Colorado Alluvial Aquifer

Proposed Desired Future Condition and Monitoring Network for the Colorado Alluvial Aquifer in Bastrop County, Texas, to sustain the Colorado River during a repeat of the Drought of Record.

Environmental Stewardship

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2. PROPOSED DESIRED FUTURE CONDITION FOR THE COLORADO ALLUVIAL AQUIFER.

Environmental Stewardship is requesting that a desired future condition be established for the Colorado Alluvial Aquifer with the following objective:

> To maintain the saturated depth of the Colorado Alluvial Aquifer at a minimum of [to be determined] feet above the most recent DOR low-flow water level in the Colorado River to maintain a relationship between the river and the alluvium that is adequate to support a *sound ecological environment* during a repeat of the most recent drought of record[1] (DOR) in the Bastrop reach of the river and protect surface water rights throughout the basin.

2.5 Include DFC and monitoring work plan in Lost Pines' Management Plan.

Lost Pines GCD is on track to review and revise its management plan this year to include changes in the adopted 2022 DFCs. As a part of the revision, it would be appropriate to include plans to remedy or mitigate the potential impacts of groundwater pumping within the district, and outside the district, on surface waters within the district such as the Colorado River and its tributaries.

A Lost Pines GCD Board member requested input from Environmental Stewardship regarding the goal, objectives and performance standards that might be included in its management plan.

Proposed District specific goal for the Management Plan:

> **Goal:** Address surface water and groundwater interactions in the Colorado Alluvial Aquifer to enable management of the impact of groundwater pumping on the Colorado River and its tributaries, to maintain a relationship between the river and the alluvium that is adequate to support a *sound ecological environment* during a repeat of the most recent DOR in the Bastrop reach of the river and protect surface water rights throughout the basin and protect property rights.
>
> **Objective:** To better understand how, and to what extent, local aquifers contribute to streamflows under wet, dry, and drought conditions. Determine what level of contribution sustains a sound ecological environment and protect property rights through extraordinary drought conditions.

[1] The U.S. Drought Monitor started in 2000. Since 2000, the longest duration of drought (D1–D4) in Texas lasted 271 weeks beginning on May 4, 2010, and ending on July 7, 2015. The most intense period of drought occurred the week of October 4, 2011, where D4 affected 87.99% of Texas land. https://www.drought.gov/states/texas#historical-conditions

Performance standard: Perform studies to determine the current relationship between the river, alluvial aquifer, and the major and minor aquifers. Determine under what conditions the aquifers are contributing to a sound ecological environment, what conditions could cause the river to reverse its historical gaining condition and start contributing water to the aquifers on a continuous basis, and determine what conditions cause a shift in equilibrium.[2]

Performance standard: Install a surface water and groundwater network of wells and gauges to collect groundwater elevations and basic water chemistry data from alluvial water wells that are directly comparable to water stage and chemistry data from established river gauges. Compare the data from the alluvial well network to the data being collected on major and minor aquifer wells through the Monitoring Well Program.

Performance standard: Set DFC to maintain a gaining relationship between the river and the alluvial aquifer and sustain a sound ecological environment in the river during a repeat of the most recent DOR.

Performance standard: Track and map the exempt water users in the District to determine reliance on the alluvial aquifer (this might be a performance standard under Drought goal whereby the District determines how many exempt water wells might be impacted by declining stream.)

Performance standard: Monitor water quality in alluvium water wells to determine if industrial and municipal activities upstream and in Bastrop County are degrading water quality.

NOTE: water chemistry and water quality are differentiated here with water chemistry associated with characterizing a water source, i.e. Simsboro vs. river. Water quality is associated with detecting pollution and pollutants.

Environmental Stewardship is submitting this proposal to establish a desired future condition on the Colorado Alluvial Aquifer (Colorado River Alluvium) and to monitor the surface water-groundwater relationship to facilitate the work of the District to establish a plan to manage, and potentially mitigate, the risks that have been identified. By including a plan related to the protection of surface waters and the river in the management plan, the District will take an important step in recognizing its duty and responsibility to conjunctively manage water resources and to conserve and protect those resources for the benefit of the citizens of Bastrop and Lee Counties, and Texas.

[2] Water budget analysis, as described by Hutchison 2021, will be useful in describing and understanding these conditions. Hutchison, William R. Ph.D., P.E., P.G. September 1, 2021. Analytical Tools for the Regional Evaluation of Surface Water-Groundwater Interactions. Texas Groundwater Summit Texas Alliance of Groundwater Districts, San Antonio, TX.