March 2005
Priority Groundwater Management Area File Report

Evaluation for the Hudspeth County Priority Groundwater Management Study Area

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Water Supply Division

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

EVALUATION FOR THE HUDSPETH COUNTY PRIORITY GROUNDWATER MANAGEMENT STUDY AREA

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EXECUTIVE SUMMARY

The purpose of this evaluation is to determine if the Hudspeth County area is experiencing, or is likely to experience within the next 25 years, critical groundwater problems, and whether a groundwater conservation district should be created in order to address such problems. The study area included all of Hudspeth County; however, only the area outside of the Hudspeth County Underground Water Conservation District (UWCD) No. 1 was considered for priority groundwater management area designation. Because groundwater conservation districts have the authority to manage groundwater resources, the Hudspeth County UWCD No. 1 has been excluded from priority groundwater management area designation consideration.

For this report, TCEQ staff considered comments, data, and information provided by a number of different sources. These sources included water stakeholders from within the study area, the Texas Water Development Board, the Texas Parks and Wildlife Department, the Far West Texas Regional Water Planning Group, and independent research by the staff. The report discusses the available authority and management practices of existing groundwater management entities within and adjacent to the study area, and makes recommendations on appropriate strategies needed to conserve and protect groundwater resources in the study area.

Within the study area, groundwater is produced from the Hueco Bolson, West Texas Bolsons, Capitan Reef Complex, Bone Spring-Victorio Peak, and the Diablo Plateau aquifers. Irrigation has been historically the largest use of groundwater. In 2000, 263,886 acre-feet was used for irrigation and 614 acre-feet for livestock with 41,863 acre-feet and 31 acre-feet, respectively, coming from surface water. Groundwater supplied 222,023 acre-feet for irrigation, 583 acre-feet for livestock, 376 acre-feet for municipal uses, two acre-feet for manufacturing, and one acre-foot for mining. However, information generated for Hudspeth County stakeholders indicated that only about 103,000 acre-feet of groundwater was used for irrigation in 2000. The total annual water demand for the study area is expected to decrease by more than six percent by 2030. The Rio Grande is the only surface water resource for the study area. The 2003 estimated population for the study area is 3,193 and is projected to increase to 4,054 by 2030.

The water supply problems identified in the study area include widespread high total dissolved solids concentrations in groundwater and the lack of firm alternative supplies for irrigation use in the Rio Grande Valley during drought-of-record conditions. Groundwater concerns expressed by area stakeholders included sustainability, water quality, availability, access to alternative water supplies, and the possibility of water exportation. More groundwater research is needed in this study area to understand the nature and dynamics of the aquifers and to understand how much usable water is truly available for annual use.

The available data indicates that water is of sufficient quality in the study area to meet intended and projected uses. Water suppliers either use or are planning to use desalination to treat groundwater to meet drinking water standards. Surface and groundwater supplies are sufficient to meet the present needs during typical years and are projected to be sufficient to meet all future needs to 2030. The exception to this is the Irrigation surface water use category in the Rio Grande Valley during drought-of-record conditions. Another potential water supply problem for the study area is water exportation. It is unknown at this time how much, and from where, this water exportation may take place. Therefore, the potential effect this exportation will have on the water resources of the study area cannot be determined at this time.

The water supply and water quality issues identified in the report are not presently critical problems and are not anticipated to be critical problems during the next 25-year planning horizon, and it is concluded and recommended that the Hudspeth County PGMA study area should not be designated as a priority groundwater management area at this time. This does not mean that groundwater management would not be beneficial for the study area aquifers. Locally initiated creation of a groundwater conservation district (GCD) for the Hueco Bolson, Red Light Draw, Eagle Flat, Green River Valley, and Capitan Reef Complex aquifers, or adding these areas to an existing GCD are feasible and practicable groundwater management options for citizens of the study area to consider.

INTRODUCTION

To enable effective management of the state's groundwater resources in areas where critical groundwater problems exist or may exist in the future, the Legislature has authorized the Texas Commission on Environmental Quality (TCEQ), with assistance from other agencies, to study, identify, and delineate priority groundwater management areas (PGMAs), and to initiate the creation of groundwater conservation districts (GCDs) within those areas, if necessary.

