

Colfax Regional Water Plan

Volume 2: Appendices A Through K



Prepared for:

**Colfax Soil and Water
Conservation District
Raton, New Mexico**

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Appendix A
Bibliography

Colfax Water Plan Bibliography

Author	Report Date	Title	Publishing Information
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Ballance, W.C.	1967	Arkansas River basin – Geography, geology, and hydrology.	pp. 13-23 In New Mexico State Engineer Office (comp.), Water resources of New Mexico: Occurrence, development and use. State Planning Office, Santa Fe, New Mexico.
Bartolino, J.R., L.A. Garrabrant, M. Wilson, and J.D. Lusk	1996	Reconnaissance investigation of water quality, bottom sediment, and biota associated with irrigation drainage in the Vermejo Project area and the Maxwell National Wildlife Refuge, Colfax County, northeastern New Mexico, 1993.	Water-Resources Investigation Report 96-4157, U.S. Geological Survey, Albuquerque, New Mexico
Bondurant, D.C., Jr.	1936	Report on existing irrigation works in the south Canadian river watershed above the Conchas Dam	U.S. Engineer Office, Tucumcari, New Mexico
Clark, K.F., and C.B. Read.	1972	Geology and ore deposits of Eagle Nest area, New Mexico.	New Mexico Bureau of Mines and Mineral Resources Bulletin 94. 152p.
Clark, Kenneth F.	1966	Geology of the Sangre de Cristo Mountains and adjacent areas, between Taos and Raton, New Mexico	In Northop, S.A., and C.B. Read (eds.), <i>Guidebook of Taos--Raton--Spanish Peaks Country, New Mexico and Colorado</i> . New Mexico Geological Society, Guidebook, 17th Field Conference
Colpitts, R.M., Jr. and C.T. Smith	1990	Geology of the Moreno Valley, Colfax County, New Mexico	pp 219-228. In <i>Southern Sangre de Cristo Mountains, New Mexico</i> , New Mexico Geological Society Guidebook, 41st Field Conference.
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Ewing, R.C., and B.S. Kues (eds.)	1976	Guidebook of Vermejo Park, Northeastern New Mexico.	New Mexico Geological Society Guidebook, 27th Field Conference.
Geldon, Arthur L.	1989	Ground-water hydrology of the Central Raton Basin, Colorado and New Mexico.	U. S. Geological Survey Water-Supply Paper 2288.
Geldon, Arthur L., and P.O. Abbott	1985	Selected climatological and hydrologic data, Raton Basin, Huerfano and Las Animas Counties, Colorado, and Colfax County, New Mexico	U.S. Geological Survey Open-File Report 84-138
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Griggs, Roy L.	1948	Geology and ground-water resources of the eastern part of Colfax County, New Mexico	Ground-Water Report 1. New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.
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Hart, D.L., Jr., and C. Smith	1979	Ground water in the vicinity of Capulin, New Mexico.	U.S. Geological Survey Water-Resources Investigations 79-79.
Hirsch, Richard J.	1988	Impacts to nearby wells from the diversion of 85 acre-feet/annum from CR-1020 & proposed supplemental well CR-1020-S, Val Verde Ranch Subdivision, Moreno Valley, Colfax County, New Mexico	Technical Division Hydrology Report 88-13, New Mexico State Engineer Office. October 1988
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Jenkins, David N.	1981	Geohydrology in the vicinity of the proposed Vistas de Cintas Subdivision, Colfax County, New Mexico	Water Futures, Albuquerque, New Mexico. November 1981
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Kilmer, L.C.	1987	Water-bearing characteristics of geologic formation in northeastern New Mexico-southeastern Colorado	In Lucas, S.G., and A.P. Hunt (eds.), <i>Northeastern New Mexico</i> . New Mexico Geological Society, Guidebook, 38th Field Conference
Lee Wilson and Assoc.	1989	Aquifer Sensitivity Map, Colfax County, NM	Prepared for the New Mexico Environmental Improvement Division
Leyenberger, T.L.	1983	Precambrian geology of Cimarron Canyon, Colfax County, New Mexico	Master of Science Thesis, University of New Mexico, Albuquerque, New Mexico
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Trauger, F.D. and T.E. Kelly	1987	Water resources of the Capulin topographic basin, Colfax and Union Counties, New Mexico	pp 285-293. In Lucas, S.G., and A.P. Hunt (eds.), <i>Northeastern New Mexico</i> . New Mexico Geological Society, Guidebook, 38th Field Conference



