PETITION OF WIMBERLEY VALLEY WATERSHED ASSOCIATION APPEALING THE DFC SET BY GMA 9 FOR THE TRINITY AQUIFER WITHIN THE HAYS-TRINITY GROUNDWATER CONSERVATION DISTRICT

Desired Future Condition Being Appealed: Wimberley Valley Watershed Association ("WVWA" or "Petitioner") files this petition to appeal the desired future condition (DFC) adopted by GMA 9 on July 26, 2010 (Resolution No. 072610-01, **Attachment A**) of "an average drawdown of approximately 30 feet through 2060" as it applies to the Trinity Aquifer within the boundaries of the Hays-Trinity Groundwater Conservation District (HTGCD). Based on modeling by the Texas Water Development Board (Draft GAM Task 10-005, referenced in the GMA 9 resolution), the average 30 foot drawdown would translate into a drawdown of 19 feet in Hays County (Scenario 6 for Hays County, TWDB GAM Task 10-031, **Attachment B**).

Petitioner's Name: Wimberley Valley Watershed Association

Petitioner's Representative & Contact Information:

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(**Attachment C** is a copy of a resolution adopted by the Wimberley Valley Watershed Association describing the extent and nature of the authority of Mr. Hollon.)

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Legally Defined Interest: Section 36.108(l) of the Texas Water Code authorizes any person "with a legally defined interest in the groundwater in the groundwater management area" to file a petition with TWDB appealing the approval of the desired future conditions of the groundwater resources. WVWA is a non-profit corporation and the owner of real property located in Hays County. This ownership is reflected in Attachment D to this petition.

Appeal:

Section 36.108(l) of the Texas Water Code provides that a person with a legally defined interest in groundwater may, by petition, appeal a DFC as "unreasonable." The 30 ft. average drawdown for the Trinity Aquifer, as adopted by GMA 9 on July 26, 2010, and as it applies to the Trinity Aquifer in the HTGCD, is not reasonable for the following reasons:

The adopted DFC allows the issuance of permits for the withdrawal of such a high quantity of groundwater that it will be difficult or impossible to implement an adaptive management strategy moving forward. Too much uncertainty exists to justify this approach set forth in the DFC;

The combination of non-exempt permitted groundwater pumping and pumping by exempt wells already exceeds the amount of available groundwater (3,713 ac-ft) as documented in the adopted 2005 HTGCD management plan;

The DFC allows more pumping than the current management plan's available groundwater, which may itself be unsustainable, as evidenced by the unavailability of water in wells and springs during drought conditions in 2009;

The adopted DFC will have unreasonably harmful environmental impacts, including adverse impacts on spring flow at Jacobs Well and other springs in Hays County;

The adopted DFC will have unreasonably harmful impacts on the use of private water wells in Hays County; The impact of the DFC on spring flow and groundwater well use in Hays County will have unreasonably harmful economic impacts; The adopted DFC fails to ensure the reasonable and prudent development of the state's groundwater resources and unlike DFCs for other regions, does not prohibit "aquifer mining" or ensure sustainable management of groundwater;

Because the adopted DFC is based on "average precipitation," it fails to address

desired future conditions of the aquifer during droughts and associated impacts on spring flow and groundwater levels, including the drought of record.

The adopted DFC fails to account for reasonably foreseeable water uses in Hays County, such as the great variance in pumping estimates in projected growth of exempt wells located within the County;

The adopted DFC fails to consider environmental and economic impacts related to changes in surface water flows that will result from lowered aquifer levels.

The adopted DFC fails to ensure conservation and protection of groundwater in the Trinity Aquifer within Hays County; and,

The adopted DFC is not adequately quantified, because the term "average drawdown" lacks adequate specificity and the DFC does not provide a reasonable basis to determine the baseline or method for measurement of the "average drawdown."

The adopted DFC does not properly account for the distinctive character of the Upper, Middle and Lower Trinity Aquifers. Each of these aquifers functions in a manner that is adequately independent to justify separate DFC criteria for each aquifer.