Purpose and Scope

This report has been developed with input from the Texas Parks and Wildlife Department (TPWD) and Texas Water Development Board (TWDB). In December, 2004, TPWD submitted an evaluation of natural resources within Hudspeth County. And, in January, 2005, the TWDB submitted a report on the hydrogeology of Hudspeth County, including information regarding water supplies and demands within the county. Information from the Far West Texas (Region E) Regional Water Plan was also included in this report. This report serves as the basis of the Executive Director's recommendations to the Commission for action regarding designation of a priority groundwater management area, necessary management activities, and the need to create a groundwater conservation district.

Methodology and Acknowledgments

This report summarizes and evaluates data and information developed for the Hudspeth County area to determine if the area is experiencing or is expected to experience, within the next 25-year period, critical groundwater problems. By statutory definition, these critical groundwater problems can include shortages of surface water or groundwater, land subsidence resulting from groundwater withdrawal, and contamination of groundwater supplies.

Further, since the end-purpose of PGMA designation is to ensure groundwater management in areas of the state with critical groundwater problems, PGMA evaluation has not been initiated for areas presently within the jurisdiction of an existing GCD. The existing GCDs are authorized to adopt policies, plans, and rules to address critical groundwater problems.

The present report has been prepared using information contained in George and others, 2005, and El-Hage, 2004. Information was also taken from the Far West Texas (Region E) Regional Water Plan. Additionally, information provided by some of the major water-stakeholders in the area has also been used in the report.

Location, Climate, and Topography

The Hudspeth County study area is located in west Texas, bounded by the state of New Mexico on the north, by the Rio Grande and the state of Chihuahua, Mexico on the south, by El Paso County on the west, and by Culberson and Jeff Davis counties on the east (Figure 1). Located within the study area is the Hudspeth County Underground Water Conservation District (UWCD) No. 1 (Figure 1). Since the Hudspeth County UWCD No. 1 has authority to manage groundwater within its territory, it is not being considered for PGMA designation in this study.

The study area covers part of the Rio Grande Basin. The only incorporated city within Hudspeth County is Dell City with a 2000 population of 728 (TWDB, 2002). Other population centers in the county include the communities of Sierra Blanca (County Seat) and Fort Hancock. The 2003 population of

