



1. Introduction

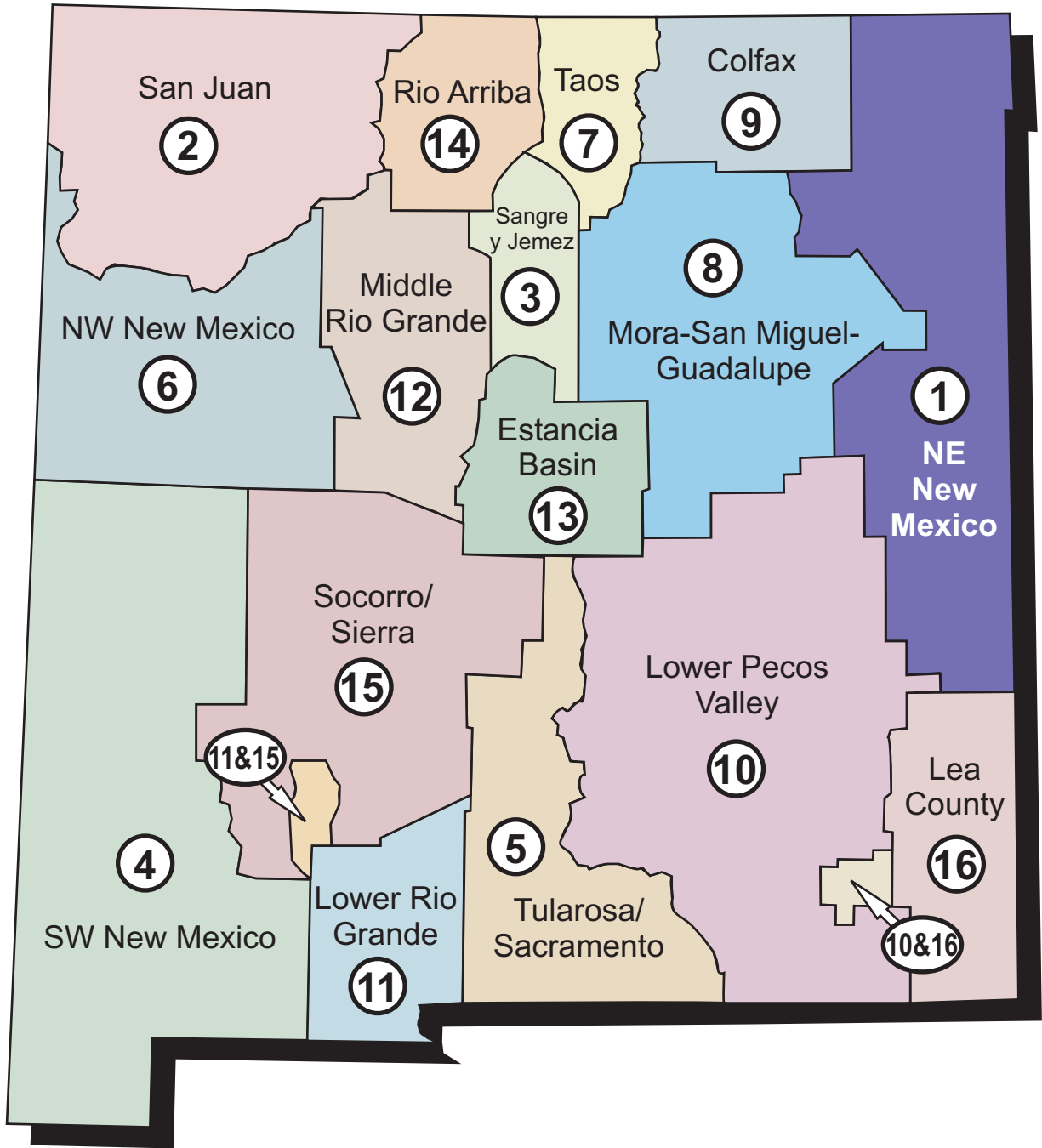
The Northeast New Mexico Water Planning Region (Northeast Region), which includes Union, Harding, Quay, Curry, and Roosevelt Counties (Figure 1-1), is one of 16 planning regions in the State of New Mexico. Regional water planning was initiated in New Mexico in 1987, with the purpose of protecting New Mexico water resources while ensuring that each region is prepared to meet future water demands. Regional water planning activities are funded through and overseen by the New Mexico Interstate Stream Commission (ISC).

The designated fiscal agent for the Northeast Region is the City of Tucumcari. The City retained the team of Daniel B. Stephens & Associates, Inc. (DBS&A), Sites Southwest, LLC, Sheehan, Sheehan and Stelzner, P.A., Amy C. Lewis, and Michael Barnes to complete this regional water plan, and activities to develop the plan were initiated by DBS&A in 2004. All of these regional water planning activities have been overseen by a steering committee consisting of representatives of the counties, municipalities, agricultural water users, state and federal agencies, and others with water interests in the region. Additional information on the composition of the steering committee is provided in Section 2.

