

SECTION 11

WATER SUPPLY OPTIONS

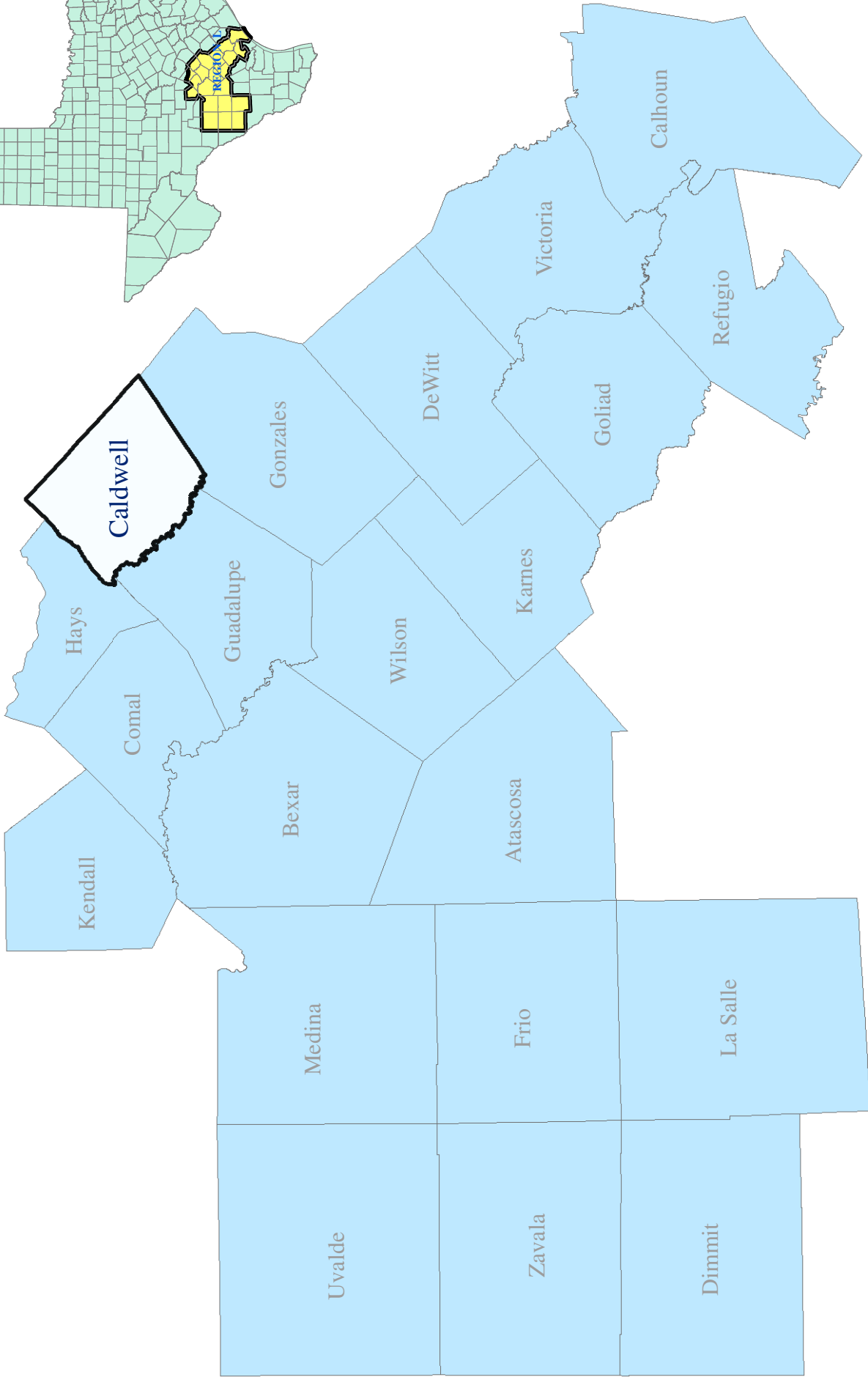
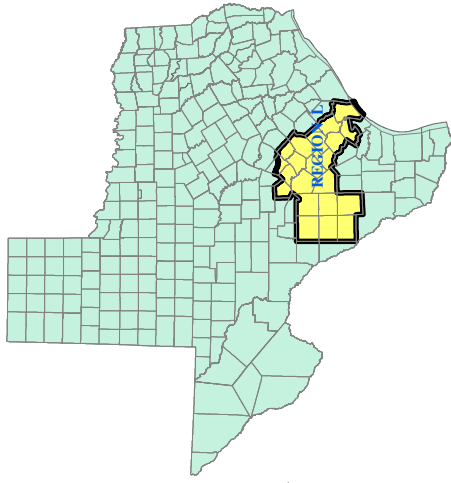
11.1 Regional Water Plans

