



Protecting Water for Western Irrigated Agriculture

COLORADO RIVER BASIN WATER MANAGEMENT

Principles & Recommendations

Abstract

The Family Farm Alliance is a grass-roots organization with the sole mission of protecting and enhancing irrigated agriculture in the Western United States. We have crafted this paper articulating our principles for smart, effective management of water resources in the Colorado River Basin to help decision-makers in the Basin deal with the harsh realities of current and future water shortages due to drought and over-allocation of water to growing, predominantly municipal, demands. Even with all of the various water users' perspectives on demand management and other issues in the Colorado River Basin, there is support for the main drivers behind the Alliance's policy thrust summarized in eight principles. Based on these principles, there are four common recommendations that we believe will be critical to successful drought and water shortage management efforts in the Colorado River Basin.

The Family Farm Alliance believes that the Colorado River Basin can and will successfully work through future droughts and water shortages in a collaborative and effective way. The future of millions of people and millions of acres of farms and ranches and the food and fiber they produce in the Basin rest on this belief. We also believe if Basin interests use the principles and recommendations in this paper, solutions can be found that do not pit one user against another in resolving differences and complex water problems. The Alliance looks forward to working with the many agricultural, urban, energy and environmental water users in finding these solutions so critical to the future of the Colorado River Basin.

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Colorado River Basin Water Management Family Farm Alliance Principles & Recommendations

EXECUTIVE SUMMARY

Predicted near-term Colorado River water supply scenarios are dire enough that drought contingency planning has been initiated in the Colorado River Basin. These efforts may seek to emphasize demand reduction as one of the primary tools to stave off critical water shortages. If dry conditions continue, diminishing reservoir levels in Lakes Powell and Mead will have extremely negative consequences for water and power users throughout the watershed, including urban areas outside of the Basin that rely on Colorado River trans-basin diversions.

The Family Farm Alliance (Alliance) is a grass-roots organization with the sole mission of protecting and enhancing irrigated agriculture in the Western United States. We have crafted this paper articulating our principles for smart, effective management of water resources in the Colorado River Basin to help decision-makers in the Basin deal with the harsh realities of current and future water shortages due to drought and over-allocation of water to growing, predominantly municipal, demands.

Colorado River water – like all Western water resources – is a finite resource subject to competing demands. Demands for water can already exceed available supplies in normal years, let alone during times of drought-induced shortages. In recent years, more and more focus has been placed on using perceived “simple” or “cost-effective” solutions to meeting growing demands in other sectors. Agricultural irrigation water has become the default “reservoir” to meet growing municipal, industrial, environmental, recreational and energy sector demands. We must go beyond these perceived easy answers that focus on paying farmers to fallow their land in order to funnel their irrigation supplies to other competing uses, and start seeking the real but challenging solutions that will address the long-term supply-demand imbalance.

Continuing to look to irrigated agriculture as a new “source” of water to solve growing urban and environmental problems can carry enormous consequences and costs to society. The erosion and degradation of the West’s rural agricultural communities and the reduction in the number of domestic food producing farms and ranches will incrementally impact the currently affordable cost of food and fiber upon which this Nation’s economy is built.

The Basin has reached the full use of its finite water supply and its users must come to grips with how water will be allocated between the competing demands – agriculture, energy, municipal and industrial, the environment, and recreation. Prioritization of water uses in times of shortage cannot be made without considering all costs and benefits of a particular use. There has to be an accepted understanding of the water use data associated with all of these competing demands to do justice to the appropriate prioritization.

Even with all of the various water users' perspectives on demand management and other issues in the Colorado River Basin, there is support within our membership for the main drivers behind the Alliance's policy thrust summarized in the following eight principles:

- **State water laws, compacts and decrees must be the foundation for dealing with shortages.**
- **Water use and related beneficial use data must be accurately measured and portrayed.**
- **Benefits of water use must reflect all economic / societal / environmental impacts.**
- **True costs of transferring water away from irrigated farms in a managed system like the Colorado River through land fallowing must be accurately accounted for, including unintended consequences and third-party impacts. Understanding these costs will assist in determining the fair value of any land fallowing proposal.**
- **Agricultural water conservation can help stretch water supplies, but has its limits.**
- **Public sentiment supports water remaining with irrigated agriculture, and developing strategic water storage opportunities as insurance against shortages.**
- **Technologies for water reuse and recycling are proven effective in stretching existing supplies for urban, environmental and other uses.**
- **Urban growth should not be permitted in the future without locking in sustainable and diverse water supplies, and using irrigated agriculture as the reservoir of water for municipal growth is not sustainable in the long run.**

Based on these principles, there are four common recommendations that we believe will be critical to successful drought and water shortage management efforts in the Colorado River Basin:

- **Planning for water shortage in the Basin must look to the long-term in meeting the goals of agriculture, energy, urbanization and the environment.**
- **A successful water shortage strategy must include a "portfolio" of water supply enhancements and improvements, such as water reuse, recycling, conservation, desalination, water-sensitive land-use planning, and water system improvements. New infrastructure and technologies can help stretch water for all uses.**
- **Temporary fallowing proposals should be approached in a thoughtful, thorough manner only after urban, energy and environmental users of water demonstrate a better management of their share of the finite supply and only for temporary shortfalls caused by droughts or emergency situations.**
- **Unintended consequences associated with reducing productive agricultural land/groundwater recharge/riparian habitat benefits should be avoided and, if unavoidable, minimized and fully mitigated.**

We understand that some water will inevitably move from agricultural use in the Basin as long-term transitional strategies are developed. This is regrettable, since numerous studies and forecasts suggest that we will need to double our food and fiber output in the next 40 years to keep up with global hunger. Agriculture is also a strong foundation for many rural communities

in the Western U.S. and is vital to the economic, social and environmental health of those communities. Our members share a desire to keep water in its place of use in the rural West, to the maximum extent practicable to ensure long-term agricultural sustainability.

