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## POLICY MEMORANDUM

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**SUBJECT: Surface Water and Groundwater in Texas**

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**DATE:** 18 November 2014

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### Topic

The laws governing surface water and groundwater usage in Texas are incompatible with a hydrologic system that is interconnected. The current legal statutes and regulatory mechanisms lead to difficulty and ambiguity in water management, a problem that has become particularly acute during the recent drought.

### Background

In his 2002 book *Water Follies*, Professor Robert Glennon states “groundwater and surface water are not separate categories of water, rather the designations “groundwater” and “surface water” merely describe the physical location of the water in the hydrologic cycle.” Yet the legal and regulatory framework for managing water in Texas treats surface water and groundwater as if they were disconnected.

Surface water and groundwater are part of an interconnected hydrologic system. Groundwater becomes surface water when it emerges above ground through springs. In turn, surface water becomes groundwater when the streams, rivers and creeks dip below the surface to recharge aquifers. For example, in the Texas Hill Country, groundwater from the Edwards-Trinity Aquifer emerges through faults within the formations or springs to become the headwaters of many rivers including the Frio, Pecos, Guadalupe, Nueces, and Llano. The Carrizo-Wilcox, Sparta, Yegua-Jackson, and Queen City Aquifers support the flow of the Brazos. Other aquifers support other rivers and some support multiple rivers. The Carrizo-Wilcox aquifer is one of these as it also supports the Colorado River.

Despite the fact that surface and groundwater are hydrogeologically connected, they are managed as separate resources. Establishing statewide policies and regulations that manage surface and groundwater as a single resource could allow for improved water planning and collaboration throughout the state.

### *Surface Water Regulation*

Surface water contained in its natural beds and banks is owned by the state and apportioned through a permit system based on priority rights. This prior appropriation doctrine is popularly known as “first in time, first in right,” and is the most common practice of surface water management in the U. S. west of the 100th meridian. This method replaced more antiquated regulations that allowed different parties to lay claim to the same stream. Prior appropriation provides the most senior water rights holders first priority to water and this is especially impactful during times of drought.

There are two types of surface water—natural and diffused surface water, and a different legal framework applies to each. Diffused surface water flows across the land in an un-patterned way and is typically rain runoff. Texas courts have ruled that diffused surface water belongs to the landowner until it

enters a natural waterway where it becomes state water. Natural surface water includes water flowing in every natural watercourse in the state with a definite bed and bank.

The Texas Commission on Environmental Quality (TCEQ), along with the river authorities, is responsible for surface water planning and permitting. Senate Bill 3, passed in 2007, established a process whereby the TCEQ is tasked with ensuring healthy rivers throughout the state. This law sets up environmental flow protection standards for each river and bay system based on flow recommendations from scientists as well as stakeholders in the region. There is a public process for soliciting input from scientists and stakeholders, which is considered by a stakeholder committee and an expert science team. The TCEQ considers recommendations from both groups and then establishes environmental flow standards for each river system to regulate surface water planning and permitting.

In accordance to Senate Bill 3 and based on the recommendations described above, “the commission (TCEQ) by rule shall”:

- 1) adopt appropriate environmental flow standards for each river basin and bay system in this state that are adequate to support a sound ecological environment, to the maximum extent reasonable considering other public interests and other relevant factors;
- 2) establish an amount of unappropriated water, if available, to be set aside to satisfy the environmental flow standards to the maximum extent reasonable when considering human water needs; and
- 3) establish procedures for implementing an adjustment of the conditions included in a permit or an amended water right. *It is important to note, however, that these environmental standards only apply to permits seeking new appropriation of water or to an amendment of an existing water right that increases the amount of water taken. Surface waters, additionally, have been over allocated in all Texas river systems based on estimates during times of drought.*

It is also important to note, here, that in the opinion of numerous scientists and stakeholders, TCEQ has not fully implemented the authorities given to it by this Act and that the health of Texas’ rivers, bays and estuaries continue to be degraded and/or are high risk.

As mentioned above, surface water rights are acquired by either obtaining a new appropriation from the Texas Commission on Environmental Quality (TCEQ) or by buying and transferring an existing water right. Surface water rights can be sold; though owners, who are largely river authorities, typically do not sell them. The rights can also be cancelled for non-use, but the state has not exercised that option in the past. River authorities control rights to more than 70% of the state’s surface water. There are more than 20 river authorities in Texas whose primary function is to distribute and conserve surface water. Water rights owned by river authorities are either sold to consumers, such as households or businesses, or sold to other suppliers of water, such as city and county public water suppliers (i.e. municipalities) and private water companies.