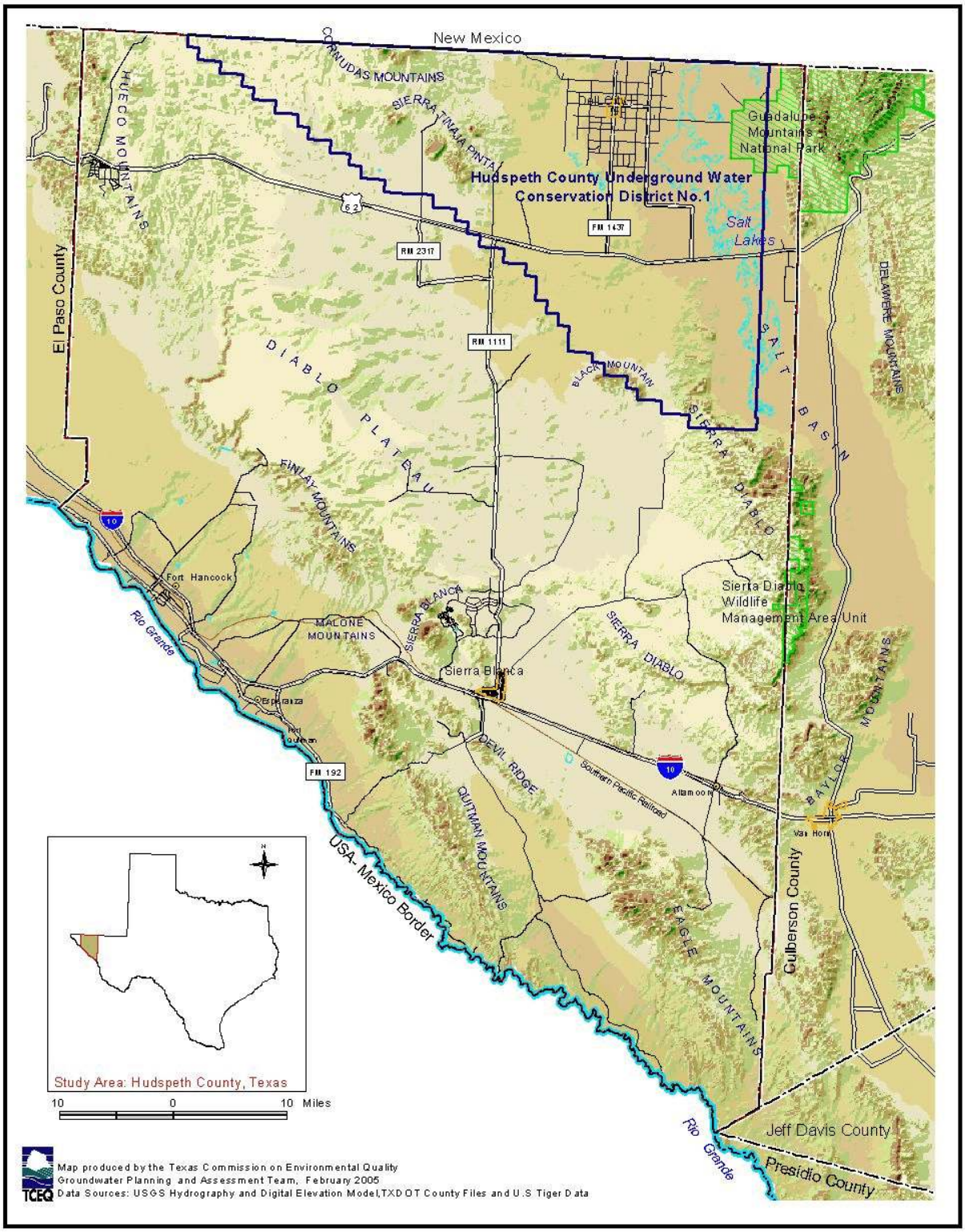

Figure 1. Location of the study area.

Hudspeth County was estimated to be 3,193 including the City of Dell City (U.S. Census Bureau, 2004). Hudspeth County has the lowest estimated per capita water demand of all the counties in the Far West Texas Regional Water Planning Area at 97 gallons per day (gpd). By comparison, the El Paso County estimated per capita water demand is 182 gpd (FWTRWPG, 2001).

Hudspeth County comprises 4,572 square miles, 3,670 square miles minus the Hudspeth County UWCD No. 1. The terrain varies from mountainous to nearly level with elevations ranging from 3,200 to 7,500 feet above sea-level. The study area is located within the Basin and Range physiographic province. The Basin and Range Province is a region of alternating, north-south-trending, faulted mountains and flat valley floors (USGS, 2005). Among the major physiographic features of the study area are the Quitman, Malone, Eagle, Finlay, Carrizo, and Hueco Mountains. Other major physiographic features include the Salt Basin and the flood plain of the Rio Grande (Figure 2).

Larkin and Bomar (1983) classify the climate of Hudspeth County as subtropical arid, with low rainfall and high evaporation creating drought conditions for all or parts of most years. Most of the rain in Hudspeth County falls from May to October in widely scattered thunderstorms. These thunderstorms, due to their convective nature, produce greater precipitation with increasing elevation (Gile and others, 1981). Precipitation averaged 15.64 and 16.95 inches, respectively, for quadrangle 602 (which covers the central part of the county) and quadrangle 702 (which cover the southern part of the county) from 1940 to 2002 (Figure 3). Evaporation rates in quadrangle 602 averaged 70.95 inches and 62.90 in quadrangle 702, based on monthly and annual gross lake surface evaporation data from 1954 through 2002. Maximum and minimum temperatures, averaged over forty years, are 80˚ and 45˚ F in the Hueco Bolson, 72˚ and 41˚ F in the Eagle Mountains, 78˚ and 45˚ F at Red Light Draw, and 77˚ and 44˚ F on the Diablo Plateau (Figure 4).

Early Water Use

Early European travelers and explorers to the area that would later become Hudspeth County learned to avoid springs frequented by the Mescalero Apaches. One of these springs was Indian Hot Springs, a place held sacred by the Apaches, who used the medicinal water to heal wounds. Two of the early explorers who passed by these springs were Fray Nicolás López and Lieutenant General Juan Domínguez de Mendoza, visiting the springs in 1683. Among the earliest Americans to cross the future county were John S. (Rip) Ford and Major Robert S. Neighbors. In 1849, Ford and Neighbors stopped at a series of springs in southeastern Hudspeth County that Neighbors called Puerto de la Cola del Águila, Spanish for "Haven of the Eagle Tail." The springs, known as Eagle Spring, became a stop for stagecoaches and wagon trains from 1854 to 1882. Other important watering places for nineteenth century travelers were Cottonwood Springs in northeastern Hudspeth County, where Captain Francisco Amangual reportedly camped en route from San Elizario to San Antonio in 1808; Washburn and Persimmon Springs, in the Cornudas Mountains on the Texas-New Mexico line; Cove Spring, in the Sierra Tinaja Pinta in northern Hudspeth County; and, Crow Springs, in northeastern Hudspeth County (these springs ceased flowing in the 1950s, due to the lowering of the water table by irrigation of cropland).