According to a 2015 economic report prepared by Pacific Northwest Project, the “Irrigated Agriculture Industry” predominately consists of three major sectors: agricultural production, agricultural services, and the food processing sectors. These sectors are the economic engine of irrigated agriculture. For the 17 states comprising the Western U.S. region in 2013, the annual direct household income derived from this industry is estimated to be about \$70 billion. Taking into account the total direct, indirect and induced impacts, the total household income impacts are estimated to be about \$172 billion annually.

The direct net benefits provided by irrigated agriculture represent the opportunity costs of economic tradeoffs made in water resource allocation decisions. Opportunity costs are the values (benefits) of what you give up to pursue some other alternative. But there are other potential costs for decision makers to consider when taking into account broader economic implications from Western irrigated agriculture. These could be termed externality benefits or, if foregone, the “silent lost opportunity costs” inherent to changes to Western irrigated agriculture indirectly tied to the consumer spending economy. A low-cost food supply provides large blocks of disposable income to the consumer spending economy, as well as the availability of high-quality food sources provided by Western irrigated agriculture. These types of policy considerations should be at the forefront of future decision-making for water resources, in the Colorado River Basin and elsewhere.

PROTECTING IRRIGATED AGRICULTURE – PRINCIPLES FOR WATER MANAGEMENT

Even with all of the various water users’ perspectives on demand management and other issues in the Colorado River Basin, we believe there is public support for the Alliance’s policy summarized in the following eight principles. These principles embody our willingness to offer advice and assistance to policy makers.

More than 1.4 million acres of irrigated land throughout the Colorado River Basin produce about 15 percent of the nation's crops, 13 percent of its livestock, and agricultural benefits totaling more than \$1.5 billion a year (Source: Colorado River Water Users Association). Accordingly, the debate over Colorado River water must include the perspectives and involvement of family farmers and ranchers and the irrigation districts that represent them. We know agricultural water is targeted as a solution to competing demands from more populous areas or affluent industries when supplies are limited. Our concerns, and our real-world water knowledge, must be included in future water management and shortage plan formulations just as readily as the liquid assets we manage.

Principle #1: State water laws, compacts and decrees must be the foundation for dealing with shortages.

Solutions to conflicts over the allocation and use of water resources must begin with a commitment to and recognition of the traditional deference to state and federal water allocation systems. A simple commitment by federal agencies to work within the framework of existing appropriative systems, instead of attempting to fashion solutions that aim to circumvent current water rights allocation and administration schemes, would help to eliminate the gridlock that now paralyzes federal water management decisions in many parts of the West.

Resolutions to water conflicts should build upon the understanding that existing water rights are not "part of the problem," but instead are a foundation for future innovative solutions by motivated, cooperative parties. Incentives that create reasons to succeed will do more to address unmet municipal, energy and environmental water demands in a timely manner than actions that rely on threats of unilateral government-imposed "solutions" that result only in longer-term legal actions. Collaborative solutions to complex water supply issues can be found by reasoned, well-intentioned people working together and within existing institutional frameworks. We must recognize that while it is important to include all viewpoints in the discussion, the holders of water rights have far more at risk – but also far more to offer when it comes to actually resolving issues – than most other parties at the table.

In the Colorado River Basin, there are many tiers of control. The Upper Basin includes the states of Wyoming, Colorado, Utah and New Mexico, while the Lower Basin is made up of the states of Arizona, California and Nevada. The Basin states work within the "Law of the River" to address their water supply issues, with the Lower Basin managed by a federal water master (the Secretary of the Interior through the Bureau of Reclamation), separate from the Upper Basin, where that responsibility falls on the Upper Colorado River Commission. Every Basin state has its own unique water rights system based on the prior appropriation doctrine.

The states may also be involved in the administration of drought contingency activities. For example, the State of Colorado has been engaged in fleshing out the realities of agricultural fallowing programs for close to ten years. But, the state has not yet utilized those programs due in part to the reality of the many complexities involved in establishing and implementing them. Every fallowing proposal will have unique needs driven by geography and water law. The much publicized water conservation and transfer programs in the Palo Verde Irrigation District and the Imperial Irrigation District in California are case studies, not templates, each with unique circumstances that cannot easily be applied to other areas. But those projects, much like the proposed Super Ditch program on the Arkansas River in Colorado, can provide valuable lessons and context as the basin states further consider alternative water banking and temporary fallowing program proposals.

Additional water conservation projects and new water supplies will be needed to protect existing uses in all sectors and to facilitate new uses in the Basin. There are a number of alternative transfer methods such as rotational fallowing, deficit and split season irrigation, and interruptible supply agreements that are being investigated around the Colorado River Basin already. If there are failures or shortcomings in these programs that have kept them from being implemented, those issues must be addressed, not ignored, prior to moving forward. Each state will need to tailor any of these fallowing programs to fit within the prior appropriation water allocation system and hydrologic realities of that state. Policy makers must acknowledge these complications. They must keep working through the complicated processes to find fair and equitable solutions, as difficult as that may be.

Cooperation and collaboration among Colorado River stakeholders including the United States, States, and water users is the preferred path to address the increasing risks to the Colorado River system and all the users who benefit from the Colorado River's water supply.

Principle #2: Water use and related beneficial use data must be accurately measured and portrayed.

With the ongoing drought projected to soon limit supplies in the Colorado River Basin, all flows must be accounted for so the water users can provide responsible oversight in order to most effectively manage their allocations and collectively manage the system as a whole. Urban areas in the Basin must develop a realistic estimate of the carrying capacity of their allocations to manage anticipated municipal growth before targeting the transfer of agricultural water to supplement their supplies. Land use and planned growth decisions must be made after careful consideration of water availability and local or regional water supply planning efforts. All of these decisions must also rely on accurate and timely beneficial use data for all categories of water use, including environmental, recreation, urban, energy, and agriculture.