Summary of Evidence:

A. Impact on Private Wells

The proposed 30' DFC draw down, scenario 6 of GAM Task 10-005 (5.28.2010) estimates an additional 19.2 feet of average drawdown of the Trinity Aquifer in Hays County from 2008 levels by 2060.

During 2009, 42 existing and operating groundwater wells in the Hays-Trinity Groundwater Conservation District (HTGCD) were reported dry or had to lower pumps due to declining water levels forcing many residents to purchase and haul water brought from the Lower Colorado River (Attachment E). At a minimum, such a solution costs several thousand dollars to implement and can cost up to $15,000 for a new deep well (Attachment F). In addition many perennial springs and streams went dry during the drought (Attachment G). This was during a period of significantly less pumping than would be allowed in the adopted DFC, and only a 2 to 3 ft drop in well levels in the area immediately upgradient of Jacob's Well spring. The District monitoring wells at Mt. Baldy and Henly show an average water level decline of one foot per year in the Mt.

Baldy Well (Lower Trinity) and two feet per year in the Henly Church Well (Middle Trinity) over the period from1999 to 2010. (Attachments G, H). This provides evidence that aquifer mining is already in progress at current pumping levels, and at a rate that will exceed 16 feet by 2060.

The Trinity aquifer in Hays County is already subject to a pumping deficit of more than 2000 acre feet in excess of that allowed under the currently adopted groundwater management plan. Total estimated pumping of 5,665 acre feet in 2008 is already stressing the Trinity Aquifer in western Hays County, and exceeds the HTGCD 2005 management goal of 3,713 af/y for the upper and middle Trinity, and 449 af/y for the lower Trinity (Attachment I).

The anticipated increase in pumping from the Trinity Aquifer in Hays County as a result of the adopted DFC is excessive and significant. The DFC decision assumed 9,115 acre-feet/year (af/year) of total pumping from the Trinity Aquifer in Hays County by 2060. This additional 3,460 af/year of groundwater pumping -- above an estimated quantity of 5,655af/yr in 2008 -- would result in further economic and other harm to Petitioner and similarly situated well and land owners. At a minimum the economic impact per individual well owner could be several thousand dollars paid for hauling water during dry periods, to upwards of $15,000 for drilling new deeper wells.

Because the Hill Country (Trinity Aquifer) GAM was calibrated from the perspective of regional and annual datasets, the simulated conditions used to formulate the DFC are unverified with respect to desired local and short-term conditions. In other words, the model was calibrated to simulate regional, average-annual conditions; it has yet to demonstrate that it is capable of projecting water-level, spring flow, and water-budget conditions on a local, short-term basis. Without such verification, there is no assurance that the simulated DFC insures either desirable supplies of groundwater for existing wells or desirable rates of daily mean spring and stream flow at local watercourses (Attachment 9).

Due to the way a model must average all known conditions and stresses that occur within an area represented by a single model cell, a model underestimates the actual drawdown that results from the pumping of individual wells within the same area of a real aquifer. Although the difference between simulated drawdown (applicable to one square-mile areas) and actual drawdown depends on several factors, it is not uncommon in heavily pumped areas for individual wells and springs to go dry or cease flowing at levels far below the averages simulated for the surrounding area (Attachment J).

For this reason, it is highly likely that the DFC allowing for an additional 19 ft of

regionalized water-level decline across Hays County will result in untold numbers of dry wells and significant periods of zero spring flow not only from Jacob's Well, but multitudes of backyard springs and shallow seeps. The fact that it is impossible for anyone or any agency to predict with any degree of certainty the actual number, location, and longevity of these dried up wells and springs makes such a DFC inconsistent with sound water-resource management, given the sheer number of environmental and economic unknowns it creates (Attachment 9).

Taken together, this evidence establishes that the proposed DFC will have an unreasonable adverse effect on the ability of private well owners to continue the responsible use of their existing wells with locally impacted groundwater levels.

