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## Hydrologists Offer Observations On Groundwater Rules Procedures

By Colleen Schreiber

AUSTIN — Groundwater management in Texas is a complicated process. Only those who have been intimately involved since the implementation of SB1 in 1997 can truly understand it, and even then such understanding is questionable.

Over the last 16 years, the process has become increasingly convoluted. One hydrologist described the current groundwater management system as “an alphabet soup” of acronyms — DFCs, GAMs, GCDs, GMAs — and a system which has created “paper, digital or water shortages worse than the most severe drouth in Texas history while there is still plenty of water in the ground.”

Those were some of the comments made by hydrologist Michael Thornhill, president of Thornhill Group, Round Rock, during a CLE-International water law conference earlier this fall. Thornhill, along with two fellow second-generation groundwater hydrologists, Darrell Peckham, of Water Quest Inc., a nonprofit group from Midland/Odessa, and Bob Harden, of R.W. Harden & Associates, Austin, expressed their frustrations and concerns with the groundwater planning process and the interaction of the science and policy when it comes to groundwater management.

Thornhill offered several quotes from various sources. One was from Greg Ellis, an attorney who most often represents groundwater districts in the groundwater battles. Ellis said early this year that, “Despite our best efforts, the aquifers are dropping.”

“We could talk for a month on that statement,” Thornhill told listeners. “There is an emergency with respect to groundwater in Texas, but I’m going to tell you it’s not that the aquifers are being depleted.”

He shared another quote, this one from the 1961 state water plan, a plan which all three of the panelists’ fathers helped develop.

“Nature, within the past decade, has inscribed upon the wide-spreading Texas landscape grim warnings of greater disasters to come if development of the state’s water resources is neglected.”

“Some things never change,” Thornhill said. “Texans need desperately to develop water, and we do have an abundance of groundwater resources in this state,” he added, “though we may have to take water from some areas that have it and send it to areas where there’s not so much.”

Thornhill said Texas has been in “hydro-political” gridlock, which has stifled groundwater development, since the passage of House Bill 1763 in 2005 that regionalized groundwater availability decisions. A key part of this joint planning is determining DFCs (desired future conditions), which are used to calculate a MAG (modeled available groundwater). These conditions and num-

ber are then used in regional water plans, groundwater management plans, and permitting.

What’s being stifled since the implementation of HB 1763, Thornhill added, are numerous local and regional water supply projects that have been scientifically and economically proven.

“These projects represent hundreds of thousands of acre-feet of water that could be delivered right now. That’s hundreds of millions of gallons of water per day.”

He went on to say that the groundwater system in place today is no longer about managing the groundwater but about regulating and restricting based on policy that typically ignores or misapplies science.

Thornhill described the current process whereby groundwater districts come up with “prescribed pumping” or drawdown, as “reverse engineering.” Furthermore, he said, this consensus or stakeholder system “presumes public ownership or regulatory control of private property rights.”

“Is that even legal?” he asked. Additionally, he said, the current system allows for “plausible deniability,” in that no one seems to know who is really in charge. More often than not, he continued, well-meaning but uninformed or misinformed laymen, rather than hydrological scientists, are making decisions for all the groundwater resources in Texas.

“We are trained in the science of hydrology. We know how aquifers work, where recharge comes from; we know about inflows and drawdown; we know the difference between artesian drawdown and water table drawdown. We know how much water is stored in aquifers; we know how models work, and we know what they can and can’t do.”

And yet, he said, the opinions of these experts are often brushed aside.

“Some say we’re bought off, or that we can’t be trusted because we’re working for a water marketer,” Thornhill said. “I don’t know how many times I’ve heard a GCD general manager, a board member, county judge or mayor say, ‘We’re not going to let them take our water.’ Whose water is it, anyway?” Thornhill asked. “They’re worrying about who is being impacted instead of what the law says and what the water districts’ real function should be.”

Thornhill also said the current system creates controlled or regulated markets, which lead to “client politics, false restrictions, uncertainty, confusion, ambiguity, and chicken and egg issues.” More telling, he opined that it also results in an “ineffective allocation of resources, which wastes money, and maybe even wastes water.”

Like beauty, Thornhill said, water availability is in the eye of the beholder. Permitting decisions are made based on what the GCD wants the aquifer to look like in

the future rather than basing such decisions on how much water that aquifer can produce.