In both the Upper and Lower Basins, Colorado River water users have established successful, proactive programs to respond to Endangered Species Act (ESA) issues and environmental concerns. The Lower Colorado River Multi-Species Conservation Program was created to balance the use of the Colorado River water resources with the conservation of native species and their habitats. The program works toward the recovery of species currently listed under the ESA. It also reduces the likelihood of additional species listings. Implemented over a 50-year period, the program accommodates current water diversions and power production, and will optimize opportunities for future water and power development by providing ESA compliance through the implementation of a Habitat Conservation Plan. Partners of the Upper Colorado River Endangered Fish Recovery Program are recovering four species of endangered fish in the Colorado River and its tributaries in Colorado, Utah, and Wyoming while water use and development continues to meet human needs in compliance with interstate compacts and applicable federal and state laws.

Colorado River Basin environmental interests, fish and wildlife agencies, and water managers must continue to set priorities and evaluate the benefits and costs of these programs in order to

be accountable for the management of the environmental share of the water supply. We must develop accounting numbers across the entire Basin that identifies all environmental water uses. With a better understanding of these and other numbers, a more comprehensive plan can be developed in the Colorado River Basin that appropriately shares the risks, costs, and impacts of any proposed water management scenarios across all water use sectors and basins.

“Actual” consumptive use of water by all uses must be accurately measured

In California, agricultural uses account for only 41 percent of the state’s developed water supply according to the California Department of Water Resources (DWR). By measuring these depletions, or water uses that are irrecoverable and can no longer serve as source of supply for other subsequent uses, DWR reports in its 2013 California Water Plan Update that urban use accounted for another 9 percent, while managed wetlands, required Delta outflow, instream flow, and wild and scenic river flow totaled the remaining 50 percent. But many groups and some in the media today choose to ignore instream flow and environmental use numbers and instead continue to erroneously claim that California farmers use 80 percent of the water supply.

In Colorado, the non-consumptive uses associated with the state’s instream flow program and recreational boating have water rights that limit or curtail agricultural as well as municipal and industrial appropriations. These non-consumptive uses are a vital part of the state’s water plan, currently being developed. There are not any settled definitions on the quantity needed for Mother Nature, but those needs have been mischaracterized by some as entirely non-consumptive. There are, at a minimum, riparian consumptive uses associated with this “non-consumptive water” that is a significant part of the value of that much appreciated resource.

A thoughtful, thorough definition of the water that is utilized by the environment would expand that measured use substantially. Colorado, as a headwaters state, is party to numerous interstate compacts requiring approximately two-thirds of its water to be left in the stream to meet downstream state needs.

Consumptive use of water by all sectors must be accurately presented. The California DWR methodology could provide a clear template to describe consumptive water use throughout the Colorado River Basin and help with challenge of finding the appropriate way to characterize and prioritize water uses among competing demands. We also need a solid understanding of how, or if, water used for environmental purposes is really benefitting the species or habitat it is intended to protect, in order to more efficiently manage such uses. With a goal of reducing the use while maximizing the benefit, a level playing field would then effectively apply the same standard to which irrigated agriculture is currently being held. Moreover, the costs and benefits of stored water must be borne equitably among all users of that water, including the environment and recreation.

Accurate data must be used in water balance assessments.

We also need to develop more sophisticated and realistic calculations that best describe the water balance equation. These numbers must be accurate in order for policy makers to best advance a philosophy where all users manage their supply efficiently and productively, and in the appropriate balance to other uses. Tools must be employed to help track consumptive water uses, return flows, environmental instream uses and groundwater storage in order to account for real consumptive uses. Finally, we must conjunctively manage groundwater and surface water resources where they overlap. In this way, a water balance can be developed that more fairly represents all beneficial uses of the Colorado River

Ancillary Benefits of Irrigation Must be Reflected

Agricultural land provides many environmental benefits, regardless of how the water is used or what crops are grown. Western agricultural producers maintain that irrigation provides local environmental benefits equal to or exceeding the quality of many of the “natural” environments that host endangered species. Western rivers and associated riparian habitats are maintained and enhanced with flows from upstream dams. Competing environmental demands for water must be a part of the discussion just as competing agricultural demands are today.

As irrigation water uses are reduced or made more efficient through the implementation of new or advanced water conservation measures, we run the risk of sacrificing groundwater aquifer stability through the reduced application of surface water in agricultural operations. Surface water irrigation, as well as seepage in unlined earthen conveyance facilities, serve as important recharge components to local groundwater aquifers in many areas. Delayed return flows often maintain late season flows when even the natural stream flows are at their lowest. The ability of water managers to use local groundwater resources in times of drought will be negatively impacted if irrigated acreage is reduced and water use efficiency is increased in the absence of developing other options that enhance water supply resilience. The lag time associated with the loss of this aquifer recharge can contribute to negative unintended consequences, which could be better assessed and planned for if we had better data associated with this component of the water balance.

When water is stored and conveyed via natural waterways or engineered canals and drains, the environment also benefits from those flows. As soon as rain and snowmelt enters upland streams, the environment is benefitting, and those benefits continue to follow the water as it moves downstream through the system. Conveyance facilities built to deliver water to farms and ranches also create artificial wetlands and support riparian habitat, while flood-irrigated fields have tremendous waterfowl benefits and provide supplemental return flows that support fish populations and recreation. All of these environmental attributes should also be measured and managed to reflect such benefits.

Principle #3: Benefits of Water Use Must Reflect Economic / Societal / Environmental Impacts

Irrigated agriculture provides a strong foundation for many rural communities in the Western U.S. and is vital to the economic, social and environmental health of those communities. The total estimated irrigated acres in the 17 Western states is about 42 million acres (production agriculture of some form, including pasture and harvested crops). The agricultural crop production, agricultural services and food processing sectors, and the thousands of corresponding jobs associated with these sectors that rely on this vast acreage all form the economic foundation for many communities in the West. The open space, riparian habitat and wildlife corridors also created by these irrigated lands provide important environmental attributes.