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Citation	Annotation
<p>Ballance, W.C. 1967. Arkansas River Basin: Geography, geology, and hydrology. pp. 13-23 <i>In Water resources of New Mexico: Occurrence, development and use</i>. New Mexico State Engineer Office, State Planning Office, Santa Fe, New Mexico.</p>	<p>This document provides a general overview of geographic, geologic, and hydrologic aspects of the New Mexico portion of the Arkansas River Basin, which includes all or parts of Colfax, Union, Mora, Harding, San Miguel, Quay, Guadalupe, and Curry Counties. The geographic description notes that, of the six streams draining the area, only the Canadian River is perennial and only in its upper reaches. The geologic description includes a generalized stratigraphic section noting each formation's distribution, physical properties, and water-bearing characteristics. The hydrologic description primarily focuses on surface water, and an estimate of 583,420 acre-feet annual surface water supply was determined for the entire basin area within the state. Of this total, about 471,420 acre-feet are furnished by the Canadian River and its tributaries. Information on reservoir storage totaling 541,300 acre-feet is also provided. Water quality data for groundwater from selected wells in alluvium and the Dakota Sandstone are provided.</p>
<p>Bartolino, J.R., L.A. Garrabrant, M. Wilson, and J.D. Lusk. 1996. <i>Reconnaissance investigation of water quality, bottom sediment, and biota associated with irrigation drainage in the Vermejo Project area and the Maxwell National Wildlife Refuge, Colfax County, northeastern New Mexico, 1993</i>. Water-Resources Investigations Report 96-4157, U.S. Geological Survey, Albuquerque, New Mexico.</p>	<p>This report describes an investigation conducted in 1993 to assess the effects of the Vermejo Irrigation Project, located near Maxwell, New Mexico, on water quality in the area. The purpose of the project was to determine whether irrigation drainage has caused or has the potential to cause significant harmful effects on human health, fish, and wildlife and whether irrigation drainage may adversely affect the suitability of water for other beneficial uses. Samples of water, sediment, and biota were collected from 16 sites in and around the Vermejo Irrigation Project before, during, and after the 1993 irrigation season.</p> <p>Water, sediment, and biota (plants, invertebrates, fish, and fish fillets) were collected and analyzed for inorganic constituents, and 2 sediment samples and 28 fish samples were analyzed for organic compounds (mainly pesticide residues). Concentrations of inorganic analytes were generally within established guidelines or expected concentrations for water, sediment, and biota. Three organic compounds were detected in the sediment samples (DDD, DDE, and chlordane) while no organic compounds were detected in the 28 fish samples. In general, this study found that irrigation return flows were not related to adverse effects in biota.</p>
<p>Ewing, R.C., and B.S. Kues (eds.). 1976. <i>Guidebook of Vermejo Park, northeastern New Mexico</i>. New Mexico Geological Society Guidebook, 27th Field Conference.</p>	<p>This document is a compendium of short papers on the stratigraphy, structure, and depositional history of the Vermejo Park area. Surficial geologic maps and cross sections are included. Information on oil and gas exploration and coal production is also included.</p>