In the late 1940s, groundwater was discovered in the northeastern part of the county, setting off a minor agricultural boom in the Dell City area, but by the mid-1950s intensive pumping had significantly lowered the water table. From 1950 to 1954, total gross income in the agricultural towns of Acala, Esperanza, McNary, and Fort Hancock, in southwestern Hudspeth County, fell from $5,701,810 to $1,947,067, due to worsening water quality. During that period United Farms, just outside McNary, cut its workforce from 100 employees to three.

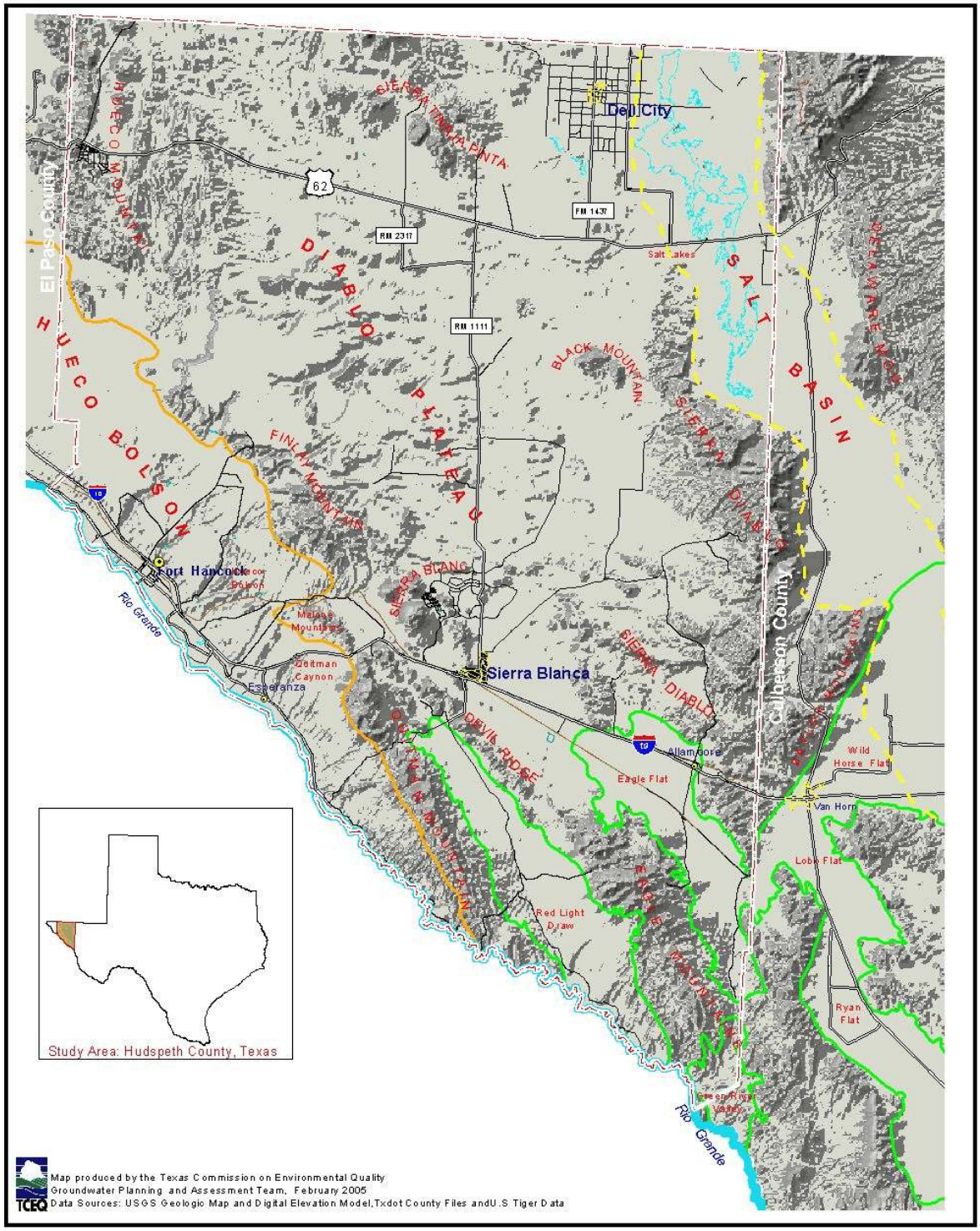

Figure 2. Physiographic map of the study area.