The Family Farm Alliance in 2015 commissioned a study of the economic benefits to the Nation from Western irrigated agriculture, calculating that the total direct and indirect production value for the 17 states comprising the Western U.S. (including the 7 Colorado River Basin states) was around \$173 billion annually. Without irrigation, these lands would not yield the billions of dollars in economic benefits for the region and the nation, let alone the vast amounts of high quality food and fiber affordably enjoyed every single day by the American public. Since World War II, the percentage of (disposable) household income spent on food has dropped from 25 percent to around 7 percent, allowing for the continued growth of our consumer spending economy.

Agricultural water users in each basin state should be allowed, and even encouraged to continue to contribute to feeding and clothing the world. Their interests and water supplies must be safeguarded to the maximum extent possible, within the legal, hydrologic and political constraints they face. Our members share a desire to ensure that policy reflects these considerations.

Principle #4: True costs of transferring water away from irrigated farms through land fallowing must be accurately accounted for and compensated or mitigated, including unintended consequences and third-party impacts. Understanding these costs will assist in determining the fair value of any land fallowing proposal.

The policy discussions for Colorado River water shortages often focus on demand management, with an emphasis on temporary fallowing of farm land and the transfer of this conserved water to meet non-agricultural demands in areas far from the affected rural communities. Many members of the Family Farm Alliance are water managers, and they typically share a farmer's practical approach to finding solutions to problems. Demand management means very different things to the broad spectrum of our membership depending upon where they are geographically located in the Upper or Lower Basin, if their use is within the Colorado River hydrologic basin or if the water is exported for use outside the watershed, if they are adjacent to the river or off-stream, and where they are located within the state, both physically and within the context of the priority-based water rights system.

In certain locations, it may be demonstrated that water conservation and transfer programs are tools that can help address the impacts of distressed water supplies. These tools may also provide much-needed added farm or irrigation system revenue, or storage opportunities that would benefit the conserving entity in future years. If Lakes Powell and Mead benefit volumetrically from these actions, the potential loss of power revenues associated with decreased hydroelectric generation from declining reservoir elevations that fund local water and environmental projects can be avoided. Furthermore, increased reservoir levels may prevent a Compact call, which could potentially affect all Upper Basin water rights holders. Finally, these “voluntary” programs could effectively limit unwanted federal intervention should the drought concerns intensify.

However, reducing irrigated agricultural production to contribute to the elevation building of Lakes Powell and Mead also creates other consequences, and may come at some cost as well. Irrigated agriculture must play an important role in identifying solutions to any Basin water shortages. And, at times, irrigated agriculture may be able to provide a temporary solution to extreme and prolonged drought conditions. However agriculture should not serve as a de facto “reservoir” for long-term municipal and industrial water supply planning. Nor should urban growth and prosperity come at the expense of our rural communities and food producing farms and ranches. If “dire hydrologic conditions” are going to be the norm in a more volatile hydrologic future, it will be even more important for policy decisions to be made that take into account the benefits that are derived from each of the competing uses of this finite water resource as well as the loss of that resource from its historical use.

Relationship to Management Actions Undertaken in Adjacent River Basins

Colorado River Basin management actions are interconnected with federal water management decisions made in both tributary and adjacent river basins. Restrictions on other non-connected water sources can limit opportunities to manage Colorado River water more effectively in a drought. The direct consequence of the lack of northern California water to Metropolitan Water District of Southern California (MWD) will it impact the demands and reliance on its Colorado River supplies and is the most prominent modern-day example of this larger-scale policy influence. Interestingly, while the linkage between California’s Bay-Delta and much of the West should be obvious given daily headlines, many in California do not see the connection. In order to fix the larger problem facing the entire region, California has to resolve the Bay-Delta issue.

Similarly, the environmental impacts to the Salton Sea from the implementation of the Quantification Settlement Agreement’s water conservation and transfer programs are also taking center stage. The Imperial Irrigation District has sought regulatory oversight to ensure the State implements its restoration and mitigation responsibilities to address local environmental and air quality impacts from these transfers. California’s record-breaking drought has highlighted the linkage of state-wide water supply shortfalls to both the Salton Sea and Colorado River hydrologic basins, as the irrigation district seeks to ensure the long-term viability of the nation’s largest agriculture-to-urban transfer.

Clearly, there are far-reaching impacts associated with these and other interconnected water management decisions. This can carry unintended consequences into regions far beyond the well-intended goals of narrowly-focused individual management actions in one basin. We believe there is a need to manage interconnected and adjacent systems with an eye towards the potential impacts of allied water systems.

Third Party Impacts

It is well documented that unintended, third-party impacts often accompany programs that pay farmers to idle lands. A more complete understanding between “willing buyer” and “willing seller” must be developed to fully address the impacts associated with the transferred water. These include impacts to neighbors, downstream water users, junior water right holders in the basin, the labor and service sectors that rely on stable agricultural acreage to stay in business, and the rural community itself. Unintended consequences associated with reducing productive agricultural land should be planned and mitigated as much as possible to minimize negative unintended impacts to rural communities, the environment, and local rural economies. States must have a role in defining these secondary impacts and requiring just mitigation and compensation for the unintended consequences of any water transfer/purchase deal. Buyers and sellers of agricultural water must reach a common understanding of the real value of such water, which extends far beyond individual transactions and may not be as cost-effective or ‘cheap’ as currently thought. Policy-makers and water transfer decision-makers also need to recognize the “silent lost opportunity costs,” or foregone benefit impacts, surrounding decisions affecting the Colorado River Basin for Western irrigated agriculture as well as the U.S. economy. As previously mentioned, residents of the United States spend less of their disposable income on food than any other nation in the world. Continuing to buy water from farmers and take agricultural lands out of production will come at a cost and eventually impact this statistic, our national food policy and potentially harm our food security and the nation’s economy.