B. Impact on spring and base flows

Additionally, the proposed DFC will have unreasonable ecological and economic consequences for downstream users, by reducing base flows to springs and rivers that sustain aquatic habitats and by impacting recreational uses of rivers. Jacob's Well spring is a major artesian spring in western Hays County that provides a significant contribution to Blanco River flow, and constitutes an important natural resource in its own right. TWDB's GAM Task 10-005 report shows a direct correlation between the level of pumping from the Trinity aquifer and the amount of base flow provided to Hill Country springs and rivers. In Scenario 6 (on which the proposed 30 ft DFC is based) pumping was modeled at 100,000 acre-feet per year, a 67% increase from 2008 pumping. Based on average values, 2008 pumping rates result in an average spring and base flow of about 164,000 acre-feet per year in the study area. Pumping at 100,000 acre-feet per year resulted in approximately 146,000 acre-feet per year average spring and base flows, a reduction of 18,000 acre-feet per year (-11%). The maximum reduction in spring and base flows modeled in this report was approximately 54,000 acre-feet per year from 2008 levels (-33%; Attachment K).

This reduction in spring and base flows will have significant ecological and economic consequences for downstream users, by reducing instream flows to sustain aquatic habitats and by impacting recreational uses of rivers (Attachment 8). For example, Jacob's Well, an artesian Trinity Aquifer spring, provides the majority of base flow to the Cypress Creek in Wimberley (Attachment L). Manford *et al*. performed a flow gain-loss study of the Blanco River during the drought of record in 1955 (Attachment M). The study results indicated that the Blanco River had no flow from a place near the Blanco and Hays County line to 13.6 miles downstream in January 1955. At Wimberley, the

discharge was 10.5 cfs. This flow derived from springs in the Blanco River 11 miles above Wimberley and the Cypress Creek, fed primarily by Jacob's Well spring. There was little or no loss of water through the streambed of the Blanco River until it reached the mouth of Halifax Creek, where all stream flow disappeared into the limestone outcrop of the Edwards Aquifer. The flow of the Blanco River is highly dependent on base flows from the Trinity aquifer, especially during late summer and periods of less-than-average precipitation.

Previous experience demonstrates the sensitivity of Jacob's Well to drawdown of the Trinity Aquifer. The water flowing from this spring represents the integrated flow of water which has recently recharged locally through fractures, solution cavities, sinkholes, and other karstic recharge features, but also includes a major component of base flow fed from the regional limestone matrix draining into the conduit system (Attachment 6). During the height of the 2008-2009 drought, daily mean flow at Jacob's Well fell below 0.5 cfs, and essentially stopped, for 166 days (6 months; Attachment N). Before 2000, the spring has never stopped flowing in recorded history. The 2009 cessation of flow occurred under conditions producing only an approximate 2 to 3 ft drawdown immediately upgradient of Jacob's Well (Attachment G). Gunnar Brune reported a flow of 2.4 cfs from Jacob's Well on Jan 6, 1955 during the 1950s drought of record (Attachment O). The drawdown in the adopted DFC would ensure that Jacob's Well would go dry more frequently, and potentially permanently -- changing from a "perennial spring" to one that flowed only during very wet periods.

Jacob's Well is a primary source of water for Cypress Creek. Other groundwater springs in Hays County also serve as important sources of water for the surface waters of Hays County and recharge to the Edwards Aquifer (Attachments K, L, P, Q, 6). Base flows from the Trinity Aquifer contribute to the flow of San Marcos Springs and Barton Springs (Attachment P). The adopted 30' DFC draw down will negatively impact these surface waters.

Historical increases in pumping in Hays County have already caused a decrease in base flow for Onion Creek in northern Hays County. Significantly reduced base flows to Onion Creek were seen during the recent 2006 and 2008 droughts, at pumping rates much lower than those allowed by the proposed DFC. Based on review of gaged flow data from 1979 to date for the Onion Creek near Driftwood gage, a clear trend exists of decreasing base flow and increased durations of no flow for recent years (Attachment F). This trend is not due to precipitation trends. Historic stream flow gain/loss data collected on Onion Creek document that Onion Creek's base flow has historically been sustained by discharges from the Trinity aquifer. However, recent substantial increases in

groundwater pumping in northern Hays County (in the Onion Creek basin) have caused groundwater levels to decline, presumably to the point where the groundwater levels no longer sustain low flow in Onion Creek. Because of the increased groundwater withdrawals in the area, it is expected that Onion Creek will experience no-flow conditions for all but storm runoff periods in the future.

