

## **Heritage Park Pond Review (Impact on BCCWID)**

by Bob Marley - 4/15/13

An objective of the Black Canyon City Water Improvement Board is to better understand the major users of the Agua Fria aquifer. While rainfall has improved in the past couple of months, the Southwest remains in a multi-year drought with substantially below average rainfall in the summer monsoon season.

A bit over a decade ago the drought was so severe many of our wells were sucking air and new wells had to be drilled at substantial cost to the District. A decade long drought is obviously impacting the District negatively but increased development in the Cordes area may also be decreasing available water. The District has been able to reduce annual water usage by 20 million gallons over the past 4 years by following ADEQ and ADWR conservation suggestions (primarily heavily tiered billing and more recently drought warnings). The second major user of water in Black Canyon City, Coldwater Canyon, can not be expected to significantly reduce pumping levels because of flat rate billing. It is a private company and is having major problems with billing increases being approved by the Corporation Commission.

Our management team is concerned that the District's water levels were abnormally low during the current winter period when usage is traditionally low (they have rebounded with reduced pumping and increased rainfall). They are projecting possible problems this summer if it is again hot and dry with no late summer monsoon activity. This has caused the Board to wonder about how much water is being used by the Community Association's Heritage Park Pond. If information was available about pumping rates during the year, a total draw on the aquifer could be determined and might help in understanding how bad the situation could become. A request was submitted to the Community Association for pumping rates and well specifics but a couple of months have passed with no response.

Individuals involved with the Community Association have heard at meetings a number of claims regarding Heritage Park pumping for the pond. It has been said the pond pumping has no impact on the town's domestic water system because the water comes from a 600' deep well and the District pumps at 20-40'. It has been claimed the water from this deep well is arsenic free. It has been claimed any loss from the pond is returned to the aquifer by percolation and is still available for domestic water pumping. It has also been claimed by some the pump runs a lot and costs the Community Association heavily. It also seems to be true that the pond pumping rate is a big secret that those in charge believe the community shouldn't know about.

Because of the close proximity to the Towns primary water source, the District Board believes it has a responsibility to know and started a search of the State's public records for data so they could make some calculations. The first thing learned from the record search was all wells in Arizona are required to be registered since the mid-80's. The drilling company is required to file a report within 30 days of completion and that report minimally documents the level where water was found, the pumping rate, and well draws when pumping. A search for Albins wells in Black Canyon City and more specifically the well on the Heritage Park property resulted in the following information:

- 1) One registered well was found on the Heritage Park property and Randy believes it is not the one being used to fill the pond. The one that is registered appears to have no drilling report as it was drilled in the 1930's according to a Phil Albins late registration submission in 2004. He claimed it is a 60 foot deep well but it is probably perforated above that level and drawing water from the same depth as the District's wells. It is a non-exempt well, meaning it can supply over 35 gallons per minute.
- 2) No registration was found for the well near the Old Black Canyon Highway that is being used to keep the pond filled. The pumps electric utility box says the driller was Western Drilling and has a contact phone number. We've contacted them and they claim the company did not drill the well and they are just maintaining it.
- 3) Reviewing the Department of Water Resources website, one can see the Albins family drilled a lot of wells in Black Canyon City. Most of the ones that yielded water are perforated at 20 foot or so and only drilled 60 foot deep, as is true of most of the private wells in Black Canyon city that are close to the river bed elevation. A couple of the Albins wells were drilled between 150-300 feet deep and they either did not yield reliable water or encountered water at levels similar to the other producing wells near the Heritage Park. No record of a 600 foot well was found.