Environmental Impacts

Environmental damage to rural riparian areas, open spaces and regional ecosystems as a result of fallowing productive agricultural land must be a consideration in new water transfer or sale proposals. Agricultural waters uses also provide environmental benefits that are often overlooked. For example, many of our artificial wetlands have been created by irrigated agriculture, and much of the land adjacent to public lands are privately owned ranches that serve as important buffers from developed and urbanized areas. In Northern Colorado, a study by Colorado State University (CSU) researchers found that 92 percent of that region’s artificial wetlands were connected to the irrigation infrastructure. Most of these wetlands would disappear if irrigation ceased. Though land use conversions from development and the associated changes in water diversions have led to reductions in historic wetland acreage in some places, it is clear from the CSU study that irrigated agricultural landscapes create wetlands and provide long-term environmental benefits.

Principle #5: Agricultural water conservation can help stretch water supplies but has its limits.

There is significant collaboration and cooperation between agricultural and urban users when all stakeholders understand the various and shared risks associated with low reservoir conditions.

Conservation efforts for both urban and agricultural water users are not evenly distributed across the Basin; certain agricultural districts are some of the most efficient in the nation while others have significant room for improvement. Conservation opportunities may exist on-farm or within the delivery system's conveyance infrastructure, or perhaps both if there are limited financial resources to fund improvements. Funding partnerships have allowed for extensive system improvements and conservation programs to be implemented in some agricultural districts over the last twenty-five years in exchange for water supply benefits based on these increased efficiencies. Geographic location also plays an essential role in some water systems' efficiency as certain areas return a high rate of diverted water back to the river system, while other areas – either due to high water-use efficiencies or because of their distance from the river – provide minimal return flows to the river. Likewise, urban users that rely on Colorado River water have mixed success in employing water conservation measures. Some municipalities have reduced per-capita use by over 20 percent since the mid-1990's, while other urban users have not invested in conservation or recycling opportunities or adopted more modern water use regulations or pricing to maintain or reduce their water use demands.

As detailed in an extensive series of interviews conducted by Colorado State University (CSU) in 2009 (http://wrdc.usu.edu/files/publications/publication/pub_5916275.pdf) and 2013¹, and depending on the unique circumstances faced by farmers and ranchers throughout the watershed, public opinions are strong and varied on issues such as water transfers, water banks, land fallowing, and the future of agriculture within the Colorado River Basin. Survey respondents polled in 2006 from throughout the West dislike transferring and leasing water from agriculture, and instead preferred to restricting outdoor watering on public and private landscapes. Households preferred to address short-term water scarcity without impinging on the performance of irrigated agriculture. Survey respondents were keenly aware of the potential for long-term water scarcity. Buying water from farms was the least desirable alternative among the long-term strategies while reusing water in various forms and building storage projects were the most popular alternatives.

The 2013 CSU report documented the significant uncertainty that farmers and ranchers across the Colorado River Basin are now feeling about the security of their water supply. This is especially evident among more junior water rights holders, but uncertainty also exists even

¹ “Water for the Future: Farmer, Rancher and Manager Perspectives on Agricultural Water in the Colorado River Basin- Synthesis of Interviews”, Colorado State University. August 5, 2013.

among more the more senior rights holders such as those in California's Imperial and Coachella Valleys. The CSU report finds:

“Agricultural water users throughout the Basin feel the mounting pressure to use agricultural water more efficiently and to conserve water that can be dedicated to municipal and other purposes. Most farmers and ranchers are not wasting resources but are using water as efficiently as possible. At the same time, many face deferred maintenance as rates, assessments and budgets have not kept (up) with the needs of aging water infrastructure. Nevertheless, many farmers and agricultural water managers across the Colorado River Basin have made investments in irrigation technology to make their systems more efficient and to conserve water.”

Substantial investments have been made to improve Colorado River system efficiencies, and to implement water conservation in both the irrigated agriculture and urban sectors, particularly in the Lower Basin.

Agricultural water users know how to manage limited water supplies, and water conservation infrastructure has become a useful and effective tool. If farmers normally use 20-24 inches of water in a growing season, they sometimes have to make do during drought with only 16 inches, or less. Local irrigation districts often operate as an in-house water bank, and work with their farmers to manage the limited water supplies: some manage cropping patterns on land as part of rotational operations, put in more efficient field irrigations systems such as sprinklers or drip systems, plant less water-intensive crops, or apply deficit irrigation for certain crops such as wheat or alfalfa. In high valley meadows where ranchers are running cows and raising grass, smart operators ensure water demands for cattle are met by reducing herd numbers.

Agricultural water users have long proven that they can manage water to a fluctuating demand during drought conditions. However, fallowing agricultural land is not a farmer's preferred water conservation measure. Instead, it simply moves water consumption from one use to another.

While water conservation in irrigated agriculture has proven effective in reducing water diversions and saving water for other uses, in some instances it may have negative impacts. Reduced return flows and seepage to groundwater aquifers can result from water conservation techniques, resulting in unintended impacts to other users and the environment. However, water conservation technologies have dramatically improved over the past decade and do have a place in integrated water management programs. Water conservation investments in all sectors can improve the long-term reliability and sustainability if the conserved water benefits the system.

Some recognition of the differences in agricultural water entitlement priorities among the users in the Basin should be a consideration in temporary fallowing or forbearance programs. For example, the Central Arizona Project (CAP) has a lower priority to the older perfected rights on the River (Yuma, Imperial Valley, etc.). Within the CAP, agriculture has the lowest priority, unlike other Colorado River projects. Consequently, if the Secretary of the Interior declares a

Shortage on the River under the 2007 Guidelines, CAP agricultural users will be cut back by 40-60 percent. For this reason, several CAP districts recently made the decision to "forebear" 15 percent of their entitlements in 2015 and 2016 to leave water in Lake Mead to hopefully eliminate or at least push back the likelihood of a Shortage Declaration, where they would stand to lose even more water. While this type of arrangement might be frowned upon in other parts of the Basin with higher priority water rights, CAP and its participating districts and farmers feel it is in their best interest given their vulnerabilities under the priority system described above. The flexibility of individual districts and growers to make these types of voluntary decisions should be embraced.