If pumping of the Trinity aquifer in the region expands much beyond current levels, the hydrostatic level of the matrix component feeding Jacob's Well will drop below the limit required to provide enough positive pressure to maintain flow to the spring, as well as to any other naturally occurring groundwater discharge feature in the area. Once water levels are allowed to decline to the degree possible under the proposed DFC plan, it will be practically impossible to recover the depleted aquifers to levels sufficient to restore any natural flow to Jacob's Well spring, other Trinity springs, and base flow in surface streams (Attachment 6).

Surface waters such as the Blanco River provide a significant source of revenue for local business engaged in recreation and tourism. Significant reductions in base and spring flow such as those modeled for the proposed DFC will have excessive negative impacts on local economies. A 1990 study of revenues due to river recreation measured the total income accrued, as well as the additional economic activity (i.e. jobs), that can be directly attributed to a recreational river site (Attachment R). This study showed that a river-based recreation industry has a multiplicative effect on local economies, where direct revenues from recreation were more than doubled as total expenditures in local economies. The multiplicative effect would be similar for lost revenues due to reductions in base flows, a situation which would tend to occur most frequently in the hot summer months when recreational use of rivers is highest (Attachment 8).

Along the perennial Cypress Creek, tax appraisal values for properties adjacent to the stream channel total over $33 million. A study of land values and drought impacts (Attachment S) revealed that a significant reduction in stream flow could cause a 25-45% drop in market values for stream-adjacent properties, resulting in a loss to landowners of between $8.25 and $14.9 million in that area alone. Decreased water quality could result in a 20-30% decline in market values, resulting in a loss to landowners of up to $9.9 million. Since the values given in the study are tax appraisal rather than market appraisal values, losses to landowners in the real estate market could be somewhat higher (Attachment 8). Such a reduction in property values would be detrimental both to local landowners and to state and local agencies dependent on property tax revenues. Business and homeowners would react accordingly and future economic development could be impaired.

If base flows are reduced to a point where recreational and ecological services are substantially impacted, the substantial public and private investment that has been made in riverine parks and nature preserves would be jeopardized. Hays County has invested $4.3 million in the newly created Jacob's Well Natural Area, in addition to significant private investment. To date, total public and private investment in Blue Hole Regional Park (along the Cypress Creek in Wimberley) is over $6.3 million (Attachment T).

Taken together, this evidence establishes that the proposed DFC will have unreasonable ecological and economic consequences for downstream users, by reducing base flows to springs and rivers that sustain aquatic habitats and by impacting recreational uses of rivers.

C. Impact on surface water quality

Reductions in spring and base flows will result in more frequent water quality impairments in surface waters, increasing mitigation costs.

Water quality in Cypress Creek is impacted by the magnitude of flow from Jacob's Well. As required by Section 303(d) of the federal Clean Water Act, the Texas Commission on Environmental Quality evaluates the water quality in each waterbody of the state every two years. In 2000, the lower 5.5 miles of the Cypress Creek made the U.S. Environmental Protection Agency (USEPA) impaired stream segment list (also known as the 303(d) list) because of a quantity of dissolved oxygen lower than needed to support aquatic life. The degraded water quality correlated with the creek's recorded low flow of 0.33 cubic feet per second (cfs) in July of 2000. Additional data analyses reveal that dissolved oxygen levels regularly fall below the target of 6.0 mg/L for exceptional aquatic life use when flows in the Cypress Creek are reduced below about 4.11 cfs (Attachment S). It is most critical to maintain flow at Jacob's Well spring during drought periods, because this is the period when stream flow in the Cypress Creek, and thus water quality and aquatic life use, are primarily dependent upon the rate of spring flow at Jacob's Well (Attachment 8).