Groundwater conservation districts, he acknowledged, can play a key role in the management of the groundwater resources. However, to do so, the district must have “fair, reasonable, uniform and consistent rules.”

Also, he said, the number-one duty of a GCD is to collect and openly report data. Open communication and accountability must also be part of the process.

Thornhill offered still another provocative statement.

“The availability of funding for water projects may not be the primary impediment to implementing the state water plan,” Thornhill told listeners. Rather, the “uncertainty” associated with permitting of groundwater projects both inside and outside of groundwater districts is the primary problem.

He cited a few examples. One project in the Lone Star Groundwater Conservation district in combination with San Jacinto River Authority has not been allowed because the district and others claim that their aquifers are going dry and that in 2009 water demand in Montgomery County already exceeded sustainable groundwater supplies by almost 30 percent.

Data from studies conducted by the Thornhill Group and R.W. Harden & Associates indicate otherwise.

“Our data shows that in 110 years of usage in this one aquifer in this one county, aquifer storage has been reduced by .3 percent,” Thornhill told listeners. “Have there been water level declines, artesian water level declines, pressure declines? Yes. Is the aquifer rapidly running out of water? Absolutely not. There’s more storage in that one aquifer in that one county than there is by far in all the reservoirs in Texas when they’re full,” he insisted.

Another example is the Lost Pines Groundwater Conservation District. According to John Burke, chairman of region K, permits in this district already exceed groundwater availability by 15,486 acre-feet per year.

“We ran the GAM with another 119,000 acre-feet per year added in for 60 years, and it only reduced the storage in the aquifer by 1.25 percent,” said Thornhill.

“There is a better way to do this, and it all has to do with free market,” he told listeners.

The free market, he insisted, provides for the best allocation of resources. Plus, “it’s consistent with our history, our water law, and property rights.”

A groundwater management system based on free market principles results in, “spontaneous order and healthy competition. It’s the best way to realize the value of the resource, and it invites investment; it also promotes conservation,” Thornhill told the group. “When someone is talking about investing hundreds of millions of dollars in a project, they’re going to have the answers backed by science. How many groundwater conservation districts can spend millions of dollars to study their aquifer?

Wrapping up, Thornhill proposed that the permitting process be overhauled.

“Long-term perpetual permits are needed; these short-term permits are too iffy.”

Finally, he said, DFCs and MAGs should be used as planning tools and not regulatory limits.

“TWDB wants sustainable, affordable water quality for Texas, our economy, our environment. After being admonished for years by the legislature, water districts, water lawyers and others to let the process play out, I say we can’t let the system play out anymore. It’s not working.”

Darrell Peckham followed up with one more example of a groundwater project that has been stopped short by a groundwater conservation district. The proposed project, in Pecos County, involved Fort Stockton Holdings. The GWCD permitted Clayton Williams 47,418 acre-feet of water. However, after the water was permitted, instead of using the water for irrigation purposes, Williams decided he wanted to sell his water to cities in the Permian Basin — Midland and Odessa.

“The district unanimously said no to the proposal to transport water outside district boundaries,” Peckham said.

Pecos County is divided between two groundwater management areas. GMA 3, which encompasses the Pecos Valley Alluvium Aquifer, is a single-district GMA. The other part of Pecos County is in GMA 7, which encompasses 22 groundwater conservation districts.

The Middle Pecos Groundwater Conservation District, representing all of GMA 3, used “reverse engineering” to set the DFC.

“They determined how much pumping they wanted based on their existing permits, plugged it into the GAM, and that gave them the DFC,” Peckham said. “They turned that back around to the water development board. The water board gave them the MAG back, which now by definition as interpreted by the water board by Chapter 36, equals availability.”

“As a scientist, I have a real problem with that,” he told listeners. “The modeled available groundwater is a fantasy; availability is availability. On a technical level this is the real sticking point for me.”

GAMs, he added, are a good planning tool, and TWDB needs them, but GAMs “are not good management tools,” Peckham insisted.

Water Quest instead proposes a much simpler solution for groundwater management purposes. Their solution is based on actual water levels in the aquifer. It is meant to act much like a drouth contingency plan, using a tiered approach. The focus is on monitoring and protecting aquifer conditions.

“Our approach doesn’t even try to predict the future,” he told listeners.