Principle #6: Public sentiment supports water remaining with irrigated agriculture and developing more water storage opportunities as insurance against shortages.

The Family Farm Alliance has long advocated that additional water storage projects must be part of water management portfolios to address long-term water reliability. This philosophy is also supported by many Western citizens. The general public has indicated its defense of farmers and agricultural water use. In the 2009 CSU survey, there was strong support for irrigated agriculture, especially in times of drought. The report provides very interesting findings that underscore the fact that Western households support water storage projects and irrigation over environmental and recreational water needs in times of shortage. Three focus groups were used to develop a multi-faceted questionnaire, and an e-mail invitation to an Internet survey yielded 6,250 municipal household responses from 17 Western states. Respondents were keenly aware of the potential for long-term water scarcity and how that could impact farmers and ranchers. In summary, the results of the survey demonstrated broad support in the Western United States for ensuring water was available for agriculture, particularly during droughts.

Principle #7: Technologies for water reuse and recycling are effective in creating drought-proof supplies for urban, environmental and other uses.

It is possible to meet the needs of cities and the environment in a changing climate without sacrificing Western irrigated agriculture. To achieve that goal, the West needs to implement a full array of different but complementary water management actions. Each contributes in different ways to the overall reliability of the water management system. Water recycling and reuse technology can take pressure off the need for water transfers from agriculture to urban uses in areas where imported water is part of the municipal supply. Water reuse could include treatment and reuse of single-use water supplies, from municipal water treatment plant effluent to non-tributary produced waters from oil and gas production.

While expensive, when the high costs of water reuse are compared to the total costs of moving water away from agriculture, including public policy costs, the cost of reuse and recycling water becomes more favorable. Water reuse technologies will continue to improve through applied research that is bringing the cost of reuse and recycling projects down. And, even though reuse water is costly, this water is also much more valuable to the urban area, in that the water is actually already in hand and does not have to be moved from the farm to the city. The fact that

imported water supplies from the Colorado River are, in some instances pumped over a mountain, purified, used once, treated as wastewater, and then allowed to runoff in to the ocean is inherently inefficient, especially when farms are being fallowed to provide even more water in order to meet the same fate. Technology can be used to purify and reuse imported water supplies in urban settings and while allowing the farms to continue to be productive.

Principle #8: Urban growth cannot be permitted in the future without locking in sustainable and diverse water supplies, and using irrigated agriculture as the reservoir of water for that growth is not sustainable in the long run.

Municipal water providers in the Basin are understandably concerned with the certainty and reliability of their Colorado River supplies during this record-breaking drought. A common theme in both the Upper and Lower Basins is that when compared with agriculture, the major municipalities have some of the most junior water rights and thus the least reliable supplies. In the Upper Basin, the large trans-mountain diversions that serve Colorado's vast Front Range municipalities, Albuquerque, Utah's Wasatch Front Range, and Cheyenne are all junior to the Colorado River Compact, thus subject to a compact curtailment (also referred to as a "call"). In the Lower Basin, Las Vegas and the Arizona cities served by CAP have the most junior mainstem water rights, and thus, would be the first to be shorted. Even within California, whose entire entitlement is senior to CAP's water right, the Metropolitan Water District's rights are junior to its major agricultural diverters such as the Palo Verde Irrigation District, Imperial Irrigation District, and Coachella Valley Water District.

Planners have known for decades that the Lower Basin States are over-subscribed . That is why grandiose (but implausible) plans such as that to bring Columbia River Basin water into the Colorado River watershed have been proposed. Since 1968, the Lower Basin has relied upon the additional water flowing into Lake Powell from the Upper Basin's undeveloped apportionment. The temporary benefit of those inflows into Lake Powell will not be available when the Upper Basin grows into its Colorado River allocation. As a result, some are now advocating for more large-scale fallowing programs to address the "emergency situation" on the Colorado River, even though the direst predictions will come true only if one assumes two more years of extremely low hydrologic conditions. Proactive planning and action are needed. We need to be very thoughtful and have the diverse agricultural community actively engaged in every one of these discussions.

Urbanization at the expense of agricultural production is not a viable tradeoff. Moving water from rural to urban areas represents a one-time transfer of wealth and economic benefit and results in long-term social dislocation and environmental justice issues. The reduction in domestic food production will result in food security issues on a national scale associated with increased reliance on imports, increased food costs, and threats to our consumer-driven economy. Urbanization at the expense of the rural environment is neither viable nor sustainable. Continued urbanization will also pressure remaining agriculture to mitigate for lost environmental attributes (e.g., ESA-listed species/open space/resident species/migratory birds),

or other local health impacts (e.g. air quality concerns identified earlier at the Salton Sea in southern California) and environmental justice concerns.

RECOMMENDATIONS TO PRESERVE AND PROTECT IRRIGATED AGRICULTURE IN A WATER-SHORT COLORADO RIVER BASIN

The Family Farm Alliance, whose mission is to ensure the availability of reliable, affordable irrigation water supplies to Western farmers and ranchers, has members that span the spectrum of Basin users. Within the Colorado River Basin, all of the various water users' perspectives are shaped by where they are in the system: whether they are in the Upper or Lower Basin, within or outside of the natural hydrologic basin, in which state, and the priority of their use within their state. However, there are several key common recommendations our membership agrees upon that we believe will be critical to successful drought and water shortage management efforts in the Colorado River Basin.

Recommendation #1: Planning for water shortage in the Basin must look to the long-term in meeting the goals of agriculture, energy, urbanization and the environment.

The Colorado River is a shared resource and benefits a broad range of uses including irrigated agriculture, urban, recreation, power, and environment, and the risks from continued drought and low reservoir conditions will impact all users regardless of location, priority, or use sector. We must start planning and managing water in the Colorado River Basin to meet the future needs of humans and their communities, as well as protecting the environment. This includes better managing our current water supplies for multiple needs by developing new water supplies and management infrastructure, such as new water storage facilities. Water reuse, advanced water treatment and resource management projects will further provide the greater flexibility needed to meet the demands of future growth and manage through future droughts.

