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(Via E-mail and First Class Mail)

Ms. Natalie Mast
Program Manager, Management Plans
Arizona Department of Water Resources
1110 W. Washington Street, Suite 310
Phoenix, Arizona 85007

Dear Ms. Mast:

This letter is in response to the Department's presentation on safe-yield at the Safe-Yield Technical Group meeting on September 23rd, comments offered from participants at that meeting and recent discussion at several other work group and committee meetings of the Governor's Water Augmentation, Innovation and Conservation Council. SRP offers these views to provide a perspective on the goal of safe-yield - what we believe it requires, how it should be measured, and over what period it should be assessed. Since SRP's water operations are concentrated in the Phoenix AMA, we focus the majority of our comments on safe-yield in the Phoenix AMA.

After reviewing the Department's presentation and listening to some of the comments made at the September 23rd meeting, it seems evident that there is a wide range of opinions on what the safe-yield goal requires and similarly, how it should be evaluated or measured. Coupled with comments we have heard since the September 23rd meeting, we are afraid this wide range of opinions arises from a lack of common understanding of what safe-yield does and doesn't mean. Further, we are concerned that this lack of common understanding about various aspects of safe-yield could lead to suggestions for water policies and programs that are out of the scope of safe-yield, unnecessary, or even impractical given the size and complexities of the sub-basins comprising each AMA.

For example, at the September 23rd meeting, one of the commenters showed a graph depicting the cumulative amount of groundwater that had been withdrawn by water users in the Prescott AMA's groundwater basin since 1980. The graph showed a deficit of several hundred thousand acre-feet for an AMA that has a significantly smaller

amount of annual water use. The commenter seemed to suggest that in order for the Prescott AMA to reach safe-yield, this amount of groundwater needed to be restored to the basin. While SRP, and others who rely on water from the Verde River, certainly would be interested in the Prescott AMA making up for past groundwater depletion given that the AMA is located at the Verde's headwaters, the safe-yield goal for the Prescott AMA does not actually require that past groundwater depletion be replenished or otherwise restored to what it was in 1980. Nor does it require that all groundwater pumped in AMAs since people started withdrawing groundwater in the AMAs (since the early 1900s) be restored as some have recently suggested.

The safe-yield goal is a groundwater management goal "which attempts to achieve, and thereafter maintain, a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area" (see ARS 45- 561.12). The goal was established by the Legislature for the Phoenix, Prescott and Tucson AMAs to be achieved (actually *attempted* to be achieved) by January 1, 2025 (see ARS 45-562.A). From our perspective, restoration of the AMA's groundwater supply to historical levels, whether from 1980 or at the turn of the last century, or some other point in time is not required by the goal. It is not a retroactive goal, but rather a prospective goal.

Likewise, as one commenter apparently suggested, we believe the safe-yield goal does not mean nor require that certain groundwater levels be maintained in these three AMAs. In response to a series of charts showing groundwater overdraft in the AMAs derived from a water budget approach to measure progress toward safe-yield, another commenter apparently suggested that water levels in the AMA would be a more appropriate measure.

From our perspective, the goal does not require that groundwater levels in the AMAs be stable or set at a certain level as the measure of when safe-yield is achieved. In fact, with respect to the Phoenix AMA, requiring water levels to be stable or at a certain level as the safe-yield measure would likely be very difficult to achieve given that the Phoenix AMA consists of several very large groundwater sub-basins and the characteristics of pumping and recharge in each of the sub-basins varies greatly. Moreover, water levels fluctuate widely and at different amounts, based on the amount and timing of incidental recharge from water use occurring in those sub-basins and across the entire AMA. Since the timing of when incidental recharge of water actually percolates through the ground to reach the saturated area of the aquifer is not very well known and varies greatly in time and volume across the AMA, using water levels as the measure of whether safe-yield is being achieved would seem to be very difficult and could give an inaccurate result about the AMA's progress toward safe-yield.

While some may suggest that an average groundwater level across the entire Phoenix AMA might be a reasonable measure of safe-yield, it is important to keep in mind that the AMA might actually be in safe-yield, while at the same time water levels could be falling. This can and will likely occur during periods when significant pumping is occurring to recover water storage credits that have been created in the AMA by the Arizona Water Banking Authority and others. The withdrawal of long-term storage credits will likely negatively affect groundwater levels; however since the water is not legally groundwater, it can be withdrawn and will not count toward groundwater pumping and toward safe-yield. Accordingly, measuring safe-yield based on groundwater levels could lead to inaccurate conclusions about whether the AMA is in safe-yield.