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Citation	Annotation
<p>Geldon, A. L., and P.O. Abbott. 1985. <i>Selected climatological and hydrologic data, Raton Basin, Huerfano and Las Animas Counties, Colorado, and Colfax County, New Mexico</i>. U.S. Geological Survey Open-File Report 84-138</p>	<p>This publication is a compilation of data for the Raton Basin of which the Canadian River drainage is a part. The authors and others had conducted previous studies in the area. Almost all of the data in the publication are from Colorado. Of interest to Colfax regional water planning are some of the evaporation data and water quality data from Colorado. Transmissivity data from slug injection tests on a few wells in Colfax County is included (p.199).</p>
<p>Gordon Herkenhoff & Associates, Inc., and W.K. Summers & Associates. 1977. <i>Geology and hydrology of a site proposed for burial of low-level solid radioactive waste, Western Colfax County, New Mexico</i>. Prepared for Chem-Nuclear New Mexico, Inc., Albuquerque, New Mexico.</p>	<p>The report discusses local geologic, hydrologic, and climatic conditions as they pertain to evaluation of a potential waste disposal site located northeast of Cimarron and about 8 miles west of Maxwell. The climatic summaries are useful but do not include post-1977 data. The report includes surficial geologic maps and cross sections. The report also includes estimated recharge rates and a synthesis of streamflow characteristics in the Upper Canadian River Basin. The investigators estimated an average surface water discharge of 4.3% of total precipitation.</p>
<p>Griggs, Roy L. 1948. <i>Geology and ground-water resources of the eastern part of Colfax County, New Mexico</i>. Ground-Water Report 1, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.</p>	<p>This document provides an overview of the geography, climate, and geology of the eastern half of the county, including detailed descriptions of stratigraphy and geologic formation characteristics plus structural geology and physiography. Groundwater conditions are described in detail for each water-bearing formation, including information on water levels, well yields, and water quality. Public water supplies (ca. 1948) are described and a groundwater availability map is provided (Plate 3) that includes locations of known wells and springs and boundaries of 16 separate groundwater production areas. Documented well and spring records include locations, elevations, well depths, water levels, and spring yields (Tables 1, 2, and 4). Groundwater quality information is provided in Table 7, and surface water quality is provided in Table 8. At the time of this report, most groundwater was produced for domestic or stock wells. Major groundwater resources discussed include an estimated 50 million acre-feet in the Dakota Sandstone Formation and 160,000 acre-feet in the Ogallala Formation. A structural contour map of the Dakota Sandstone is included in the report.</p>
<p>Kilmer, L.C. 1987. Water-bearing characteristics of geologic formation in northeastern New Mexico-southeastern Colorado. pp. 275-279 <i>In</i> Lucas, S.G., and A.P. Hunt (eds.), <i>Northeastern New Mexico</i>. New Mexico Geological Society, Guidebook, 38th Field Conference.</p>	<p>This document describes the geologic formations present in the study area that host known aquifers, with particular emphasis on their water-bearing properties. The described formations pertinent to Colfax County include alluvium, volcanics, the Ogallala and Dakota Formations, and Permo-Pennsylvanian clastics (Sandia, Madera, and Sangre de Cristo Formations). Information on aquifer and formation thicknesses, well yields, and transmissivity, storage, specific capacity, and general water quality is provided in Table 1. Fairly detailed discussions of the Dakota Sandstone and Ogallala Aquifers are provided, with more cursory descriptions of the other formations.</p>