Inaction in this regard may be “action” when it comes to current water supply scenarios. Inaction will push water-short cities and growing environmental water demands to pursue new water supplies from agricultural-to-urban transfers. It is possible for the Colorado River Basin water users to find collaborative balanced solutions, although they will not come easily or at the expense of senior water users and agriculture:

- Rather than threaten existing water users with dire consequences or federal mandates if issues are not resolved, the states should redouble their efforts to find solutions that minimize using additional fallowed agricultural land as a “new” water source and encourage compromise by those entities most affected by water supply shortfalls.
- States should be signatories to significant water conservation and transfer proposals if they are responsible for administering water rights affected by these proposals. States should review proposals for consistency with state water law as appropriate. In the Upper Basin, the Upper Basin Compact Commission must be heavily involved in managing such a program. Agricultural interests must be engaged in state and federal processes that

consider transfer policies and particular transfers. The recognized rights of other affected water users must be protected from “injury” by any transfer. And, the larger picture of sustained irrigated agriculture as a national food-producing treasure must be considered and protected in future farm fallowing proposals.

- Agricultural water contractors, and water users where appropriate, need to be involved in the earliest stages of water planning efforts to respond to growth and continued dry hydrology. We have to weigh any potential benefits to reservoir levels with the potential harm to our collective goals that might inadvertently arise should long-term or perennial “temporary” fallowing of agricultural lands occur. We fear that hastily constructed short-term programs could lead to long-term impacts and unintended consequences. Any proposed pilot fallowing programs should apply a diverse portfolio approach and require new investments in municipal reuse projects using direct and indirect potable reuse, improved irrigation and water management technologies, and urban water conservation (i.e., efforts focused on lawns, parks, and golf courses, as well as growth management).
- As we work on individual projects and programs in various watersheds of the West, we need to understand how those actions are linked to other related actions and plans occurring in different parts of each watershed and in adjacent watersheds.

Solutions to the problems facing the Colorado River will not and should not fall on the backs of any single user, state or sector of the economy. It is incumbent on all Colorado River water users to work together to find and implement voluntary collaborative solutions. This will inevitably require some level of sacrifice and/or compromise from all users.

Recommendation #2: A successful water shortage strategy must include a “portfolio” of water supply enhancements and improvements, such as water reuse, recycling, conservation, desalination and water system improvements. New infrastructure and technologies can help stretch water for all uses.

Often policy discussions on Colorado River matters focus on demand management – with an emphasis on temporary fallowing of farm land. Proposals to develop actual “new” water through constructed storage, reuse, recycling, desalination and modernized conveyance facilities to meet these demands, rather than moving agricultural water to other uses, must be part of all water shortage planning efforts. Meaningful solutions will require a suite of integrated demand management and supply enhancement actions driven by local interests and reflective of unique regional conditions and challenges. Expanded urban and agricultural water reuse and recycling programs and improved irrigation water management and conservation activities can provide useful tools to satisfy environmental needs, as well.

Water storage projects that are sized, designed and located so as to provide a variety of public benefits in an environmentally beneficial and fiscally responsible manner must be a part of the solution to better manage our limited water supplies. Modernization of water conveyance

facilities and other capital infrastructure improvements should also be integrated components. Improved conveyance infrastructure can contribute to a more resilient and profitable agricultural sector alongside healthy rivers and a thriving recreational economy. When projects have the support of multiple entities, including agriculture, environmental, and urban interests, the regulatory process should reward and expedite such projects. Integrated management of new above-ground and groundwater storage projects underscores our earlier concerns about the importance of having a firm understanding of surface storage levels/capabilities and, more importantly, aquifer storage numbers and how they both fit into the “water balance equation.”

Development of these types of plans should reflect the unique role of each state as appropriate with its water contractors. Each state and/or water contractors will need to take a different approach to developing mechanisms to determine which conservation projects will be prioritized and selected. Whatever the approach, the states and water contractors must ensure that agricultural interests have a voice in the planning efforts. Policy discussions regarding the amount of water used by various sectors (agriculture, urban and the environment) should be based on the methodology employed in the California Water Plan approach because that frames water use data in a more accurate, equitable, and realistic way that is helpful to our prioritization discussions. More sophisticated, accurate and realistic water use data should be developed that better describe the water balance equation, which must also include surface and aquifer storage, as well as environmental consumptive uses and the costs and benefits associated with agricultural and municipal use.

Recommendation #3: Temporary fallowing proposals should be approached in a thoughtful, thorough manner only after urban, energy and environmental users of water show a commitment to better manage their share of the finite supply and only for temporary shortfalls caused by droughts or emergency situations.

All four primary sectors of water use need to actively and responsibly manage their water supply portfolios. All water users should strive to be active and responsible stewards of our limited water resources to ensure long-term agricultural, urban and environmental viability and resilience. All water users should seek to implement cost-effective conservation measures, employing economically and environmentally sustainable practices in accordance with state law. Fallowing/idling (temporary or permanent) cannot be the only tool in the tool box and should always be used in tandem with other supply augmentation or demand management projects.

Municipal and industrial users need to tie land use decisions to available water supplies

Urban areas should determine the carrying capacity of municipal growth before targeting agricultural water as a “new” source on an “as-needed” basis. Land use decisions must be made in conjunction with this information and with a thorough assessment of available local water supplies. Municipalities and other holders of water rights for urban, municipal, or residential uses should seek to conserve, reuse and maximize the benefit from existing water supplies before seeking transfers of water from rural areas. A better understanding of the manner in which

municipal water conservation efforts directly accrue to the river is also required. Further, while there is a “hardened demand” in urban areas, parks and lawns should be sacrificed in certain years so that taps can still flow in suburban homes. Recreational properties, like golf courses, can be modified to reduce their water footprint. And, it’s time to start developing policies that limit or manage new development in a manner that is commensurate with local water supply availability. Housing densities, landscaping, location and concentration of services have fast become the modern urban planning tools that recognize the new reality of managing and minimizing water usage in our current “era of limits,” especially in the Colorado River Basin.