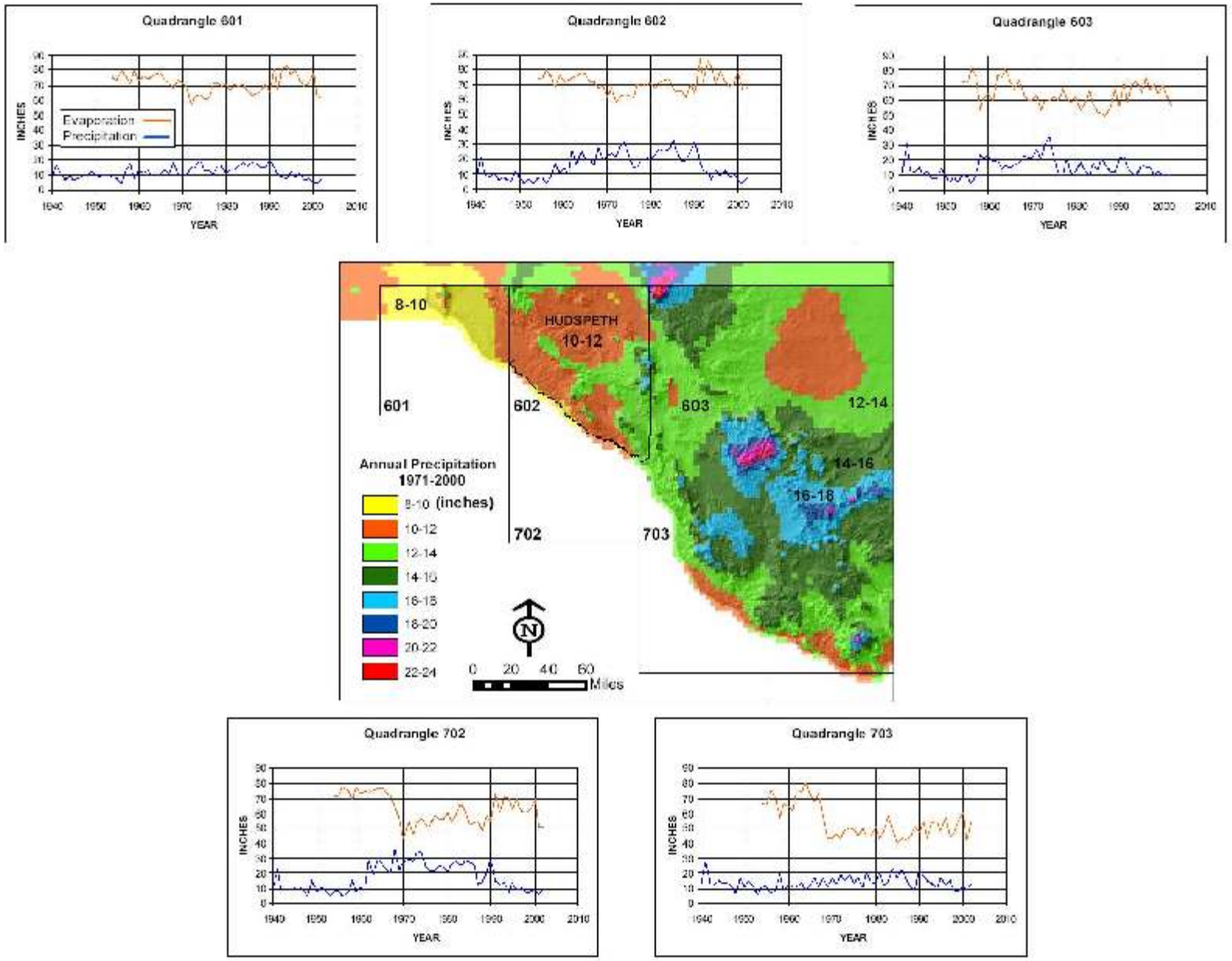

Figure 3. Precipitation and evaporation in Far West Texas (contour map based on data from the Spatial Climate Analysis Service, Oregon State University; data for graphs from monitoring sites operated by the National Weather Service and the Texas Water Development Board) (after George and others, 2005).