TCEQ monitors surface water rights by issuing and managing permits to surface water using the first in time, first in right principle, meaning that those with the oldest permits get first access to their allocated share of water. This process can be contentious during dry years or years where rainfall is lower than average, as a wide range of permit holders, from farmers to ranchers, homeowners to manufacturers and power generators, divvy up water supplies shrunk by drought. Water availability in the West has always been a contentious issue. In the 19<sup>th</sup> century the geologist and explorer, John Wesley Powell, mapped out large portions of the river ways of the American west. His years of study led to the formulation of water policy recommendations for the arid west that stressed regional oversight of water resources. He proposed self-governing water districts within watershed areas. Watermasters

would oversee individual water rights in the established district. This program has been adopted by southwestern states such as New Mexico, Colorado and California. The first watermaster was appointed to aid in disputes along the Rio Grande in the 1950s. Today, watermasters in Texas are established by TCEQ, court appointment or legislation. Watermasters and their staff oversee water rights by monitoring water use and storage levels. They also prevent illegal diversions and mediate conflicts among water users. They work to enforce water claims without the lengthy legal process that can emerge between rights holders in basins without watermasters. Today, however, only three watermaster programs exist in Texas, covering nine of the state's 23 river basins – a relatively small portion of Texas' surface water. In 2011 the Texas Legislature required that the TCEQ conduct evaluations twice a decade to assess the need for watermasters in river basins without them. However, TCEQ has thus far declined to recommend the creation of additional watermaster programs.

Surface water permitting and appropriation has produced significant conflict among water customers. As previously mentioned, surface water is managed under a prior appropriation doctrine, with river authorities holding the largest percentage of senior rights. For instance, the Lower Colorado River Authority (LCRA) has water rights for use of more than 1.5 million acre-feet of water per year from Lakes Travis and Buchanan, and it must distribute the water to customers including downstream cities and agricultural enterprises. The LCRA abides by a Water Management Plan in which cities have “firm” water contracts with the LCRA, meaning their water supply deliveries will take priority over those with “interruptible” contracts, which are primarily held by downstream agricultural interests. Interruptible contract holders pay considerably less per acre-foot for water than the “firm” water holders. This arrangement enables the LCRA to reduce the amount of water supplied to “interruptible contract holders” when drought conditions become severe. In the recent dry years, water to the downstream agricultural interests has been cut off for the first time in history. Farmers have voiced frustration and concern that resources should be shared, and that upstream municipalities are not conservative enough in their water usage to allow splitting the water resources.

### *Groundwater Regulation*

Groundwater, on the other hand, is considered to be private property owned by the surface landowner. In 1904, the Texas Supreme Court officially adopted the widely practiced “rule of capture,” in the *Houston & T.C. Ry. Co. v. East* decision (generally referred to as the “East case”). The court reaffirmed the rule in 1999 in *Sipriano vs. Ozarka*. The Sipriano family sued Ozarka for drilling near their land and depleting their wells. The Court ruled in favor of Ozarka, finding that “the rule provides that, absent malice or willful waste, landowners have the right to take the water they can capture under their land and do with it as they please, and they will not be liable to neighbors even if in so doing they deprive their neighbors of the water's use.”

Under the rule of capture, Texas landowners have three types of rights: the right to try to capture groundwater; the right to the physical water brought to the surface and captured; and the right to use or sell this water. Groundwater rights can be sold or leased, and may be transported off the originating land.

The laws governing surface and groundwater both have their deficiencies. In regard to groundwater, the rule of capture protects the rights of a single property-owner when pumping their water resources below their land. It does not, however, protect adjacent property-owners whose underground water could be depleted due to their neighbors' over pumping via aquifer depletion or by creating a cone of depression (which has led to the rule of capture being called the rule of the “biggest pump”) making the water inaccessible even if it were available (see *Friendswood Development Company vs. Smith-*

*Southwest Industries*, where the Texas Supreme Court ruled that landowners could not recover damages if their well ran dry).

