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Water and Food Security in the Desert Southwest

The difficulties we are experiencing with water in the west are the consequence of the worst megadrought in 1200 years, which is increasingly clear to be a process of aridification and climate change (Wheeler et al., 2022). These conditions are bearing down on desert agriculture in a very significant way. In the next week, the U.S. Bureau of Reclamation (BoR) is expected to announce the 2023 operational plan for the Colorado River and it will definitely involve reductions in water allocations.

On 14 June 2022 BoR Commissioner Camille C. Touton described the need to achieve additional reductions on Colorado River allocations. The BoR has been engaging in discussions with the seven basin states that depend on the Colorado River to develop a plan for the reductions, and that decision will be announced in the next few days. As Commissioner Touton described, the BoR has the authority to “act unilaterally to protect the system, and we will protect the system.” (Bureau of Reclamation, 28 June 2022). Commissioner Touton stated that the seven basin states on the Colorado River must reduce allocations by 2 to 4 million acre-feet (MAF).

The basic arithmetic on the Colorado River is as follows:

16.5 MAF is currently the allocated amount of water budgeted with 7.5 MAF allocated to both the upper and lower basins, plus 1.5 MAF allocated to Mexico:

$(7.5+7.5 \text{ MAF} = 15 \text{ MAF U.S.} + 1.5 \text{ MAF Mexico} = \mathbf{16.5 \text{ MAF total}})$

In the past two decades, the average annual flow of the Colorado River from 2000 - 2018 has been approximately **12.4 MAF**, which is 16 % lower than the 1906-2017 average of **14.8 MAF/year**. Thus, we can see where the **4 MAF differential** is determined.

A reduction of Colorado River water allocations from 16.5 MAF to 12 MAF represents a 27% reduction. That is in line with the climate and hydrological reality we are dealing with and a huge reduction for the Colorado River basin. So, while the good news is that we do have

approximately 12 MAF coming down the river, the bad news is that it is almost 1/3 less than what has been allocated on the existing Colorado River water budget. To bring the Colorado River system into better balance will require some major changes.

The valleys of the Colorado River watershed are tremendously valuable resources with alluvial soils that are young geologically, extremely fertile, and highly productive *if* sufficient water is provided. These are some of the richest agricultural areas in the western United States. For example, the lower Colorado River valley, particularly the valleys in the Yuma, Arizona and Imperial Valley, California areas, provide more than 90% of the leafy green vegetables (all types of lettuce, broccoli, cauliflower, etc.) for the U.S. and Canada every year from November through March. These valleys produce an abundance of other crops including high quality durum wheat production that supports the pasta industry, including most Italian pastas, and a seed production industry that provides high quality seed stocks regionally, nationally, and internationally. An extremely well developed and sophisticated infrastructure system is in place to direct and manage water to the fields for highly efficient and productive irrigation systems. The management of these systems requires a high level of specialized and well-developed expertise which is in place and operating in the rich and productive valleys of the lower Colorado River. Thus, the valleys of the Colorado River and the people on the ground in the field are managing some of the most productive farms in the U.S. and anywhere in the world. These are resources that we should value and protect for both water and food security that is both regionally and nationally significant.

Analysis of the desert Southwest's paleoclimate have shown a distinct susceptibility of the region to experience extraordinary megadroughts that can last for decades or even centuries (Baum, 2015; Stahle et al., 2000; and Acuna-Soto et al., 2002). For example, paleoclimate records show that a fifty-year drought struck the Southwest, Northern Mexico, and the Rocky Mountains between about AD 1540 and 1590. Three hundred years earlier, records reveal the Great Drought of AD 1267-1299. It is believed that this 32 year Great Drought period was at least partially responsible for the abandonment of concentrated Native American populations throughout the Southwest (Cook et al., 2007; Benson et al., 2007; and Cook et al., 2010). Paleoclimate records indicate that droughts of more than a century in length have hit this region in the past (Stine, 1994).