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Citation	Annotation
<p>Moody, T., M. Wirtanen, K. Knight, and W. Odem. <i>Integrating regional relationships for bankfull stage in natural channels of Arizona and New Mexico: Draft integration report</i>. Northern Arizona University, College of Engineering and Technology, Department of Civil and Environmental Engineering, Water Resources Engineering Laboratory. May 2000.</p>	<p>The Executive Summary of this report states the following: "Over the past four years research by the College of Engineering and Technology at Northern Arizona University have conducted studies to determine regional relationships of bankfull stage in the arid southwest. Two studies were completed; one in central and southern Arizona and one in New Mexico. The studies included survey data from 139 perennial, intermittent, and ephemeral stream channel sites. Drainage areas ranged from 1 to 5000 square miles. The studies reached similar set of conclusions: 1) consistent alluvial features representing bankfull stage are evident in the study channels and can be identified in the field, 2) bankfull stage represents flows with recurrence intervals of between 1.0 and 2.0 years with an average of 1.5 years but varies widely within the region, and 3) hydro-physiographic provinces could be identified that were defined by distinct regional relationships of bankfull channel geometry. The purpose of this paper is to integrate the data from those studies to develop a set of relationships that apply to the larger geographical area."</p> <p>The primary use of the data compiled and analyzed in this paper will be to estimate parameters for those streams in New Mexico that do not have gaging stations. From watershed area, one may determine numerous characteristics, including bankfull discharge, that will provide better estimates of annual discharge.</p>
<p>Moyer, D.L. 1998. <i>Influence of livestock grazing and geological setting on morphology, hydrology, and nutrient retention in four southwestern riparian-stream ecosystems</i>. Master of Science Thesis, University of New Mexico, Albuquerque, New Mexico. August 1998, 79p.</p>	<p>The objective of the thesis was to take an ecosystem approach to determine how livestock grazing influences the structure and function of the riparian-system ecosystem with respect to morphology, hydrology, and nutrient retention. Four field study sites were selected: the Rio Peñasco in the Lincoln National Forest of south-central New Mexico, Chihuahueros Creek and Rio Las Vacas in the Santa Fe National Forest, and Rio de Don Fernando in the Carson National Forest. The Rio de Don Fernando is the stream closest to the study area of Colfax County.</p> <p>The results of the study show that livestock grazing directly affects the channel's structure. The effects include changes in width, changes in depth, changes in width to depth ratios, changes in plant cover, and changes in in-channel vegetation. However, not all effects were significant. The results of the thesis work do not have a direct bearing on the development of the Colfax water plan. However, the results do show that grazing affects stream channels and associated vegetation and system function.</p>
<p>New Mexico Interstate Stream Commission and New Mexico State Engineer Office. 1975. <i>County profile, Colfax County: Water resources assessment for planning purposes</i>. Santa Fe, New Mexico.</p>	<p>This document includes a very general profile of the natural and human resources of Colfax County. Three alternative water demand projections, to the year 2020 were computed. The document indicates that except for 1 square mile in the Rio Grande Basin, Colfax County lies within the Arkansas-White-Red River Basin. Because the report was prepared in 1975, it is limited in its usefulness for providing current information.</p>



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Citation	Annotation
<p>Pierce, Steven T. 1986. <i>Intensive survey of Cieneguilla Creek, Sixmile Creek, Moreno Creek and the Cimarron River near Angel Fire and Eagle Nest, Colfax County, New Mexico, September 10-12, and November 6, 1985.</i> EID/SWQ-86/8, Surveillance and Standards Section, Surface Water Quality Bureau, New Mexico Environmental Improvement Division, Santa Fe, New Mexico. May 30, 1986.</p>	<p>This report describes a water quality survey of eight stations along Cieneguilla Creek, Sixmile Creek, Moreno Creek, and the Cimarron River. Chemical, physical, and biological data collected during this intensive survey are presented and discussed.</p> <p>The objectives of the survey were to (1) assess the water quality of Cieneguilla Creek, including any effects of the sewage lagoons or land-applied effluent in Angel Fire, (2) assess the water quality of Moreno and Sixmile Creeks near where they enter Eagle Nest Lake, and the Cimarron River near the point of discharge from Eagle Nest dam, and (3) determine whether water quality standards are attained in these river sections.</p> <p>The conclusion reached was that water from Cieneguilla, Moreno, and Sixmile Creeks and the Cimarron River were generally of high quality during the study period. However, following a heavy rain event, violations of the numeric water quality standard for fecal coliform bacteria occurred at five of the eight sampling stations. Only the Cimarron River and the two upper stations on Cieneguilla Creek did not violate the standard. There were also three violations of the dissolved oxygen standard: two on the Cimarron River and one at a station on Cieneguilla Creek just below the sewage lagoons near Angel Fire.</p>
<p>Resource Technology, Inc. 1991. <i>Colfax County Regional Water Plan.</i> Prepared for Colfax Soil and Water Conservation District, Raton, New Mexico.</p>	<p>The primary purpose of this regional water plan, as stated in the document, was “. . . to evaluate existing water supplies in relation to existing and anticipated future water uses, and to identify actions necessary for meeting the water needs of Colfax County over the next 40 years.” Accordingly, the report details the demographic, physiographic, and hydrologic characteristics of Colfax County.</p> <p>The study leading to the report used a model with the acronym SIMYLD-II River Basin Simulation. Although the details of the model were not presented in the report, it is clear that the model is a mass balance type. Input to the model included information on system configuration (as used in the report, <i>system</i> refers to the hydrologic system and the entire natural and human-built components), including locations of ponds, lakes, flow gaging points, withdrawal points and proposed water projects and the amount of water at or passing through each of those points during the selected time period. This is a common approach to modeling water resources and is not unique to this particular computer code.</p> <p>Input data were developed for the Cimarron and Canadian River basins. The scenario modeling considered that water demands would come from:</p> <ol style="list-style-type: none"> 1. Municipal and rural domestic 2. Irrigation 3. Livestock and stock pond evaporation 4. Mining 5. Stream reach losses