#### *Legal Direction*

Texas courts have repeatedly ruled in favor of parties claiming groundwater rights, even if those rights come at the direct expense of surface water users. In *Pecos County Water Control and Improvement District (WCID) No. 1 v. Clayton Williams*, the court ruled in favor of Williams, the owner of irrigation water wells responsible for the depletion of water supply to a nearby spring that served as a water supply for the WCID. The court reasoned that the Pecos Improvement District had rights to the water only after it emerged from the ground at the springs. Prior to surfacing, Mr. Williams could use any amount of the groundwater beneath his land regardless of the impact on the springs. A similar finding was reached in *Denis v. Kickapoo Land Company*, a case in which the Austin Court of Appeals ruled in favor of the Kickapoo Land Company, finding that the well owner was not liable for the reduction in the springs' flow nearby.

Recent Court rulings, especially the 2012 case of the *Edwards Aquifer Authority v. Day and McDaniel*, have further defined and reinforced the right of private property owners to the waters under their properties. This case, while not definitive, suggested that a ruling by a GCD that limited pumping might be considered a "takings" to which the property owner might be entitled to compensation.

#### *Groundwater Conservation Districts*

In the *East* case, mentioned above, the Court made clear that one could not sue their neighbor for draining their well through adjacent pumping, provided that the intent was not malicious. Numerous cases have since been brought before the Texas Supreme Court to challenge the rule of capture, also known as the "law of the biggest pump." The Court, through these subsequent rulings, determined it was up to the State Legislature to preserve the natural resources of Texas, including groundwater. The Legislature responded by enhancing powers and duties of Groundwater Conservation Districts (GCD – [see map here](#)). These entities had existed in various forms and names for decades, but had been underutilized and without strong direction and power. With a strengthening of statutory responsibilities from the Legislature, these districts act as regulators, similar to the Texas Commission on Environmental Quality (TCEQ) but on a local basis. Pumping groundwater can be managed by these districts through various regulations including: requiring a property owner to register their well, well construction standards, well spacing requirements, reporting requirements, permit requirements and production limitations. From the late 1980s through 2000, legislation created an environment promoting the proliferations of GCDs, especially along county lines, further fragmenting governance over a single aquifer.

In response to this fragmentation of governance, the Legislature passed legislation in 2001 directing the Texas Water Development Board (TWDB) to designate Groundwater Management Area (GMA) boundaries to cover all major and minor aquifers in the state. Whereas GCDs tend to follow political or county boundaries, the GMAs roughly follow aquifer boundaries. Sixteen GMAs covering the entire state were created by the TWDB. In 2005, the Legislature created requirements requiring joint planning and coordination with all GCDs in a groundwater management area. Part of this planning process involves meeting at least annually to decide desired future conditions (DFC), which is defined in Title 31 of the Texas Administrative Code as "the desired, quantified condition of groundwater resources (such as water levels, spring flows, or volumes) within a management area at one or more specified future times as defined by participating groundwater conservation districts within a groundwater

management area as part of the joint planning process.” Desired future conditions are a quantifiable future groundwater metric – what the aquifer will look like at a specified time in the future. The multiple districts making up a GMA must determine what these conditions will be for their water sources. The TWDB then takes the DFC for each aquifer and runs a groundwater availability model that converts each DFC into a volume number. This is the modeled available groundwater, or MAG. The MAG is the amount of groundwater production on an average annual basis that will ensure achievement of the agreed upon DFC. Currently, GCDs over the same aquifer are not required to coordinate their individual districts’ regulations on pumping. As a result, there are notable disparities across the state in management of the aquifer’s DFCs and MAGs.

### Concerns and Assessment

- **Population and Industrial Growth:** Water resource management in Texas will require a major overhaul to ensure sustainable resources while accommodating the needs of a population that is projected to grow by 82 percent in the next 50 years. This must be done while simultaneously providing the water needs to an excessively growing industrial base, including hydraulic fracturing for oil and gas production.
- **Diminishing Supply:** The 2012 State Water Plan estimated that by 2060 Texas would face a shortfall of 2.7 trillion gallons of water a year. In 2060, it is projected that irrigation will represent 38.1 percent of the total needs while municipal users would account for 38.3 percent of needs.
- **Over-Allocated Supply:** Most of the surface water in Texas is already over-allocated. During the recent drought, the over-allocation has prompted several groups to file suit against the TCEQ for its alleged failure to manage surface water rights. For example, the Texas Farm Bureau, on behalf of farmers along the Brazos River (including rice and other crop producers) filed a suit against TCEQ claiming that its exercise of emergency powers has given priority to junior water holders (such as municipalities and power generation plants) over the farmers’ senior water rights. The Commission has also been sued by environmental groups who claim that TCEQ’s water management practice has reduced freshwater inflows to fragile estuaries that support endangered species like the whooping crane.