It has been shown that storm water impacts to water quality at Barton Springs are greater during drought because there is less dilution. Declining water quality, particularly low dissolved oxygen resulting from reduced flow, is a critical concern to survival of endangered species during drought. (Attachments U, V). The proposed DFC is unreasonable because it fails to explicitly articulate a desired future condition for the aquifer during drought conditions, the time when prudent groundwater management is

most critical.

Assuming equal pollutant loading from watersheds, reduction in spring and base flows resulting from the proposed 30 ft DFC will result in higher concentrations of pollutants measured in streams (Attachment 8). In order for surface water bodies to continue to meet State water quality standards, additional mitigation measures will be required to reduce pollutant loading into streams, placing an excessive economic and technical burden upon local authorities.

Taken together, this evidence establishes that the proposed DFC will have unreasonable impacts on surface water quality, and will place an unreasonable economic and technical burden on local authorities charged with maintaining state water quality standards.

D. Impacts on lateral outflows to Edwards Aquifer

As mentioned above, during droughts the majority (if not all) of the flow from the Blanco River recharges the Edwards Aquifer as it flows across the recharge zone to the east of the Hill Country GAM study area. This situation is typical for many streams that have their origins in Trinity Aquifer base flows. The TWDB GAM Task 10-005 report (Attachment K) shows that, based on average values, 2008 pumping rates would result in an average outflow across the Balcones Fault Zone of 62,000 acre-feet per year. Under Scenario 6 (proposed 30 ft DFC), this outflow would be reduced to approximately 47,000 acre-feet per year, a reduction of 15,000 acre-feet per year from 2008 levels (-24%).

According to page 9 of the TWDB GAM Task 10-005 report, an increase in Trinity Aquifer pumping of about 32,000 acre-feet per year would reduce recharge to the Edwards aquifer by "about 12,000 acre-feet per year" by virtue of the associated water-level drawdown and resulting decrease in discharge from the upgradient Trinity Aquifer. This 12,000 acre-feet per year decrease in Edwards recharge would equal 38% of the additionally permitted GMA-9 pumping. In other words, according to TWDB's model analysis, 38% of the recently sanctioned 32,000 acre-ft/yr of additional pumping would result from the interception (capture) of groundwater that would otherwise discharge across the Trinity-Edwards interface to recharge the Edwards aquifer.

Lateral, subsurface inflow from the Trinity Aquifer, as well as other sources of natural recharge to the Edwards Aquifer, are critical for maintaining the habitats of endangered species that reside in San Marcos and Barton springs. Recent studies have shown that the Blanco River could be Barton Springs' largest sustaining source of recharge during drought conditions, when flow is most critical to maintain habitat and water quality

(Attachment P). Excessive drawdown of the Trinity aquifer based on the adopted DFC could have a detrimental impact on the Barton Springs salamander, a federally designated endangered species, by reducing flow in Onion Creek, a major contributor of water to Barton Springs, particularly during droughts. By permitting the interception of what would otherwise be significant lateral, subsurface inflow from the Trinity Aquifer, the proposed DFC will place an unreasonable economic burden on downstream users of the Edwards Aquifer, who (considering the recent determinations by the Edwards Aquifer Recovery Implementation Program, or EARIP; Attachment V) may soon be obligated to maintain specific target flow levels in these critical springs. Adoption of the proposed DFC would shift the economic burden of water conservation from Trinity Aquifer users to Edwards Aquifer users (Attachment 8).

The above evidence establishes that the proposed DFC will have unreasonable impacts on downstream users in the Edwards Aquifer region, by reducing lateral, subsurface inflows from the Trinity Aquifer that substantially impact critical spring flows during droughts.

E. <u>Incongruity between model results and assumptions (as a planning tool) and implementing the proposed DFC (as a policy)</u>

(1) There is too much averaging in model results and assumptions to make predictions about local conditions; the proposed DFC does not clearly articulate critical drought management under future conditions.