The “2006 South Central Texas Regional Water Plan” (SCTRWP) represents 66 water user groups that have identified water needs. The water plan details the strategies to develop water resources to meet the needs and reduce demands through conservation. The South Central Texas Region, also known as Region L, is shown in *Exhibit 11-1*. The exhibit illustrates the represented counties in Region L. In this section, a closer look is given at the plans and viability of the projects mentioned. For the purpose of this study, only the proposed plans that influence the supply for Caldwell County are discussed.

The plans and strategies in the 2006 SCTRWP that are reviewed include:

- Hays Caldwell Public Utility Agency (Plumbing Plan) supply project
- Lower Guadalupe Water Supply Project
- Lockhart Reservoir
- Recycled Water Programs
- Surface water rights
- Local Carrizo
- Local Storage (Aquifer Storage and Recovery)
- Simsboro Aquifer
- Weather Modification
- Rainwater Harvesting
- Water Conservation.

Additionally, the GBRA Mid-Basin Project, which is currently not in the 2006 SCTRWP, will be discussed. The work effort to review the Mid-Basin project for this study was sponsored by funds solely from the GBRA.



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Caldwell County
South Central Texas Region L

Water and Wastewater Planning Study

Klotz Proj. No. 0972.001.000

June 2009

EXHIBIT

11-1

11.1.1 GBRA Mid-Basin Project

The Guadalupe-Blanco River Authority (GBRA) is proposing a project that will provide 25,000 ac-ft to customers of Caldwell, Comal, Gonzales, Guadalupe, and Hays Counties. The source of water will be primarily surface water from the Guadalupe River with a point of diversion below the confluence of the San Marcos River. The water in the river at the proposed diversion point is not considered firm yield unless it is backed up with off channel storage or a groundwater source. Off-channel storage in Guadalupe County is being considered for the Mid-Basin Project as well as a secondary source of supply from the Carrizo and/or Wilcox Aquifers in west-central or northeast Gonzales County.

A feasibility report has been prepared by HDR to assess the use of groundwater to supplement surface water during dry periods. During dry periods, water would be supplemented with groundwater from the Carrizo/ Wilcox Aquifer to provide a constant supply of 25,000 ac-ft/ yr.

Groundwater availability from the study was determined using the CCWQCS GAM model. The pumping simulation model was run over a period of 55 years from 2010 to 2065. Pumping and well distribution from the proposed field was analyzed in three scenarios. Two pumping scenarios were capable of producing up to 25,000 ac-ft/ yr alone from the Carrizo. The other alternative utilized the Carrizo-Wilcox wells with river water. The layout of the well field was assessed using current GCUWCD rules for well spacing and requirements of 1 ac-ft per acre.

The study used a baseline scenario for comparative purposes and to illustrate the groundwater level and projected draw down. Instream flow restrictions in the pumping simulations were based on the historical period from 1934 to 1989.