Additionally, groundwater is not sustainably managed – in many aquifers pumping limitations already exceed the annual expected recharge, threatening the future stability of the resource. Although groundwater is technically managed, the GCDs need to consider pumping allocations that fall well below the sustainable recharge rate per year to allow for sustainable water resources for our rapidly growing state. And, groundwater management needs to be addressed in aquifer areas not governed by a GCD.

- **Drawing from “the same water well”:** Population stress, combined with drought, has depleted surface water supplies, forcing communities to turn to groundwater. However, the interconnectivity in the resources means over pumping of groundwater leads to reduced inflows from springs to lakes and rivers. With most surface water already over-allocated, groundwater is currently the most economical option. However, responsible management practices that include the connectivity between surface water and groundwater are critical to the sustainability of both resources and have yet to be addressed.

## Recommendations

While Texas' water policy is a complicated issue, there is indeed one glaring point of conflict: surface and groundwater are regulated as separate resources. Hydrogeological science demonstrates there are direct connections between surface and groundwater; however, these entities are still being treated as different sources by Texas laws. Managing water in a more integrated manner would offer an improved policy approach to Texas water. Regulating these resources as a single water supply would be ideal, but may not be a feasible solution from a policy or political perspective. However, similar regulations between surface and groundwater would be helpful. The following are various policy related suggestions that may improve surface and groundwater conditions and management in Texas and ensure water resources for decades to come:

- Establish requirement of meters on all groundwater-pumping wells to provide better tracking data for aquifers.
- Allocate more funding and resources to GCDs and GMAs, and require them to more adequately fulfill their statutory duties.
- Require GCDs over the same aquifer to establish coordinated pumping requirements based on the MAG assessments.
- Abandon the rule of capture for more sustainable regulatory authority over groundwater.
- Require regulatory agencies to conduct studies and research to provide more specificity to the interconnectivity of groundwater and surface water resources. As established, specific determinations of interconnectivity should be factored into all future water management and regulatory decisions for the applicable water resources.
- Ensure surface water users are protected when granting permits for groundwater pumping.
- Reallocate surface water rights using a market-based system that takes into account the supply and corresponding value of water in drought periods. Though this was not discussed in this policy analysis, it is, nevertheless, a mechanism to be considered in the toolbox for water management.
- Determine the amount of water necessary for environmental flow to estuaries and allocating water rights to these environmental flow needs.
- Expand the watermaster program and its authority to include assessing municipal conservation levels as a component in allocation of water rights during times of severe drought.

The importance of monitoring and requiring different conservation or management techniques to fit a specific area as opposed to a "one size fits all policy" cannot be overstated. Due to the interconnectivity of the two water sources through various recharge and faulting activities, it is essential that the management of both resources be considered together. Without proper groundwater management and improvement of GCDs and GMAs, Texas may find itself lacking water resources in a short time span. Both GCDs and GMAs are grossly underfunded, which has led to a deficiency in the quality of research, monitoring and regulatory abilities. Currently, without specific regulation based on sound science, over pumping is already occurring - particularly in districts where well fees are a funding source, and thus approval of wells is desirable to ensure adequate revenues. If this continues, it may lead to other concerns such as reduced spring or stream flow in other parts of the same watershed. In many cases, this only affects downstream users, who have little or no recourse and who must rely on the

reduced flows of surface water. Because surface and groundwater sources are interconnected geologically, if one resource is depleted or significantly reduced the other will be gravely affected. Due to geographic, hydrologic and climatic differences in this large state, it is essential that each region be identified and managed based on aquifers and supplies in the region, including the surface and groundwater interactions. These interactions are key and should be wholly acknowledged, prompting policy makers to engage with experts to prevent future water shortages. Concerns regarding the lack of coordinated regulations are urgent. The future of water in Texas is dependent upon it. Action is needed now to create effective and sustainable management plans for these separate but same water resources.

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