One of the most important limitations that results from the model's relatively coarse grid (one square-mile cell size) is that associated with what Jones et al. (2009) describe as "Scale of Application." Under this heading, it is explained that the "accuracy and applicability" of the Hill Country GAM:

> "Decreases when moving from addressing regional- to local-scale issues because of limitations of the information used in model construction and the model cell size that determines spatial resolution of the model. Consequently, this model is not likely to accurately predict water-level declines associated with a single well or spring because (1) these water-level declines depend on site-specific hydrologic properties not included in detail in regional-scale models and (2) the cell size used in the model is too large to resolve changes in water levels that occur over relatively short distances. Addressing local-scale issues requires a more detailed model, with local estimates of hydrologic properties, or an analytical model. This model is more useful in determining the impacts of groups of wells or well fields distributed over a few square miles. The model can be used to predict changes in ambient water levels rather than actual water-level changes at specific locations, such as an individual well." (Attachment W)

Given this summary of the model's limitations with respect to its regional scale versus reality, it seems problematic to use its output in any context that would affect the fate of individual wells, springs, or tributary streams. It appears particularly unwise and inconsistent with sustainable groundwater development to use such output to justify pumping increases that are simulated to cause an additional 30 ft of regionalized water-level decline (Attachments 7, 9).

Another issue with the Trinity (and the adjacent Edwards-Trinity (Plateau)) models that should be recognized is that neither model is supported by a sufficient number of long-term water level measurements such that accurate trends can be evaluated in the context of naturally occurring (seasonal and multi-year) fluctuations verses seasonal and multi-year trends induced by pumping. This understanding is critical when attempting to evaluate how the aquifer system will respond to future conditions such as global warming, projected future water demands (including pumping associated with exempt wells), and various groundwater management policies.

(2) High uncertainty in projected growth of future pumping from exempt wells

Projections of growth in groundwater pumping from exempt wells vary greatly, making it difficult to effectively estimate the actual water available. An initial draft report, using estimates provided to HTGCD by HDR Engineering, Inc., estimated exempt pumping in 2060 at 8,763 acre-feet. A later draft, using numbers provided by TWDB, estimated future exempt pumping at 4,108 acre-feet (Attachment 10). This resulted in a variation in Managed Available Groundwater (MAG) estimates for 2060 from 311 to 4,986 acre-feet. This is an increase of over 1500% in the estimated available water from one draft to the next. Such a large degree of variation creates so much uncertainty that it seems problematic to use the resulting MAG in a context that would affect the fate of individual wells, springs, or tributary streams.

(3) Model predictions and the proposed DFC do not incorporate the complexity of multiple aquifer layers in the Trinity Aquifer.

In addition, the recently updated GAM for the Hill County Trinity models three specific layers, or aquifers in Hays County: Upper, Middle and Lower Trinity aquifers. The amount of water level information on which these are based decreases with depth, which calls into question the overall accuracy of the model results (Attachment 7). The proposed GMA9 desired future condition of 30 ft is based on the entire Trinity Aquifer System (Upper, Middle and Lower Aquifer units combined). However the Lower Trinity (Hosston and Sligo Formations) is only very poorly connected if at all to the overlying Middle Trinity, and thus in most places can be considered a separately operating aquifer

(Attachment 5). There is no established rational for determining which aquifer(s) the 19.2 feet of drawdown will impact, let alone monitoring and setting individual baselines and targets for the multi-functioning aquifer system.

(4) Incongruity between model projections and observed conditions: observed data show impacts from current pumping in some areas are as bad as or worse than the models predict under scenarios of 67% increase from 2008 pumping.

As discussed above under **Impact on spring and base flows**, observed data show that at current pumping levels, aquifer levels in Hays County continue to decline at a rate of 1 to 2 ft per year, many wells went dry during two droughts within the last decade, and perennial springs and creeks dried up for a substantial period of time (Jacob's Well flow was below 0.5 cfs for approximately 6 months in 2009). Yet the proposed 30ft DFC and modeling results used to support it predict an average 30ft drawdown in the Trinity Aquifer by 2060 resulting from a 67% increase in pumping, but in some areas the recent drawdowns during the 2008-2009 drought exceeded 35 ft upgradient of Jacob's Well and 175 ft in northern Hays County (Attachment G). This evidence shows that the proposed 30 ft *average* drawdown allows for excessive ecological and economic consequences under drought conditions even less severe than the 1950s drought of record.