The result of this overall situation is that we are reaching a crossroads in the development of a strategy to deal with the changing conditions in the west and immediate action is needed. All efforts that have been directed to deal with this issue in the past 20 years, although well-intended, have not been sufficient in addressing the problem, including the 2007 interim guidelines, the Intentionally Created Surplus program, the Drought Contingency Plan, and the 500+ Plan. The climate is changing much faster than our system of governance. Thus, we are facing an existential crisis for the desert Southwest that includes the interface between the agricultural and urban sectors of our society. It seems to be one of the classic cases of “If you are not at the table, you are probably on the menu.” In this case, it might be both.

One of the difficulties with this overall situation is the past tendency to develop short-term responses to a situation that has long-term implications and needs. In general, people have a tendency in strategic management at all levels, from international relations, to national, state, and local governance towards “Strategic Narcissism”, which is the tendency to define challenges as we would like them to be while ignoring the agency that other entities have over our results.

This term of strategic narcissism was first presented by Hans J. Morgenthau and he expanded on this theme in his 1948 book *Politics Among Nations* where he introduced the concept of political realism, presenting a realist view of power politics. He pointed out that strategic narcissism and the tendency to think idealistically and narrowly about the scope of the problem or challenge usually leads to narrow solutions and strategies, which commonly fail.

In his 2020 book *Battlegrounds: The Fight to Defend the Free World*, H.R. McMaster reinforces Morgenthau’s point regarding the dangers of indulging in strategic narcissism and the corresponding tendency to artificially separate interconnected problem sets, which encourages short term and simplistic solutions to complex problems. He describes the common tendency to define and address a problem in a manner that allows us to develop a response that we favor. This is often based on wishful thinking and our own capacity for self-delusion with flawed assumptions rather than dealing with a realistic assessment of basic facts.

While Morgenthau and McMaster are addressing strategic issues on the international scale, we are confronted with similar challenges of avoiding the indulgence in strategic narcissism in our efforts to develop effective strategies to manage our water resources in the desert Southwest, as

exemplified in the Colorado River situation. It is important for us to recognize the legitimacy and importance of all involved components, current and future, including both urban and agricultural interests and understand that the decisions made today will have an impact on residents of the desert Southwest in the decades to come in all sectors.

Thus, we need to be considerate of more than ourselves and the immediate needs and include the prospects for our children, grandchildren, and the unborn generations yet to come. Considering the basic facts associated with the current Southwestern megadrought and the realistic indications that we are dealing with increasing aridification of the climate through the process of climate change is a good example. We have consistently held onto the hope that the drought will end, and we will soon return to the climate and hydrological patterns of the mid-20th century. Instead, it would be better to plan for the probable contingency that aridification is taking place and future generations in the desert Southwest will be forced to continue to deal with it. As the paleoclimate records show us, this is within the range of possibilities.

A case of strategic narcissism is the belief and conviction that some people hold that commercial agriculture in the desert Southwest should be eliminated with the food and fiber production being replaced by distant and perhaps international sources or small farm local crop production operations. Placing future generations at the mercy of long-distance sources of food production is dangerous and it would be irresponsible to do at this time. These are rather simplistic and idealistic visions. For example, small scale local farming can serve as a nice food supplement to some communities, particularly in urban areas, but it is not going to replace the needs for large scale food and fiber production supporting 7.4 M Arizonans, 330 M people in the United States and nearly 8 B people on the planet today. These ideas run counter to good and practical strategic planning for water and food security for the desert Southwest.

Admittedly, it is exceedingly difficult for humans to have the necessary discipline to avoid strategic narcissism and develop a better sense of empathy for strategic planning. As Jamil Zaki, a psychologist from Stanford University has pointed out, it is difficult for people to develop the necessary empathy because it runs counter to our basic nature and instincts (Zaki, 2019). Both time and distance diminish our capacity for empathy because “humans caring instincts are short sighted. Our ability to feel empathy about future development is limited because we tend not to

feel for our future selves. It goes against our instincts to tackle problems that we have not yet been forced to confront.”