Environmental water managers need to prioritize how best to use their finite share of a limited water supply.

Environmental water releases need to be held to the same standards for efficiency and accountability as required of urban and agricultural uses. If an environmental water release is not accomplishing the objectives for which it was intended, that water should be made available to the other water users so it may be beneficially used for society. Today, we live with a managed, working Colorado River, with water storage, diversions, and environmental flows; we do not have the “natural” river conditions our pioneering forefathers found in the Basin. The environmental benefits associated with agricultural irrigation must also be acknowledged and weighed to consider their proper priority when compared to environmental flow augmentation efforts that simply move water from agriculture to supplement instream flows, many times without measuring the net environmental benefits or impacts of such flows.

In many parts of the Western U.S., urban and certain agricultural water suppliers are already required to complete and submit comprehensive integrated water management plans to their respective states. Water must be measured at numerous locations using acceptable accuracy standards, reported to the appropriate entity and Best Management Practices (BMPs) or efficient water management practices implemented and identified. To our knowledge, environmental water managers are not held to the same standard – yet. If we truly want to see an improvement in the Colorado River Basin’s ecosystems, then it will be necessary to actively measure and manage the beneficial use of all of our water supplies, including environmental water uses. We must also require that corresponding environmental benefits expected from such uses of limited water resources be measured and reported in a transparent fashion. Improving environmental water management by creating a set of defined outcomes will not only benefit the Basin’s overall water management goals, it will help truly protect environmental resources by assuring that the time, money, effort and water dedicated to the environment is actually doing something beneficial and are not wasted on perceived or alleged benefits without true accountability.

Water associated with energy development and use must be factored into water management and planning policies.

Policy makers need to understand the potential water impacts associated with water used for fracking, coal bed methane production, and other petroleum extraction operations, and new

overall power demands in the future. The total water consumed by electric utilities accounts for 20 percent of all the nonfarm water consumed in the United States. Across the Colorado River Basin, astounding amounts of “produced water” are brought to the surface daily during petroleum and natural gas production. This is considered wastewater by energy producers, and is usually re-injected deep into salty aquifers, precluding further surface uses. Meanwhile, with the growing prospect on opening up oil shale production in the Rocky Mountain West, new energy extraction techniques require large amounts of water. Recovered “produced water” and treating it could help satisfy these new demands. Recovering usable water from oil and gas drilling operations could also significantly help our farmers, ranchers and recreational users, as well as enhancing the habitats of many plants and animals.

Recommendation #4: Unintended consequences associated with reducing productive agricultural land should be accounted for and avoided, and, if unavoidable, minimized and fully mitigated.

Any water banking or other proposal that would shift existing agricultural water to meet other demands must be considered in the light of the foregone benefits to source users of agricultural water, followed by the broader interests outside of that original place of use. Those proposals must recognize that any potential damages to rural agricultural communities resulting from such transfers will harm the economic, social, and environmental interests of the entire region. Agricultural water cannot and should not be the sole source for filling water supply gaps in the Basin; those water users with the supply gaps must lead the way in filling their own gaps through a diverse suite of resources, not just increased agricultural conservation and reduced use/diversions.

The debate concerning the pressures on the Colorado River will continue. Agricultural water users want to be, and must be, included at a fundamental level in defining what their mutual water future will look like. If water is transferred from irrigated agriculture, the unintended consequences associated with lost agricultural lands should be factored and fully mitigated to avoid any negative impacts to rural communities, the environment, and local economies. There are creative ways to address mitigation to surrounding agricultural operations, agribusinesses whose success depends on a stable agricultural base, and rural communities whose culture and economic well-being is linked to a sustained agricultural economy. For any water transfer from rural to urban areas, there should be explicit requirements in the transfer instruments for avoidance and/or mitigation of harm to rural/agricultural economies and environmental values. Further investigation into creative ways to mitigate for third-party impacts associated with fallowing agricultural land is warranted. And, fallowing agricultural lands should be the water source of last resort, and only be tapped for emergency situations on a very temporary basis.

Buyers and sellers of agricultural water must reach a common understanding of the real value of agricultural water, which extends far beyond individual transactions. Outside areas seeking to secure temporarily transferred water from rural sources will have to pay a higher price for water to properly reflect the value of the source water to the participating water users and their

surrounding community. Impacts to the community and the environment from removing water from the land, even if only for a temporary period, must be fully mitigated. Collaborative discussions to address development of a water bank or temporary fallowing program, and the appropriate funding levels, must continue. The “disconnect” in perceptions of the value of the water to be transferred requires more careful thought and incorporation into water resources decision-making. The goal must be to get past this disconnect and ensure that rural communities and their agricultural economies are protected. Policy makers and water transfer decision-makers also need to recognize that there are “silent lost opportunity costs,” or foregone benefit impacts surrounding decisions affecting the Colorado River Basin and Western for irrigated agriculture as well as the U.S. economy. Those considerations must be factored into decisions involving “choices” of where water will go. Finally, water managers will need to determine the amount of water available for transfer, limited to the consumptive use of growing crops, in order to ensure there is sufficient flow for “carriage” water necessary to deliver water to remaining downstream users, as well as other riparian water benefits.

These recommendations will require visionary leadership and a firm commitment to a balanced, workable policy. But collaborative opportunities do exist, and if we are prepared to seize them, conflict will be reduced and certainty for all water uses increased.

CONCLUSION

The Family Farm Alliance believes that the Colorado River Basin can and will successfully work through future droughts and water shortages in a collaborative and effective way. The future of millions of people and millions of acres of farms and ranches and the food and fiber they produce in the Basin rest on this belief. We also believe if the Basin uses the principles and recommendations in this paper, solutions can be found that do not pit one user against another in resolving differences and complex water problems. The Alliance looks forward to working with the many agricultural, urban, energy and environmental water users in finding these solutions so critical to the future of the Colorado River Basin.