



September 14, 2014

Via WMP2014@lcra.org

Water Operations Committee of the Board
Lower Colorado River Authority
3700 Lake Austin Blvd
Austin, TX 78703

Re: Comments regarding stakeholder process and inflows hypothesis

Chairman Spears and Members,

First, I want to thank the Board for providing the opportunity for the stakeholders to meet with your staff over the last month to learn the details of the LCRA staff proposal and to fine-tune the WAM Model. It is clear to me, and I think to many, that we have a better operating model today than we did a month ago. And perhaps more importantly, we know more about how it works, and we have a better appreciation for the current interests and concerns of all the stakeholders in the basin. My observation is that we have also seen some healing in the rift that has split our basin over the last few years. For that alone, the time spent has been worthwhile.

Though the stakeholder process has lead to very minor improvements in attainment frequency for environmental flows; especially for the bays during drought conditions, the bay and estuaries are still at significant risk. Statistically, the model predicts that attainment of Threshold flows, the most basic safety net for the bay, is only at 86% with a goal of 100%, and bay salinity is above the target of 27.5 ppt for 17 consecutive months during a repeat of the DOR. An objective of the WMP is to "Provide threshold [flows to the bay] every month."¹ This plan does not meet that objective. We need to do better.

As many will tell you, I have participated actively in the stakeholder process not only during this last month but also over the last several years. From that experience I can tell you, as I am sure you already know, its not just about modeling and WAM runs. Rather, it is about establishing some over-arching principles and policies that guide the detailed work of crafting a solution that fits the needs and expectations of the stakeholders in our basin.

We appreciate that the TCEQ has put the time and effort into preparing the tools to do the work of amending the Water Management Plan, and has provided a framework for guiding that work.

If we have learned anything from this process, it is that we have changing hydrological conditions in the basin. At the same time we are literally trying to wring more water out of the system as a result of population growth in Central Texas. From my observations, I am concerned that the principles and policies that are guiding the water management planning process are flawed.

I want to call your attention to a study just released in the Texas Water Journal titled: "Observed trends in air temperature, precipitation, and water quality for Texas reservoirs: 1960-2010²". Here are some conclusions I have drawn from the report that apply to the Highland Lakes³:

1. The number of dry days in the watershed of these lakes has DECREASED. That means that there have been MORE WET DAYS.
2. There has been a DECREASE in precipitation intensity. That means there have been fewer intense precipitation events that provide episodic high inflows.
3. There has been an INCREASE in average annual, summer and winter temperatures.
4. There has been a DECREASE in number of days below freezing, and an INCREASE in the coldest day temperatures.

When this information is considered along with the changing hydrology, which is resulting in decreased inflows to the Highland Lakes, a different story starts to appear.

National Weather Service data⁴ for the region indicate that the 30-year average annual rainfall in the contributing watershed is up 7-20%. This is consistent with rainfall in San Angelo, in the middle of the contributing watershed, where precipitation has increased about 28%⁵ in the last six years (2008-13) when compared to the first six years of the drought of record (1946-57).

Though it is getting hotter, rainfall in the contributing watershed is up significantly over the same drought of record period. Yet inflows to the lakes are significantly lower (-54%⁶) than for first six years of the drought of record (1946-57 compared to 2008-13). Simply stated, rainfall in the watershed is not being converted to inflows to the Highland Lakes. Rainfall, therefore, is not the solution to the challenge of managing the Highland Lakes. This leads to the conclusion that something has significantly changed in the contributing watershed besides climate. Whatever has changed needs to be identified and understood before we can find a solution to the changing hydrology.

At the risk of being very wrong, let me pose a hypothesis.

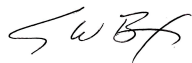
Hypothesis: *Improved land management practices, along with increased rainwater harvesting and declining base-flows from aquifers above the Highland Lakes have combined to have the unintended consequence of causing a significant decline in the inflows to the Highland Lakes resulting in changed hydrological conditions in all years (POR) and especially during years that are comparable to the drought of record (DOR). Warming climate conditions and changes in rainfall patterns exacerbates these changes.*

As the "watershed" has become a better "water catchment basin" as a result of improved land and rainwater management practices introduced since the 1950's, rainfall over the watershed has been increasingly retained in the soil and in reservoirs (both small cattle tanks and larger reservoirs). This phenomenon is likely not significant to Highland Lake management practices in wet years, but becomes critical during dry and drought years.

Episodic "cloud-burst" events have historically been significant drivers of reservoir levels and, in fact, flood control is the primary reason that the Highland Lake reservoirs were constructed. Even such episodic events, today, do not seem to deliver the inflows that were historically delivered.

Thank you for the opportunity to participate in this important public policy debate as we seek to develop a water management plan that provides for the diverse interests of our communities while protecting our environment.

Respectfully submitted,



Steve Box
Executive Director
Environmental Stewardship

cc: Myron Hess, National Wildlife Federation (WMP Advisory Committee Member)
Cindy Loeffler, Texas Parks and Wildlife Department (WMP Advisory Committee Member)
Jennifer Walker, Sierra Club (WMP Advisory Committee Member)
Judge Paul Pape, Bastrop County

Environmental Stewardship is a charitable nonprofit organization whose purposes are to meet current and future needs of the environment and its inhabitants by protecting and enhancing the earth's natural resources; to restore and sustain ecological services using scientific information; and to encourage public stewardship through environmental education and outreach. We are a Texas nonprofit 501(c) (3) charitable organization headquartered in Bastrop, Texas. For more information visit our website at <http://www.environmentstewardship.org/>.

¹ August 25, 2014 staff overview on the Water Availability Model (WAM), page 13, Environmental Flows 2012 Application, Bay and Estuary Inflows, - Provide threshold every month. <http://www.lcra.org/water/water-supply/Documents/WAM-overview.pdf>

² Rodica Gelca, Katharine Hayhoe, and Ian Scott-Fleming. Observed trends in air temperature, precipitation, and water quality for Texas reservoirs: 1960-2010. Texas Water Resources Institute. Texas Water Journal, Volume 5, Number 1, pages 36-54. <https://journals.tdl.org/twj/index.php/twj/issue/view/364/showToc>

³ Lakes Buchanan, O.H. Ivie, E.V. Spence, and J.B. Thomas. The location of the lakes on the Colorado River in Figure 1 correlate with the latitude and longitude locations of these four lakes. (see Texas Reservoir Trends Supplement - LCR.pdf)

⁴ Bruce Melton, PE. Historic Highland Lakes Drought Comparison. 2014. Climate Change Now Initiative, Austin, Texas. <http://www.climatediscovery.com>.

⁵ Calculated by Environmental Stewardship from Melton data (see attachment HL_Rainfall_Inflow_Analysis14Sept14).

⁶ Calculated by Environmental Stewardship from Melton data (see attachment HL_Rainfall_Inflow_Analysis14Sept14).