The proposed GBRA Mid-Basin Project is a viable solution to meet the water needs of Caldwell County. The permits for this project have not been issued by permitting agencies. Although it is a feasible solution, some concerns have developed regarding environmental flows. Preservation of fresh water in streams to maintain healthy ecosystems has caused some concern. Maintaining base flows of fresh water are necessary for rivers and streams to remain healthy and balanced. The TCEQ, Texas Parks & Wildlife and the TWDB are working to establish environmental flows and these flows will probably need to be established before permits will be issued.

Other issues that the project must resolve include:

- Carrizo-Wilcox groundwater availability (if needed for the project)
- Well spacing according to GCUWCD may require more land leases or acquisitions (if groundwater is needed)
- Obtaining groundwater leases from landowners if groundwater is a part of the project

11.1.2 Hays Caldwell Public Utility Agency Supply Project (HCPUA)

The HCPUA was initially formed with the Canyon Regional Water Authority, Buda, Kyle, and San Marcos for the purpose of sharing water supplies and cost of infrastructure development. The HCPUA was created under Chapter 422 of the Local Government Code General Law in January 2007. The role of the HCPUA is to provide wholesale water through the participants. The participants, who are part owners in percentage distribution, could take a role of wholesale water distributors.

The participants have been working together for approximately five years and initially had several interested entities. Many who were invited to participate chose not to pursue the project as a water supply strategy.

The water supply strategies developed by the HCPUA are described in The Plumbing Plan Report prepared by Lockwood, Andrews, and Newnam, Inc. The plan outlines the purpose, approach, timeline, and cost of the projects the HCPUA proposes. An evaluation is given of the water supply options in the report and then makes recommendations on infrastructure improvements and build-out phases.

The plan also developed scenarios based on a 50 year projection of water need. It was determined in the Plumbing Plan that water demand will surpass supply 2018. Some participants have been identified to need water before 2018. The plan projects a minimum water demand of 27,000 ac-ft/ yr in 2060 based on information they received from participants. The projected demand with high growth estimates from the State Data Center is approximately 142,000 ac-ft/ yr.

The project proposes to pump from wells in the southeast corner of Caldwell County adjacent to Bastrop, Fayette and Gonzales Counties. Available yield in this region of the Carrizo is expected to reach 15,000 ac-ft.

The HCPUA is a viable project but will not meet all the needs for Caldwell County. The project would need to consider additional WUG to meet the demands of the county. Other issues that the project must resolve include:

- Carrizo-Wilcox groundwater availability
- Well spacing according to GCUWCD may require more land lease/acquisitions
- Obtaining leases from landowners (at the time of this study no leases have been obtained)

11.1.3 Lower Guadalupe Water Supply Project for GBRA Needs

The Lower Guadalupe Water Supply Project (LGWSP) for GBRA was introduced into the 2006 South Central Texas Regional Water Plan (SCTRWP) to meet water supply needs for customers in Caldwell, Comal, Guadalupe, Hays, and Kendall Counties. The strategy would deliver 36,710 ac-ft/ yr of available water through underutilized GBRA and Union Carbide Corporation water rights from the Guadalupe River.

The original LGWSP is no longer considered a viable strategy and has been removed from the SCTRWP. However, a smaller scale project using the concepts of the original LGWSP is considered a viable strategy for water supply development. The smaller project appears to have fewer potential participants than the original LGWSP.

11.1.4 Lockhart Reservoir

The Lockhart Dam and Reservoir project as described in the 2006 Region L Water Plan would be located upstream from Lockhart on Plum Creek as a means of meeting projected water needs. The Lockhart Reservoir was recommended to be included and considered as an important economic development. However, the original Lockhart Reservoir Project is no longer viable because the area where the dam was proposed is being used to mitigate loss of wetlands associated with the construction of SH 130. A reconfigured Lockhart Reservoir Project may be viable but this strategy is not currently being actively pursued.

11.1.5 Recycled Water Programs

The Recycled Waters Program involves the expansion or development of programs that reclaim municipal water for non-potable uses. Recycled water can be used in to irrigate parks, cemeteries, golf courses, athletic fields, open spaces,

and landscape watering. The water can also be used to cool building and for industrial processes.