As we plan and develop a functional strategy for future water and food security in the desert Southwest, it is realistic to consider that large urban areas will exist and continue to grow. Agriculture is essential to any society and that is certainly true for the large cities of the Southwest, present and future. In 2022 we should be very alert to the dangers of depending on long supply chains and the single points of failure in supply chains that can be devastating to the dependent populations. The current situation is an opportunity to strategically plan for the future of the desert Southwest in a manner that provides for both water and food security.

Based on the agricultural capacities of the desert Southwest, Arizona could be self-sustaining, or very nearly so. Considering Arizona, New Mexico, and California collectively, the possibility of long-term agricultural sustainability is entirely possible. But sufficient water is required to support the agricultural systems necessary to support that population.

I am confident that we can work through these challenges in a balanced and effective manner but “business as usual” will not be sufficient in addressing the demands of today. This is a complex situation environmentally, geographically, politically, economically, and socially. Compounding the current challenges is the fact that actions need to take place rather swiftly and here are many factors to consider simultaneously. It is important that we develop a consideration of the broad and long-term impacts of our decisions for all parties with critical issues such as the management of our water resources for both water and food security in the desert Southwest. This requires a conscious and concerted effort to do so and all parties taking Colorado River water should share in absorbing the changes that are coming, nobody should get a pass. It is possible to develop a balance of coexistence with agriculture and urban development with the water resources available in this region but it will not be easy.

As stated in the old Greek proverb: “*Society grows great when old men plant trees whose shade they know they shall never sit in.*” We can see the value of that line of thought that was true 3,000 years ago and also with what we are dealing with today. This is one of the great challenges of our time and I believe we can step up and deliver in a balanced and constructive manner.

References:

- Acuna-Soto, R., D.W. Stahle, M.K. Cleaveland, and M.D. Therrell. 2002. Megadrought and Megadeath in 16th Century Mexico. *Historical Review* 8(4): 360-362.
- Baum, R. 2015. Climate change and drought in the American Southwest. The Climate Institute. <https://climate.org/effects-of-21st-century-climate-change-on-drought-risk-in-the-american-southwest/#:~:text=Drought%20is%20a%20common%20occurrence%20in%20the%20American,completely%20unprecedented%20within%20the%20past%2010%2C000%20years.%208>
- Benson, L.V., M.S. Berry, E.A. Jolie, J.D. Spangler, and D.W. Stahle. 2007. Possible impacts of early-11th-, middle-12th-, and late-13th-century droughts on western Native Americans and the Mississippian Cahokians. *Quaternary Science Reviews* 26(3): 336-350.
- Bureau of Reclamation, 28 June 2022 <https://www.usbr.gov/ColoradoRiverBasin/>
- Cook, E.R., R. Seager, M.A. Cane MA, D.W. Stahle. 2007. North American drought: Reconstructions, causes, and consequences. *Earth Science Reviews* 81(1): 93-134.
- Cook, E.R., R. Seager, R.R. Heim Jr., R.S. Vose, C. Herweijer, and C. Woodhouse C. 2010. Megadroughts in North America: placing IPCC projections of hydroclimatic change in a long-term paleoclimate context. *Journal of Quaternary Science* 25(1): 48-61.
- McMaster, H.R., 2020. *Battlefields: The Fight to Defend the Free World*. Harper Collins Publishers, New York, NY.
- Morgenthau, H.J. and K. Thompson. 1948. *Politics Among Nations*. New York: McGraw-Hill. (1985, 6th ed.).

Stahle, D.W., E.R. Cook, M.K. Cleaveland, M.D. Therrell, D.M. Meko, H.D. Grissino-Mayer, E. Watson, and B.H. Luckman. 2000. Tree-ring Data Document 16th Century Megadrought Over North America. EOS 80(12): 121-125.

Stine, S. 1994. Extreme and persistent drought in California and Patagonia during mediaeval time. Nature 369: 546-549.

Wheeler, K.G, B. Udall, J. Wang, E. Kuhn, H. Salehabadi, and J.C. Schmidt. 2022. What will it take to stabilize the Colorado River? Science, 377 (6604) p. 373-375. • DOI: 10.1126/science.abo4452

Zaki, J. 2019. The War for Kindness: Building Empathy in a Fractured World. Crown Publishing Group (NY).