Prior to the current water planning efforts, the Eastern Plains Council of Governments prepared a Regional Water Plan in 2000 (EPCOG, 2000). This plan did an excellent job of identifying regional visions and goals and strategies for addressing water resource needs; however, ISC required that additional technical emphasis should be included in future planning efforts. The area covered by the 2000 plan was larger than the current planning region, as it included Guadalupe County, the eastern portions of San Miguel County and De Baca County (except that portion below Sumner Dam on the Pecos River) in addition to the five counties in the current planning region (Union, Harding, Quay, Curry, and Roosevelt).

Regional water planning in New Mexico is guided by the template outlined in the ISC *Regional Water Planning Handbook* (NM ISC, 1994), which defines the scope and content of regional water plans. According to the template, a regional water plan must address five key questions:

1. What is the water supply available to the region?



Explanation

① ISC Planning Region

**NORTHEAST NEW MEXICO REGIONAL WATER PLAN
Location of Northeast New Mexico
Water Planning Region**

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4. What is the region's current and projected future demand for water?
5. What are the region's alternatives for using available supplies to meet projected water demands?
6. What are the advantages and disadvantages of each alternative with respect to local values and criteria?
7. What are the best water supply alternatives, and how will they be implemented?

This regional water plan is organized to be consistent with the regional water planning template (NM ISC, 1994) and to address these five water planning questions:

- Background information regarding the process used to develop the plan and the characteristics of the planning area are provided in Sections 2 and 3, respectively.
- To address the first question, this water plan discusses both the water rights and legal constraints that affect the availability of water (Section 4) and the physical availability of surface and groundwater, as well as water quality constraints (Section 5).
- To address the second question, historical and current regional water demand was evaluated, projected population and economic growth were analyzed, and projections of future water demand were developed, as presented in Section 6.
- A discussion of the ability of the water supply to meet projected demand is included in Section 7.
- To address questions 3 through 5, the final section specified in the ISC handbook (NM ISC, 1994) is an analysis of possible alternatives for closing the gap between supply and demand and a list of recommendations for further action. This information is included in Section 8.



1.1 Regional Water Planning Issues

The Northeast Region is faced with some unique challenges when compared to other planning regions in New Mexico. Some of the key water issues facing the planning region, which are further discussed in subsequent sections of this document, are:

- *Long-term water supply availability.* All municipal water in the planning region is currently supplied by groundwater. A significant portion of the planning region's groundwater supply comes from the Ogallala aquifer, where declining water levels and projected dewatering of portions of this aquifer indicate the need for additional monitoring and careful management practices. The southern portion of the planning region is anticipating that the Eastern New Mexico Rural Water System project, where water will be imported from Ute Reservoir, will be a means to transition to a renewable water resource. Individuals in Harding County are also interested in using a renewable surface water source as a future water supply.
- *Infrastructure needs.* Upgrades to address aging infrastructure are needed in communities throughout the region. The Village of Des Moines is in need of a new water source and has identified drilling a new well in the Capulin Basin as the favored alternative. The Village's need is seen as a priority by the entire region. In addition, the Village of Des Moines' distribution system is believed to be leaking and in need of repair, and the possibility of implementing a regional system serving the Villages of Des Moines, Folsom, Grenville, and Capulin is being discussed.
- *Protection of water rights.* Most of the planning region has not been adjudicated (Section 4), and the resulting uncertainties regarding water rights ownership create complexities in the planning process. Efforts to protect water rights and ensure that water resources remain within the planning region were identified as priorities during the planning process. Of particular concern is protection of water rights and water resources along the Texas border



- *Water quality.* Stakeholders have expressed considerable interest in protecting water quality. Dairies, cattle and hog feedlots, and septic systems are some of the potential sources of groundwater contamination in the area. Protection of water quality in the vicinity of Ute Reservoir is a key concern.
- *Rangeland and watershed management.* Although the bulk of the needs in this region are met by groundwater, the need for rangeland and watershed management to protect water quality and potentially to reduce riparian depletions is seen as an important component of the planning effort. There is consensus in the region that all salt cedar removal efforts should be supported.
- *Drought vulnerability.* Although the bulk of the needs in this region are met by groundwater, there is still concern over drought vulnerability. Surface water currently supplies agricultural users in the Arch Hurley Conservancy District on the Canadian River and along the Dry Cimarron and is expected to supply municipalities in the eastern portion of the region (through the Eastern New Mexico Rural Water System) in the future.
- *Economic development.* The region is pursuing economic development opportunities, including tourism, recreation, and commercial and or industrial development. Ensuring that long-term supplies are adequate to support the growth and vitality of the region is a key concern.
- *Data gaps.* Lack of information about water use, water depletions, and extent of water resources causes uncertainty in water planning efforts, especially regarding the amount of remaining groundwater.