This strategy is a feasible solution with the development of new treatment facilities. It may not be cost-effective to retrofit and modify existing systems to provide this alternative.

11.1.6 Surface Water Rights

The Surface Water Rights management strategy refers to the recognition of existing water rights available for purchase or lease under agreements from sellers and buyers. Additional diversion points consistent with TCEQ rules and applicable laws are consistent with the 2006 Regional Water Plan.

In Caldwell County run-of-the-river surface water rights are not viable. The water rights for the San Marcos River have all been appropriated. There are no water rights available.

11.1.7 Local Carrizo

The Local Carrizo management strategy involves the development and expansion of well fields in the Carrizo-Wilcox Aquifer. Local municipal and steam-electrical needs would be met in Atascosa, Caldwell, Gonzales, Guadalupe, and Wilson Counties. The planned implementation of this strategy as listed in the 2006 SCTRWP would provide new supplies totaling approximately 20,279 acft/ yr. The cost would range from about \$114 acft/yr to \$443 acft/yr.

This strategy is viable and utilized by the HCPUA (Plumbing Plan) and the GBRA Mid-Basin Project. However, groundwater withdrawal permits and if required, export permits, are currently being granted by groundwater districts on almost a “first come first serve basis” without a limitation on the total permitted volume. In the future, the process to establish desired future conditions (DFC) and

the maximum available groundwater from the aquifer may result in groundwater management rules that restrict or curtail groundwater production.

11.1.8 Local Storage

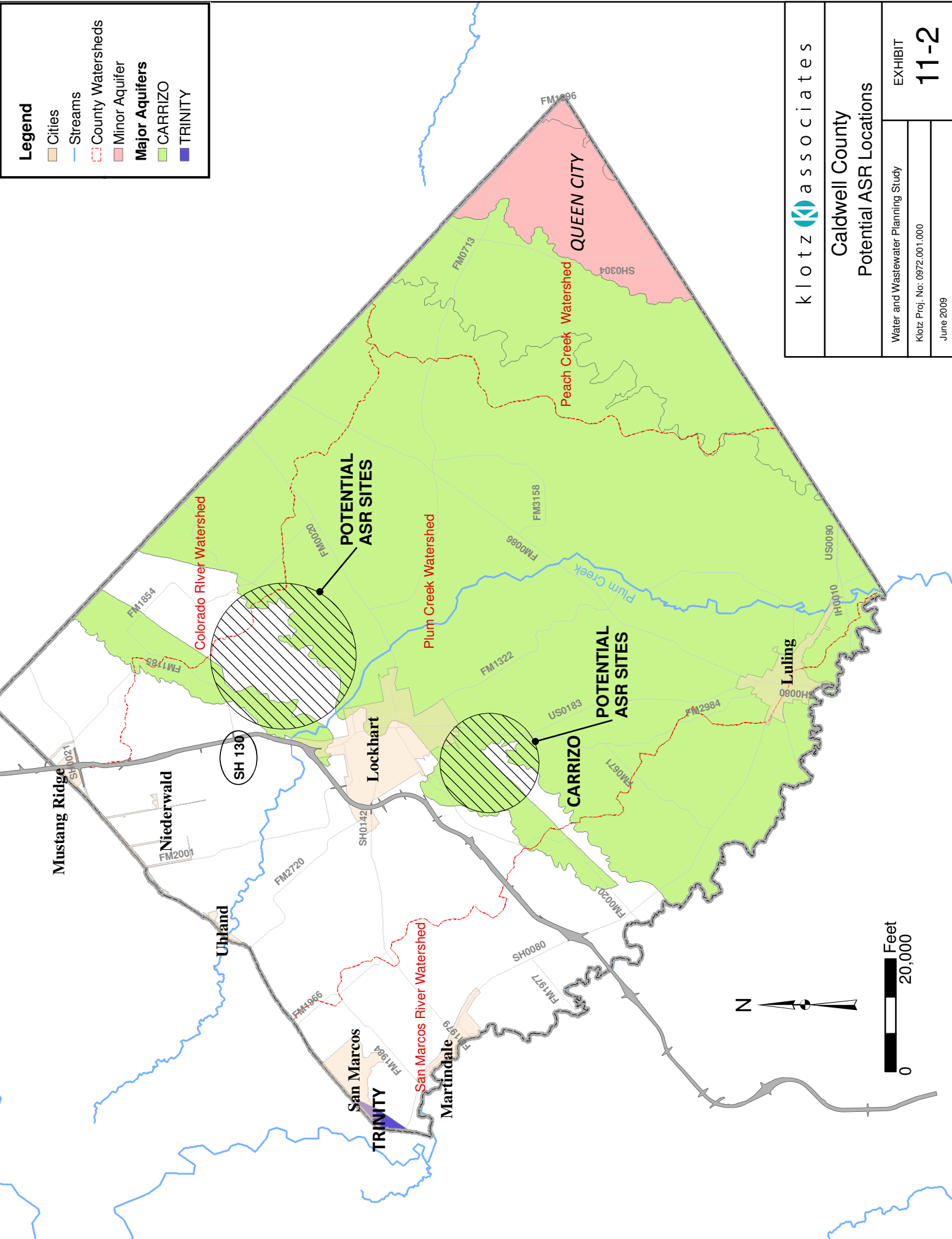
According to the SCTRWP, local storage involves implementing large, regional scale Aquifer Storage and Recovery (ASR) Projects and/or surface storage facilities adequate in size to store surplus flows of surface water during periods of high stream flows, including flood flows, to be available during extended periods of drought. Present management strategies of the South Central Texas Regional Water Plan are sized and scheduled to meet seasonal and daily variations of demand, but some current supplies may not be fully reliable during extended or multi-year droughts. The lack of reliability creates the need for surface reservoirs, large scale ASR systems or multipurpose reservoirs. If the water management need is for a water source that could be made available for emergencies or used during drought, surplus water available during wet periods could be stored in the Carrizo or Gulf Coast Aquifers for future use or stored in surface water reservoirs.