From our perspective, we believe the most appropriate method to measure progress toward safe-yield is the annual water budget approach that considers groundwater withdrawals as debits to the aquifer and recharge (natural and incidental) as credits to the aquifer. This annual accounting of debits and credits provides a good measure of how water users affect whether more groundwater is being withdrawn than is being recharged – a state of overdraft, or whether more water is being recharged than withdrawn – a state of positive balance in the aquifer. While some may suggest that the water budget approach may not be accurate due to the lag time in which water from natural and incidental recharge reaches the aquifer, if consistently used over a long period of time, the water budget approach will eventually take into consideration past recharge in the budget.

Additionally, as we indicated in our comments on the Department’s draft of the 4th Management Plan for the Phoenix AMA, we believe safe-yield should be assessed over a long period, consistent with the natural variability in surface water supplies available to the AMA, particularly those from in-state rivers that flow to the Phoenix AMA.¹ The availability of surface water supplies to the Phoenix AMA is an important factor in determining how much pumping occurs in the AMA. When sufficient surface water supplies from these sources are available to water users in the AMA, their groundwater pumping is reduced. Alternatively, when their surface water supplies are limited, they pump more groundwater. In the former years overdraft is reduced or eliminated altogether, while in the latter years pumping is increased and the AMA may be in a state of overdraft. Moreover, when abundant surface water supplies from these sources are

¹ Colorado River water supplies available to the Phoenix AMA may also be highly variable in the future. However, the fact that Arizona has stored several million acre-feet of Colorado River water in the Phoenix AMA for future recovery helps reduce the amount of groundwater that may be withdrawn by entities that rely on Colorado River water as their main supply of surface water.

available, more natural recharge tends to occur in the AMA. Alternatively, less natural recharge occurs during dry years when surface water supplies are limited.

The availability of surface water supplies from in-state rivers to the Phoenix AMA has historically been highly variable. Records kept by SRP for the Salt and Verde rivers since the early 1900s show that these river systems undergo long cycles of producing water above the long-term average and long cycles of producing water below the long-term average. The length of these cycles is consistent at about 25 to 30 years (see Exhibit 1 enclosed). These long cycles also show up in the tree ring records (see Exhibit 2 enclosed). As a result, during the wet periods when runoff is above average, more surface water is typically used in the AMA and less groundwater is used. Alternatively, in the drier periods, more groundwater is pumped and less surface water is used. Groundwater overdraft is reduced or eliminated in the former periods and is increased in the latter periods. Climate scientists also believe that the natural variability of runoff from river systems will continue to occur in the future. However, under a warming climate the degree of variability may increase. Many scientists believe that more runoff may occur during wet periods than we have experienced in the past and less runoff may occur during drier periods.

Accordingly, assessing whether the AMA is in safe-yield should be evaluated under these long cycles of surface water availability. If safe-yield is evaluated under a shorter period, one might conclude the AMA is in safe-yield or a state of positive balance, if the analysis is occurring during a wet period and vice-a-versa, if the analysis occurs during a dry period. Additionally, safe-yield should be assessed using a long-term rolling average of net groundwater pumping (overdraft or positive balance) to average the highs and lows of pumping and recharge. The long-term rolling average is analogous to maintaining a checkbook to determine whether a person has money in the bank, or whether the person is dipping into the bank's funds under an overdraft situation.

Lastly, as we mentioned in our 4th Management Plan comments, SRP is very encouraged with the progress the Phoenix AMA water users (and the Department) has made over the past 40 years in reducing groundwater use and groundwater overdraft. The progress toward safe-yield that has been made in the Phoenix AMA is exactly what the Legislature anticipated when it passed the Groundwater Management Act in 1980. The rolling average amount of overdraft is currently just under 40,000 acre-feet per year – that is only 2% of the total water use in the Phoenix AMA. This is especially remarkable considering that before 1980, the overdraft was reported to be nearly 1,000,000 acre-feet. However, we cannot rest on these great accomplishments. More work needs to be done, particularly when it comes to addressing sustainable water supplies for future populations to come.

I hope this letter is helpful and we look forward to continuing to participate in the Department's work going forward under the Management Plan process and GWAICC.

Sincerely,



David Roberts

Enclosures

cc: Christa McJunkin
Anthony Beckham