1.2 Data Sources

As mentioned above, prior to the beginning of this planning effort in 2004, the Eastern Plains Council of Governments prepared a regional water plan for a larger planning area that included the current Northeast Region (EPCOG, 2000). This plan, which focused on recommendations



for augmenting supplies in the region, was a key source of information for the current planning effort. Other reference materials pertaining to the water supply and water quality in the Northeast Region were compiled and reviewed; these materials are cited throughout this report and listed in the References section. Some of the key publications used in DBS&A's evaluation include:

- Baldwin and Bushman (1957) evaluated the feasibility for groundwater development in Union County.
- Trauger and Bushman (1964) reported on the geology and groundwater around Tucumcari, in Quay County.
- Berkstresser and Mourant (1966) described the groundwater resources and geology of Quay County.
- Cooper and Davis (1967) explained the occurrence and quality of groundwater in Union County.
- Lansford et al. (1982) performed a High Plains-Ogallala aquifer study.
- As a part of the U.S. Geological Survey (USGS) Regional Aquifer System Analysis (RASA) Program:
 - Gutentag et al. (1984) described the geohydrology of the High Plains aquifer.
 - Luckey et al. (1986) digitally simulated groundwater flow in the High Plains aquifer.
 - Luckey et al. (1988) discussed the effects of future groundwater pumpage on the High Plains aquifer.
 - Weeks et al. (1988) summarized the full High Plains RASA study.



- Broadhead (1987) described regional geology while researching the occurrence of carbon dioxide in Union and Harding Counties.
- Kilmer (1987) detailed the water-bearing characteristics of geologic formations in northeastern New Mexico and southeastern Colorado.
- Trauger and Churan (1987) discussed the geohydrology of Harding County.
- Gustavson (1996) described the depositional systems and geology of the Ogallala and Blackwater Draw Formations.
- Wood (2000) studied groundwater recharge in the Southern High Plains (Ogallala) aquifer.
- DBS&A (2003) modeled groundwater availability in the Ogallala aquifer.

In addition to these published sources, much of the information used in DBS&A's water supply and water quality assessment was derived from climate and hydrologic records available electronically from state and federal agencies:

- Climate data were obtained from the Western Regional Climate Center web site (<<http://www.wrcc.dri.edu/summary/mapnm.html>>).
- Streamflow and depth to water well data were obtained from the USGS web site (<<http://waterdata.usgs.gov/nm/nwis>>; <<http://nwis.waterdata.usgs.gov/nm/nwis/gwlevels>>).
- Water quality data were obtained from the New Mexico Environment Department (NMED) web site (<http://www.nmenv.state.nm.us/swqb/PSRS/NPDES_Permits/psrlist.pdf>; <<http://www.nmenv.state.nm.us/ust/leakcity.html>>; <<http://www.nmenv.state.nm.us/wqcc/303d-305b/2004/index.html>>).



- Information on water rights and wells was obtained from the New Mexico Office of the State Engineer (OSE) Water Administration Technical Engineering Resource System (WATERS) database (<http://www.ose.state.nm.us/waters_db_index.html>).
- Monthly Palmer Drought Severity Index (PDSI) data from 1900 through 2005 were obtained from the NOAA National Climatic Data Center web site (<<http://lwf.ncdc.noaa.gov/oa/climate/onlineprod/drought/xmrg1.html>>).

In addition to the above electronic information, other unpublished information obtained for this water planning effort included the following:

- Land use, geology, and other reference maps were provided by the New Mexico Water Resources Research Institute (WRI) (Appendix A) and by DBS&A geographic information system (GIS) technical staff.
- Information on water rights and administrative decrees was provided by OSE staff and Sheehan, Sheehan, and Stelzner, P.A., who prepared the majority of Section 4 of this water plan.
- Although information on historical water use was obtained primarily from OSE water use reports (Sorensen, 1977; Sorensen, 1982; Wilson, 1986; Wilson, 1992; Wilson and Lucero, 1997; Wilson et al., 2003), records regarding municipal water use were obtained directly from the municipalities, and records regarding agricultural and livestock water use were obtained from the New Mexico Department of Agriculture (NMDA), U.S. Department of Agriculture (USDA), and New Mexico Agricultural Statistics Service (NMASS).

Additional information on the sources of data and information used in this plan is included in Sections 4 through 8.