remove them, even if only on a small scale, to test innovative approaches.

BACKGROUND AND METHODOLOGY

Carpe Diem West seeks and creates opportunities to bring together key interests in the Colorado River Basin for basin-wide solutions that address the new climate reality. Working with diverse partners, including experienced practitioners and university-based researchers, Carpe Diem West is building an inclusive vision for the Colorado River's future that is durable, equitable, and workable for all interests.

In the first phase of Carpe Diem West's Colorado River Futures program, we produced **Thinking Like a River Basin: Leaders' Perspectives on Options and Opportunities in Colorado River Management**, (April, 2011). Prepared in conjunction with the Center for Natural Resources and Environmental Policy at the University of Montana (CNREP), the report was based on interviews with 35 influential stakeholders and political leaders in the Colorado River Basin. Building on that progress, we produced a second report, again in collaboration with CNREP, **Governing Like a River Basin** (Dec. 2011), which explored different governance models for addressing issues in complex aquatic ecosystems with myriad competing consumptive demands.

In December of 2012, the U.S. Bureau of Reclamation released the **Colorado River Basin Water Supply and Demand Study**. In light of the Study's findings about projected shortages and other challenges in coming decades, Carpe Diem West again sought out key leaders—whom we characterized as “implementers and thoughtful critics”—to gather and assess their candid opinions about priorities going forward. We asked them to reflect on the following questions:

- Among the scope of options outlined in the Basin Study, which ones do you feel most strongly should be implemented within the near term (1-5 years), medium term (10-15 years), and long term (20 years and beyond)? Please explain your prioritizing, and identify the essential implementers and partners.
- What changes in policy or management would be necessary to implement the options that you identify as highest priority?
- Are there any options that did not surface in the Basin Study that you feel should be on the table now to address the challenges facing the Colorado River Basin? If so, what are they?

Dr. Sarah Bates, Senior Fellow at CNREP, conducted confidential interviews with 32 leaders between August and October 2013. Interviewees included current and former employees of local, state, interstate, tribal, and U.S. and Mexican federal entities, as well as senior staff at water supply organizations, conservation groups and other nonprofits, universities, and research institutes. (The full interview list follows.)

In November 2013, Carpe Diem West's Colorado River Basin Water Dialogue Group met to analyze the information gathered in these interviews and to discuss opportunities for action. Their discussion shaped the preparation of this report, but the conclusions presented here are those of the authors and do not necessarily represent the opinions of participating Dialogue Group members or their organizations.

LEADERS INTERVIEWED

Note that affiliations are current as of the interview date, and are listed solely for aid in identification. All individuals expressed their own opinions in these confidential interviews, and no conclusion or statement contained in this report should be interpreted as a position of any of the participants or their organizations.

Nathan Bracken - Western States Water Council
Kay Brothers, Co-chair - Colorado River Basin Water Supply and Demand Study
John Carter - Horton, Knox, Carter & Foote, LLP
Michael Cohen - Pacific Institute
Bonnie Colby - University of Arizona
Peter Culp - Squires, Sanders & Dempsey LLP
John Fleck - Albuquerque Journal
Kate Greenberg - National Young Farmers Coalition
Herb Guenther - Troubled Waters Consulting
Holly Hartmann - University of Arizona
Bill Hasencamp - Metropolitan Water District of Southern California
Taylor Hawes - The Nature Conservancy
Jim Holway - Sonoran Institute
Bob Johnson - Water Strategies
Ted Kowalski - Colorado Water Conservation Board
Eric Kuhn - Colorado River Water Conservation District
Chuck Lawler - Ten Tribes Partnership
Mario Lopez Perez - National Water Commission of Mexico
Larry MacDonnell - University of Colorado, Boulder
Anne MacKinnon - A. MacKinnon Consulting
Guy Martin - Perkins & Coie
Jim Ogsbury - Western Governors' Association
Mark Pifher - Colorado Springs Utilities
Jennifer Pitt - Environmental Defense Fund
Halla Razak - San Diego County Water Authority
Tina Shields - Imperial Irrigation District
Morgan Snyder - Walton Family Foundation
Joe Stibrich - Aurora Water
Dennis Strong - State of Utah
Brad Udall - University of Colorado
Reagan Waskom - Colorado State University
David Wegner - House Committee on Transportation and Infrastructure, US House of Representatives

CARPE DIEM WEST COLORADO RIVER BASIN WATER DIALOGUE GROUP

The Dialogue Group is an informal group of diverse Colorado River Basin leaders and experts who are collectively exploring potential collaborative solutions at the basin-scale and who serve as advisors to Carpe Diem West's Colorado Futures Program.

Note that affiliations are listed solely for aid in identification. All individuals express their own opinions in these confidential Dialogue Group meetings, and no conclusion or statement contained in this report should be interpreted as a position of any of the participants or their organizations.

Dr. Robert Adler, University of Utah

Dr. Sarah Bates, University of Montana

John Berggren, University of Colorado

Nathan Bracken, Western States Water Council

Kay Brothers, Co-Chair, Colorado River Basin Water Supply and Demand Study

Chuck Cullom, Central Arizona Water Conservation District

Kate Greenberg, National Young Farmers Coalition

Dr. Holly Hartmann, University of Arizona

Bill Hasencamp, Metropolitan Water District of Southern California

Taylor Hawes, The Nature Conservancy

Bob Johnson, Water Strategies

Dr. Doug Kenney, University of Colorado

Eric Kuhn, Colorado River Water Conservation District

Chuck Lawler, Ten Tribes Partnership

Jennifer Pitt, Environmental Defense Fund

John Shepard, Sonoran Institute

Morgan Snyder, Walton Family Foundation

Brad Udall, University of Colorado

Dr. Reagan Waskom, Colorado State University

David Wegner, House Sub-Committee on Transportation & Infrastructure, US House of Representatives

Meena Westford, Metropolitan Water District of Southern California

Kimery Wiltshire, Carpe Diem West

Technical Advisors: Staff, US Bureau of Reclamation

Carpe Diem West is a knowledge-to-action network. Connecting and supporting leaders, we work across sectors to identify common values, create joint narratives, and develop science and evidence-based actionable agreements. Together we seek adoption of innovative, sustainable solutions to address the profound impacts climate change is bringing to water supply and rivers across the American West, helping to implement practices, policies and approaches that address the needs of a broad constituency.

Carpe Diem West's Colorado Futures Program identifies and creates opportunities to bring together key interests in the Colorado River Basin around the premise that long-term solutions will need to be basin-wide in scope, and must address the new climate reality. Working with diverse partners, including experienced practitioners and university-based researchers, Carpe Diem West is building an inclusive vision for the Colorado River's future that is durable, equitable, and workable for all interests.

www.carpediemwest.org

The Center for Natural Resources and Environmental Policy is an applied research and education center at the University of Montana. The Center is impartial and non-partisan, and is not an advocate for any particular interest or outcome. The Center's goal is to shape policy for people and places, including urban, rural, working, and wild landscapes. The Center operates on the principle that the best way to do this is through public processes that are well informed and provide meaningful opportunities for all interested citizens, stakeholders, and decision makers to participate.

www.cnrep.org

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Our water – Finding solutions together

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