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Citation	Annotation
<p>Resource Technology, Inc. 1991. <i>Colfax County Regional Water Plan</i>. Prepared for Colfax Soil and Water Conservation District, Raton, New Mexico. (continued)</p>	<p>6. Pond, lake, and reservoir evaporation 7. Recreation and fish and wildlife</p> <p>Not included were low flow or minimum in-stream flow requirements, as they were not established at the time of the study. The modeling application included 13 assumptions such as all demands being based on total withdrawals because return flows could not be adequately quantified or assured.</p> <p>The period of record used in the scenario modeling was 1951 through 1988. This period was used because it included some severe drought years.</p> <p>The model was applied to the Cimarron and Canadian River Basins under three different scenarios each. The scenarios included existing conditions and changes in operations at Eagle Nest Reservoir and Lake Maloya. In every scenario, and at almost every node (location), water shortages occurred, even for the existing conditions scenario. Water use by agriculture comprised nearly all of the water demands. A finding of the report is that significant reduction (but not elimination) of shortages may be realized through additional storage of runoff in new or existing reservoirs.</p>
<p>Robinson, G.D., A.A. Wanek, W.H. Hays, and M.E. McCallum. 1964, <i>Philmont country: The rocks and landscape of a famous New Mexico ranch</i>. Geological Survey Professional Paper 505.</p>	<p>This publication includes descriptions of the physiography, climate, geology, geomorphology, and stream systems of the Philmont Ranch near Cimarron. The publication is written from an educational perspective with clear descriptions of geologic processes and photographs of geologic formations.</p>
<p>Trauger, F.D. and T.E. Kelly. 1987. Water resources of the Capulin topographic basin, Colfax and Union Counties, New Mexico. pp 285-293. In Lucas, S.G., and A.P. Hunt (eds.), <i>Northeastern New Mexico</i>. New Mexico Geological Society, Guidebook, 38th Field Conference.</p>	<p>This document describes the geology and hydrology of the Capulin Basin and the results of a 1975 study of the groundwater resource there, performed by the authors for Plains Electric Generation and Transmission Cooperative, Inc. They found that the aquifer occurs in Quaternary-age alluvial deposits and volcanic rocks that overlie low-permeability Cretaceous age-shales and fine-grained sandstones of the Niobrara Formation. The porosity of the highly jointed and broken basalt flows and scoria deposits associated with numerous volcanic cinder cones was estimated to be as high as 50%, providing highly transmissive pathways for direct recharge to the aquifer. The alluvium consists of fine- to medium-grained sand and fine gravel which is also highly porous and transmissive. The aquifer has a maximum thickness of at least 180 feet, thinning to 20 feet thick under much of the alluvial plain. Recharge was estimated at 20% of the annual precipitation rate of 15 to 20 inches, and the total resource was estimated at 740,000 to 900,000 acre-feet in storage, assuming 40% porosity.</p>