(5) Implementation issues with proposed DFC

No proper baseline has been established from which to measure the estimated 19 ft drawdown of the Trinity Aquifer in Hays County which is set forth in the proposed 30 ft DFC. There have been no scientifically documented and agreed upon base lines within the GMA-9 districts to measure existing groundwater fluctuations, trends, levels and amounts in anticipation of further aquifer declines from increased pumping allowances.

Likewise, it is not clear how aquifer drawdown will be measured, monitored, and documented from increased pumping allowances in the future. Earlier Groundwater Availability Models (GAMs) have provided regional maps showing projected declines of water levels in current pumping centers. No maps or estimates of water level declines in current pumping centers has been provided by TWDB to assess localized impacts of the proposed increase in total groundwater available under the 30' DFC for the GMA-9 area.

Furthermore, the modeling used to support the future conditions is flawed in its assumption that total pumping would be reduced by 33% during drought conditions. HTGCD has no authority to limit pumping or enforce drought plans for exempt wells, and there is no reason to conclude that pumping can be reduced by 33% without this authority. Of the approximately 6500 wells in the HTGCD 98% of those wells are

exempt under the HTGCD's enabling legislation making it virtually impossible to manage pumping reductions during drought conditions. In addition, the inadequacy of funding for the HTGCD based on its enabling legislation makes it impossible to effectively enforce drought plans.

(F) Contradiction of DFC and Regional Water Plans

Moreover, the adoption of the DFC with 30' average drawdown is counter to many planning authorities' stated commitments to sustainable management of the Trinity Aquifer.

Regional Water Planning Groups J, K and L have established language to promote sustainable management of aquifer resources to meet near and long-term water needs during drought, to maintain discharges to surface springs and rivers, and to discourage or prohibit mining of aquifers (Attachments X, Y, Z). This is interpreted to mean the establishment of groundwater pumping regulations by county groundwater conservation districts in order to prevent more water from being removed from aquifers than is recharged.

The HTGCD has a goal of sustainable management of the Trinity Aquifer including maintaining base flow contribution to streams during a repeat of the drought of record and, in critical depletion areas and management zones, at a rate of stream/spring base flow that maintains a sound ecological environment. HTGCD is in agreement with the opposition to mining of groundwater expressed in the Region K Plan (Attachment 1).

The U.S. Geological Survey (Attachment 2) has defined groundwater sustainability as "the development and use of groundwater in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences." Managing for sustainable yield is a prudent compromise between the two extremes of little or no pumping and the sequestration of all available groundwater. Continuous extraction of groundwater from storage will eventually deplete an aquifer to the extent it is unable to supply water in any reasonable economical or physical sense. One of the earliest threats to sustainable yield is groundwater mining, as indicated by long-term water-level decline (Attachment 9).

Available published and unpublished water-level data for the Trinity Aquifer in the HTGCD area indicate that the effects of historical and current pumping have already tapped the threshold of what the scientific community considers groundwater mining or unsustainable development. Pre-development conditions are approximated in a

potentiometric map of "earliest available" groundwater levels in the Edwards-Trinity aquifer system, published by the U.S. Geological Survey (Attachment 3). Current levels are depicted in a potentiometric map of conditions in the middle zone of the Trinity Aquifer during the spring of 2009 (Attachment 4). The difference between pre-development and current water levels in the middle zone of the Trinity Aquifer is at least 50 feet in several areas of HTGCD. Water-level declines of this magnitude together with published observations (Attachment O) that during the mid-1800's flowing wells could be developed "nearly everywhere" are indicative that the Trinity Aquifer's limits for sustainable pumping were reached prior to approval of the DFC that is projected to cause an additional 19 feet of *average* (regionalized) water-level decline across Hays County (Attachment 9).

