Written comments and suggestions in response to TAC Agenda Item 3., Water Resource Managers Report, June 6, 2019

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A. GSP Sustainable Management Actions: Modeling Scenarios Description

The scenarios slides adequately present the assumptions underlying the three new DRI model runs. There has been criticism from Mojave Pistachios representative J. Nugent that the assumptions stated for model run #3 (slide 1) did not properly represent the original "White Paper". Except for assuming a specific natural recharge value of 7650 ac-ft/yr, this writer sees no other *significant* differences. The graphical representation of the continued pumping in **Scenario #3** through 2029 dramatically presents the fact that this scenario pumping is only about 20% less than the baseline Scenario over the same period and is not based on sustainability goals at all. More direct comments on this Scenario in B. and C. below.

Scenario #4, the "Water Buyout" has a sharp decline in Basin water production starting in 2020. This drop is primarily borne by agricultural pumpers. Aside from the strong political aspects this scenario results in a very uneven pumping and artificial recharge distribution between the NW and SW management areas of the Basin**.** This uneven distribution will be difficult to accommodate in a comprehensive Basin sustainability analysis**.** More on this in B. and C.

Scenario #5, the "Immediate Halt to Pumping" also results in a very uneven pumping/artificial recharge distribution between the NW and SW management areas. **Both Scenarios #4 and #5 are based on a relatively sharp drop in Basin water production and which will definitely remove much of the present shallow well threat.** More on this aspect in C.

B. GSP Sustainable Management Actions Modeling Scenarios: Model Results- Scenarios #3, 4, 5.

Scenario #3 slide #12 This slide emphasizes that the "White paper" scenario proposes to use imported water in the 2039 to 2070 years only to offset additional pumping beyond natural recharge. This means that no basin recovery is being attempted. Slide 13 emphasizes both the temporal and spatial extent of the high rates of groundwater level (gwl) declines across nearly all of the Basin including substantial areas that are not being directly pumped. This loss of storage is irreversible in this scenario. Slide 14 does demonstrate that scenario #3 from 2040 and beyond does lead to a nearly sustainable gwl condition across most of the Basin. Natural recharge from the Coso Mtns and Little lake is insufficient to reverse the severe declines in gwls in the extreme NW and SW areas during the 2020 to 2040 time period caused by continued unmodified pumping.

Scenario #4 Slide #16 emphasizes an important benefit of the "Water Buyout" scenario which is the use of recycled and imported water to augment natural recharge to help bring the Basin into sustainability. Slide #17 demonstrates the early reduction in pumping and the addition of artificial recharge in the NW results in a substantial rise in gwls in this area even in the 2020 to 2040 time period. However, continued pumping in the SW area remains and the high rates of gwl declines in this area are far from a sustainable condition.

The extreme NW also remains in a high rate of gwl decline as was the case for scenario 3. Slide # 9 shows an out-year nearly Basin-wide gwl stabilization and even some degree of recovery. Even the SW area is benefitting from the effects of this scenario and shows a slight increase in gwls.

Scenario #5 Slide #16 graphically demonstrates that this scenario also includes a recycled and imported water component that is effectively an addition to the Basin natural recharge. **This component is similar to the corresponding element in scenario #4 and is a very valuable sustainability step**. Slide #17 shows a similar response to scenario #4 over the 2020 to 2040 time period. The out-year response from 2040 to 2070 is also very similar with an even better and more complete resolution of the SW gwl declines. Again the extreme NW and SW still show relatively high rates of gwl decline. These are both low transmissivity aquifers and the affected SW area is east of the barrier effects of the Little Lake fault itself. There is currently very little to no pumping in either area.

Slide #24 summarizes the groundwater budgets for all three scenarios. The most significant aspect that is clearly shown is the much larger loss of groundwater storage with scenario #3. There is obviously no technical justification for the prolonged high pumping rates over the 2020 to 2040 time period in this plan. Slide 25 further emphasizes this aspect. **There is no technical justification for prolonged pumping as is proposed in scenario #3**.

The Bureau of Reclamation Report estimated that the potable groundwater in storage with 200 ft of dewatering was about 1.8M ac-ft. This value was significantly smaller than was estimated by Kunkel and Chase (1968) as a result of BoR discoveries of substantial additional poor quality water in the Basin. The total groundwater pumped as documented in the Cooperative Group 2016 Table was over 1M ac-ft. This writer is estimating that the additional water pumped since 2016 is at least 0.1 M ac-ft. So the total pumped to date is 1.1M+ ac-ft. **The balance of 0.7 M ac-ft needs to be protected to the extent possible- not simply consumed for convenience or non public benefit.**

Slides 26-31. **The TDS changes predicted by the transport model runs are not significant except for a limited area in the NW and SW. If the poor water associated with the organic clay known to be underlying a zone along N Brown Rd could be properly documented the affected area of water quality declines with additional pumping would be considerably larger than is presently modeled.**

The summary slide for this topic captures the most of the principal discoveries that I have just outlined.

C. **GSP Sustainable Management Actions Modeling Scenarios: Model Results – Estimated shallow well impact analysis GA model runs #3,4 and 5.**

Slide # 32 is a summary of existing and new discovery of the numbers of domestic, coop and mutual wells in the IWV Basin. **It is appreciated that these tallies are the result of continued substantial and dedicated efforts**.

The decision to create a section by section draw down map/chart is a good approach to describing the spatial variation of the gwl decline over the Basin. This approach will no doubt be useful in creating minimum thresholds for gwls. The methodology outlined in slide 35 has been previously described in detail by this author in an earlier report and remain unchanged as additional well information is obtained from well records. The only comment to be offered is that the wells drilled before about 1990 really were completed on average with 100 ft of standing water as can be verified by an examination of existing well records. Many wells were completed with even less than 100 ft in this time period. This aspect will not change the histograms of well failure by year except for early years.

As expected, scenario #3 has the greatest shallow well impact as a result of the prolonged 2020- 2040 pumping. Scenario #4 shallow well impact is spread out over the timeline to 2070 also as expected. Scenario #5 has the least impact as a result of the early reduction in pumping and artificial recharge. Slide 44 summarizes these impacts clearly and is a useful way to portray the shallow well failure effects.

Overall slide typos and other suggested clarifications/corrections

1) Slides 13-23 the “ < “ needs to be turned around to read “>”

2) Slide 37, 39, 41 and 43, the ordinate axis of the “Estimated management scenario #x impact to shallow wells” should be corrected by adding “per year” or “/year”

3) slide 43 “summary table” I suggest changing “GA” to “scenario”. Also, correct the first date in the (xx)