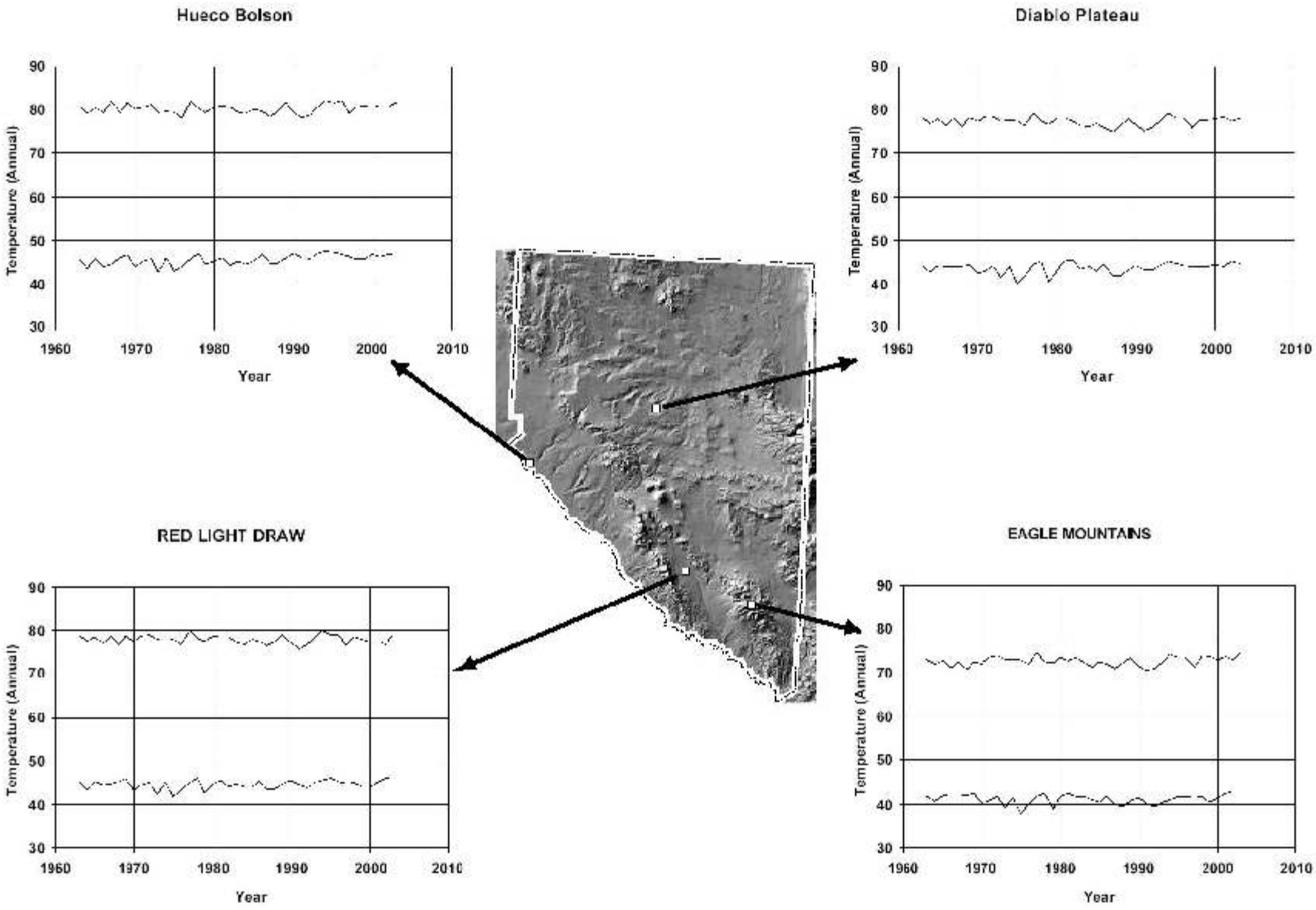

Figure 4. Maximum and minimum temperatures (degrees Fahrenheit) in selected areas of Hudspeth County (data from Spatial Climate Analysis Service, Oregon State University) (after George and others, 2005).