TWDB's GAM results support the conclusion that the proposed DFC will only exacerbate existing problems. In addition to the expense of having to deepen wells and pump from deeper depths, such problems include wells, springs, and base flow to streams that dry up–such as observed during recent droughts—events far less severe than several droughts documented to have existed in the past.

In summary, a 30 ft average draw-down of the Trinity Aquifer in GMA9 would lead to a major degradation of economic, ecological, and quality of life conditions across the Texas Hill Country.

Affidavit: I, Jack Hollon, affirm that the facts as stated above are true and correct to the best of my knowledge.

_____
Jack Hollon, President
Wimberley Valley Watershed Association

SWORN AND SUBSCRIBED to before me on this the 28 day of March, 2011.

_____
Notary Public for and in the State of Texas

My Commission Expires: _____

List of Attachments

A Desired future condition (DFC) adopted by GMA 9 on July 26, 2010, Resolution No. 072610-01.

B Hutchison, W.R. and M.M. Hassan. 2011. GAM Task 10-031: Supplement to GAM Task 10-005. Texas Water Development Board, Groundwater Resources Division. January 25, 2011.

C Resolution adopted by WVWA Board of Directors on March 22, 2011 describing the extent and nature of Jack Hollon's representation of WVWA.

D Wimberley Valley Watershed Association, General Warranty Deed

E Price, A. 2009. "As groundwater levels drop, people begin hauling in water." *Austin-American Statesman*, August 22, 2009.

F Slade, R. 2007. Perspectives of the 2006 drought severity in Hays County, Texas. Unpublished report to the Hays-Trinity Groundwater Conservation District, 15 p.

G Wierman, D.A. 2010. Water level fluctuations in the Middle Trinity Aquifer during the drought of 2007-2009, with emphasis on correlating water level fluctuations and flow from Jacob's Well.

H Trend of declining water levels at Mount Baldy based on TWDB well monitoring data.

I Hays-Trinity Groundwater Conservation District. 2005. Groundwater management plan. August 4, 2005. 61 p.

J Actual water-level drawdown compared to representation in coarse-grid model near a pumping center.

K Hutchison, W.R. 2010. GAM Task 10-005. Texas Water Development Board, Groundwater Resources Division. September 3, 2010.

L Hays-Trinity Groundwater Conservation District. 2008. Cypress Creek/Jacob's Well Hydrogeologic Report. Report prepared for Texas State University - River Systems Institute, San Marcos, Texas. 166 p.

M Manford, D., R.M. Dixon, O.F. Dent. 1960. Channel gain and loss investigations, Texas Streams, 1918-1958. Texas Board of Water Engineers Bulletin 5807-D. 284 p.

N Daily mean spring flow at Jacob's Well, 2008 to 2009.

O Brune, G. and H.C. Besse. 2002. Springs of Texas, Volume 1 (2nd ed.), Texas A&M University.

List of Attachments (continued)

P Hauwert, N., B. Hunt, M. Gary, S. Johnson. 2011. "Blanco River recharges Barton Springs during drought." *Save Barton Creek Association* newsletter.

Q D.A. Wierman, A.S. Broun, and B.B. Hunt. 2010. Hydrogeologic Atlas of the Hill Country Trinity Aquifer, Blanco, Hays, and Travis Counties, Central Texas: Prepared by the Hays-Trinity, Barton Springs/Edwards Aquifer, and Blanco Pedernales Groundwater Conservation Districts, July 2010, 17 plates.

R Cordell, H.K., J.C. Bergstrom, G.A. Ashley, and J. Karish. 1990. Economic effects of river recreation on local economies. *Water Resources Bulletin* 26(1): 53-60.

S River Systems Institute (RSI). 2010. Cypress Creek Project: Watershed characterization report. Prepared for the Texas Commission on Environmental Quality and U.S. Environmental Protection Agency, Region VI. River Systems Institute, Texas State University-San Marcos, San Marcos, Texas, August 2010. 153 p.

T Total public and private investment in Blue Hole Regional Park, Wimberley.

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5 Affidavit of John Ashworth, P.G.

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