Pond losses to evaporation were a major concern of the District. It was believed a worst case could be calculated using the losses measured for Lakes like Powell and Mead. These have been extensively studied. Using the Internet, data was collected and a summer worst case loss of one foot per month was arrived at. Using a paced estimate of an acre for the pond surface the pumping level to replace evaporative loses in the summer resulted in a bit more than 300,000 gallons a month. Comparing that to the District's summer pumping rate of 6-8 million gallons a month, it seems evaporation loss of the pond is not significantly damaging the availability of potable water to the community and businesses. However an estimate was also made for transpiration losses due to the new Park vegetation and that could be three times the evaporation loss of the pond in the summer months, which is definitely significant.

It seems that for much of the year the electric billing for keeping the pond full should be very low (under \$100.00 per month). However that doesn't agree with talk of high pumping levels and billing. The only reason the pumping levels would be high would be pond fill and eventual loss back into the ground. The lake was supposed to have a liner that prevented this but it may have failed or never been properly installed. Because the Park manager has been keeping the lake levels lower than the intended design and the running stream at garden hose levels, it is suspected someone is fully aware of the failure to contain pumped water. It's very expensive to pump water 20-30 feet to the surface and then let it percolate back into the aquifer. A similar sized lake was on the property and was being kept full prior to the transfer to Park status, possibly at higher levels than today. Evaporation losses are probably close to what they were then but the newly added vegetation would create significant water loss in the summer months. Prior to donation the Albins family was paying the pump electric bills.

While any excessive cycling of water through the aquifer should be of great concern to the Community Association because of the cost, it is would only be of concern to the District if the pond became a source of pollution. A polluted pond could create a polluted aquifer if there were high levels of recharging going on. One possible type of pollution is excessive nitrates that are

very difficult to remove from a domestic water source. Making a leaky pond a wonderful home for water fowl and native fish could also make the aquifer recharge from that pond a hazard to the town and business domestic water supply.

So unless the Community Association relents and decides to allow the community to know how it might be impacting the aquifer with their wells, the District will just have to speculate:

- 1) They are probably not pumping at 600 feet depth. The Park wells are probably sipping from the same aquifer that the town's domestic water supply uses.
- 2) It is fortunate the Community Association is not pumping at 600 feet and recharging it back into the aquifer. All Arizona wells are above the acceptable arsenic level (Federal limit for domestic water supplies). Deep well water in Arizona has high levels of heavy metals as well as arsenic and when used to recharge could pollute the 20-30 foot aquifer.
- 3) There appears to be no known deep artesian well in Black Canyon City (drilled or otherwise). Drawing non-artesian water from a deep aquifer, 600 feet down, could result in electricity costs 20-30 times the cost associated with drawing at the 20-30 foot level. No one could afford that electric bill unless the 20-30 foot aquifer had been depleted and that was all that was available.
- 4) We do not have access to any engineering calculations made as part of the \$700,000.00 plus development monies spent on the Park recently but calculations made from government studies of other lakes and extrapolated to the Park's pond suggests evaporation loss is not a significant problem (See Marley calculation of pond surface losses). The aquifer near the Park is not going to be depleted in any major way from the pond's evaporation losses.
- 5) The calculation for irrigation loss is much more complex and should have been done as part of the engineering planning for the Park. These losses would be at a maximum in the summer and substantially greater than the evaporation loss. Plants transpire huge amounts of water (An acre of cotton transpires a foot of water per month as does an acre of grass). The total Park area is 27 acres and at least several acres of that are now irrigated grass, bulrushes, and freshly planted trees.
- 6) The Community Association may be funding pump operations that primarily cycle water from and then back to the same aquifer used by the District. This could become a aquifer pollution issue. If the pond leaks like a sieve it should be repaired to conserve the Association's money by reducing electric bills and remove the potential for pollution of the District's sole source of water

Conclusion: While the District can be reassured that continuing drought will not be further aggravated by huge water losses into the air from this pond and irrigation, the Board and management should be concerned by the possibility for future pollution. The monthly well stats supplied to ADEQ for the Big John wells should be closely monitored for changes. Further, in the event of any problems associated with pond pumping, the District should not expect much cooperation from the current leadership of the Community Association, even on issues of overwhelming importance to the Community.