The system would still call for the GCDs to establish the maximum allowable impact on the aquifer based on such things as water levels, water quality, or spring flow.

The final panelist, Bob Harden, followed up with more thoughts on restructuring the Texas groundwater management template. The first piece of the template, he said, is a legal technicality — “how to apply science to support the goals of groundwater management, while at the same time not inadvertently creating a template for private property takings claims.”

The second has to do with how scientists identify, designate and report DFCs properly. The third piece is determining the difference between DFCs and modeled available groundwater for regulation versus planning.

Starting from the basics, Harden told listeners that any talk of groundwater regulation has to start in the basis of law, because groundwater is private property.

“The state can regulate it, but the state cannot take private property for public use without compensation.”

He went on to talk about the rule of capture.

“People like to admonish the state of Texas, saying that there is something wrong with the rule of capture. I say that it actually provides a great way for balancing the interests and enforcing fair law rather than controlled law.”

The rule of capture, he noted, has two parts. The first part is the non-liability component.

“If you produce groundwater, oil or gas, you’re not liable for the effect of your production depletion on your neighbor provided there is no malice, waste or noncompliance with groundwater district or Railroad Commission rules.”

The second component is the science of non-liability, which is the right to use one’s property as a means to an end.

“The state cannot take property of one landowner and give it to another through differential rules or differential application of management, groundwater district boundaries, on and on,” said Harden. “When a GMA adopts multiple DFCs based on political boundaries of conservation districts or counties which overlie a hydraulically connected aquifer, then the stage is set for potential drainage of private property on a differential basis. This is a very fundamental issue that must be addressed.”

He also noted that too often the groundwater decision-makers mistakenly believe that when pumpage is limited to recharge rate, then reductions in storage will not occur.

“This is simply not true,” Harden stated.

Instead, the hydrologist contended that recharge, discharge and the collective effects of pumping should be managed as a hydrological unit.

“If we manage groundwater based on these units, we’ll have a better chance of not taking property from one and giving it to another.”

Currently, DFCs are most often based on average drawdown, an unfortunate fact, the hydrologist said, because drawdown and water level are “vague and ambiguous terms that are not equal. We shouldn’t be averaging them be-

cause they are two totally different things.”

To demonstrate, he showed a cross-section of an aquifer. The water table, he explained, is where the groundwater level is exposed to air within the producing formation.

“It’s where recharge enters the aquifer.”

The artesian section is where the water level in a well rises above the top of the formation.

He offered an example indicating the impact of artesian pressure. In his example, artesian pressure went from 400 feet down to 250 feet over 50 years.

“Some might then say that the water table dropped 150 feet and in turn imply that indicates that the aquifer is going dry. It is not,” Harden insisted. “The top of the aquifer is 2200-plus feet below the artesian water level. It is changing in pressure, and it’s changing in pressure because use is going up so pressure must go down.”

Harden contended that the most important aquifer condition other than subsidence to consider when setting a DFC is the amount of water in storage that may be used for supply.

“We’re going to deplete some of it. How much should we deplete? That’s the question to ask.”

He pointed again to issues like spring flow and protection of spring flow to help answer this question.

“Identify the springs, determine how much they flow and if they can be monitored. If they can’t be monitored, then it’s pretty difficult to know if a DFC is being met,” he pointed out.

Like previous panelists, Harden opined that MAGs should be used strictly for planning purposes and not regulation purposes. He applauded GMA 1’s method of using a “cell by cell” apportionment of storage remaining. This method, he said, most purely conforms to “fair and impartial.”

“Models that input user-specific pumpage may begin infringing on the private property rights of non-users of the aquifer (who may wish to exercise their right in the future). Accordingly, how can apportioning of MAGs to county areas, which are common aquifers and hydraulic communication across political boundaries, conform to regulation of private property that is fugitive by nature and unwilling to be controlled by the MAG reporting areas? This suggests there may need to be a separation between regulation and state water planning.”

Harden concluded his remarks by refuting the quote some months back by Greg Ellis.

“We not running out of water, Mr. Ellis. I know fear is a powerful emotion ... we do have a lot of water; we’re blessed in that way, but it’s going to take some new thinking and invigoration to create our supplies over the next 50 to 100 years. I’m sure over the next couple hundred years we’re going to deplete our aquifers some more, but it’s nothing to be ashamed of; it’s something to rely on,” he concluded.