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Citation	Annotation
<p>U.S. Bureau of Reclamation (?). 1982. <i>Vermejo project, New Mexico: Colfax County</i>. Southwest Region Bureau of Reclamation.</p>	<p>This eight-page description of the Vermejo River Project near Maxwell, New Mexico includes information on the plan, development, benefits and engineering data of the project. Water is diverted from the Vermejo River upstream from Cortez and conveyed to Stubblefield Reservoir (capacity of about 16,000 acre-feet) and Reservoir No. 2 (capacity of about 2,900 acre-feet). The diversion has a capacity of about 600 cfs that can be divided equally into the two reservoirs. To the north of the project area, the flow of Chico Rico Creek is diverted, along with some additional intercepted drainage, through the Eagle Tail Canal into the project area. Eagle Tail Canal has a capacity of 300 cfs. In addition, there are other reservoirs in the project area for holding and distributing the irrigation water.</p> <p>Project development first began in 1888. The formal Federal contributions to the project begin with an authorization in 1950. The number of irrigable acres is 7,379. The number actually irrigated varies from less than 1,000 to more than 6,000 depending on the weather and flow conditions. For example, during the drought year of 1977, only 665 acres were irrigated (the data in the report only go through 1981). Irrigation uses include alfalfa, pasture, wheat, barley and oats. Included in the description are one-page plan and sections for Stubblefield Dam (i.e., Reservoir), Vermejo Diversion Dam, Dam No.2, and Dam No. 13.</p>
<p>Village of Eagle Nest. 1994. <i>The Village of Eagle Nest 40 year water plan</i>. April 1994.</p>	<p>The plan is not dated but appears to have been prepared by the Village of Eagle Nest in 1993. Water use projections to the year 2033 are included in the plan. Projected development includes small resort development and 3.4% residential and commercial growth. Low and high projections for water use in 2033 were 222 and 287 acre-feet, respectively.</p>