Surface water would generally require treatment prior to storing it in an ASR project. Water treatment capacity necessary to meet peak day demands may be available at non-peak times (fall, winter, spring) to treat water for aquifer storage and subsequent recovery.

At this time, no ASR has been formally proposed for Caldwell County. The Plum Creek Conservation District has taken the initiative to investigate the availability of an ASR in the county. Some potential sites have been located and will be studied further to determine the characteristics and storage capacity of the formation. *Exhibit 11-2* illustrates the potential ASR location as described by Mr. Feather Wilson.

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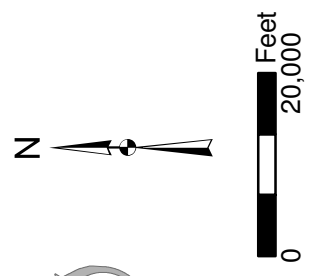
- Cities
- Streams
- County Watersheds
- Minor Aquifer
- Major Aquifers**
- CARRIZO
- TRINITY



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Caldwell County
Potential ASR Locations

Water and Wastewater Planning Study	EXHIBIT
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An ASR is a viable solution. Groundwater rights can be fully exhausted on a regional basis and stored in an ASR. Diverted flows from rivers that exceed base flood flows could also be stored with some treatment. The costs associated with an ASR would be dependent on the size of the void. The pipe network, transmission lines, and water treatment would also be cost to consider.

11.1.9 The Simsboro Aquifer

The Simsboro Aquifer water supply strategy involved the development of well fields over the Simsboro Aquifer. The project was reportedly headed by the San Antonio Water System (SAWS). SAWS and GBRA in 2008 were approached by a group of landowners, known as the Brazos Valley Water Alliance, to develop a project that would supply 200,000 ac-ft/ yr to participants.

The Brazos Valley Water Alliance was formed in 2002 to represent landowners over the Simsboro Aquifer. The Alliance has approximately 180,000 acres of land and more than 1,200 landowners. The Simsboro Aquifer is a member of the Carrizo/ Wilcox Aquifer which is capable of producing high quality water. After further investigation with SAWS no formal announcement or decision has been reached to continue evaluating this strategy. Additional studies are needed to fully evaluate this option.

11.1.10 Weather Modification

The weather modification strategy involves the practice of seeding clouds to increase precipitation. Licensed professionals within the planning region would seed clouds with iodide. The practice does not guarantee precipitation and water quantity estimates can not be measured. The strategy would be intended for cropland, livestock, and aquifer recharge. The strategy is still being studied and has been practiced since 2005 in some Texas counties.

Weather modification is a good strategy but is not considered an applicable or viable solution to meet the future water needs of Caldwell County. Without consistent results it can not be relied on to yield definite amounts of rainfall.

11.1.11 Rainwater Harvesting

The rainwater harvesting management strategy captures and stores runoff from rooftops for potable and non-potable use. In some instances this approach can adequately supply the needs of households and businesses.

Rainwater harvesting is a strategy that can assist in the demands projected by reducing per capita consumption. The effects of rainwater harvesting if consumers participated on a city wide basis could have great results. Reducing demand on a regional level would decrease the cost associated with developing new water sources or delay the timing. The Region L Water Plan estimated the cost of water developed by rainwater harvesting as \$2,000 per ac-ft. This cost is considered high. The cost associated with this strategy could be shared cities and homeowners for existing homes. New development could be given incentives for installing systems on homes and buildings. Changes in city development standards could also require such systems.

11.1.12 Water Conservation Strategy

The water conservation strategy is suggested to be part of every water management plan. It involves implementing programs and practices that will decrease water use per capita.

Municipally this approach is done by the use of low flow plumbing fixtures, selection of water efficient appliances, modifying landscaping or xeriscaping, addressing plumbing repairs, and modifying personal behavior.

Agricultural conservation methods include installing low energy precision application (LEPA) irrigation systems and furrow dikes.

The water conservation strategy is feasible and recommended to be employed with any other viable solution.

11.1.13 Desalination

Desalination is a water management strategy that involves treating brackish groundwater or seawater. The desalination strategy lead to developing facilities adjacent to well fields in the Carrizo or intake and treatment facilities on the shore of the San Antonio Bay.

Although desalination could meet the water needs of Caldwell County, at this time this strategy is not a feasible solution. This strategy requires support from many local, state, and governmental participants to be considered a viable solution in meeting water needs for Caldwell County.

11.2 Conclusions

The strategies reviewed for use in meeting the future water needs of Caldwell County indicate that there are potential solutions but the implementation of any of the projects will be costly and will require a dedicated effort to implement on a schedule that does not limit growth or development within the county. Multiple strategies may be implemented to ensure the “water future” of Caldwell County.

The most viable near term strategies appear to be the development of the GBRA Mid-Basin Project and/or the HCPUA Project. Each of these projects will rely on withdrawal of water from the Carrizo Aquifer. The GBRA Mid-Basin project has the added advantage of groundwater plus surface water supplies.

The use of a local ASR project to store surplus water in wetter years for future withdrawal is a strategy that merits further investigation. The ASR Project could be combined with the Mid-Basin Project or HCPUA to increase available water supplies during times of drought.

Developing water from the Simsboro Aquifer appears to be a strategy that could yield significant amounts of water for use in the central Texas region including Caldwell County. Development of this project will depend on a large number of potential users with significant needs coming together and jointly developing the project. The schedule for development of his project appears to be beyond the time when water will be needed in Caldwell County.

Desalination is a strategy that can meet the future water of the central Texas region. However, the cost and challenges associated with this project indicate that desalination will probably not be implemented within the planning horizon of this study.