Appendix B
NMWRRI Maps

Colfax County Water Plan Planning Region

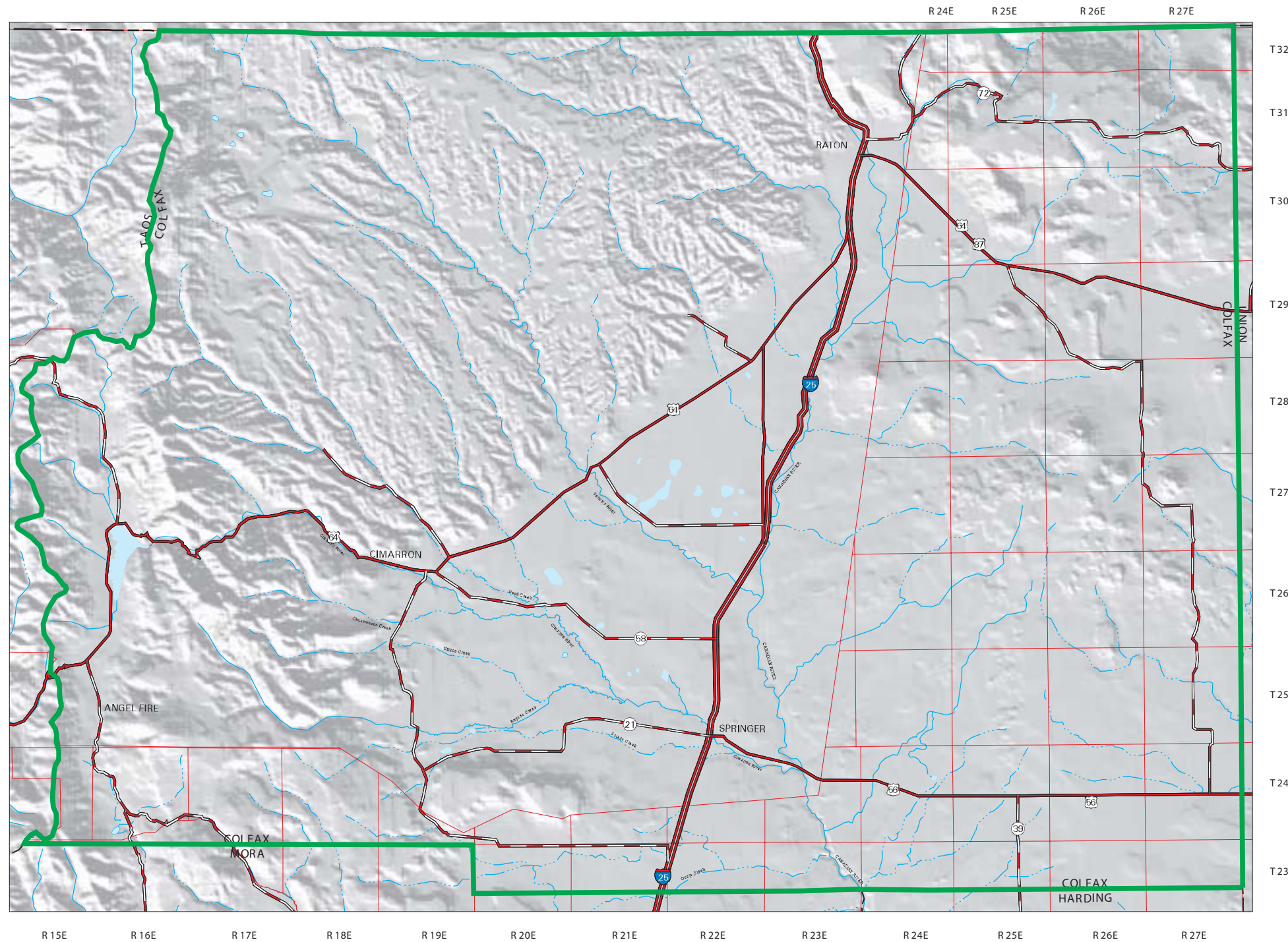
Figure B-1

Produced by New Mexico Water Resources Research Institute, April 2002
Base map prepared by the U.S. Geological Survey

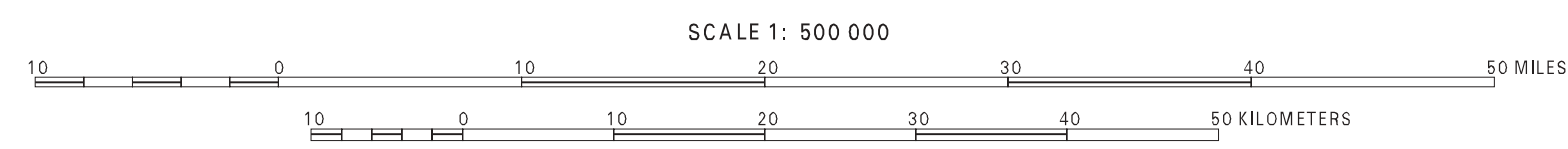
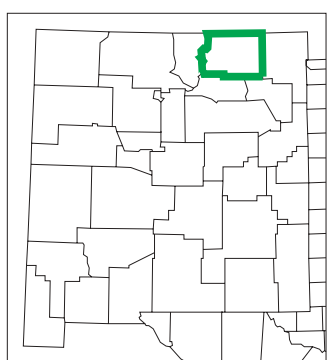
Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Shaded relief provided by RGIS and is based on 1:250,000 Digital Elevation Models (DEMs) created by the U.S. Geological Survey. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



- Explanation**
- State Line
 - County Line
 - Perennial Stream/River
 - Intermittent Stream
 - Interstate
 - U.S. Highway
 - State Highway
 - Township/Range
 - Planning Region



Colfax County Water Plan Landownership in the Region

Figure B-2

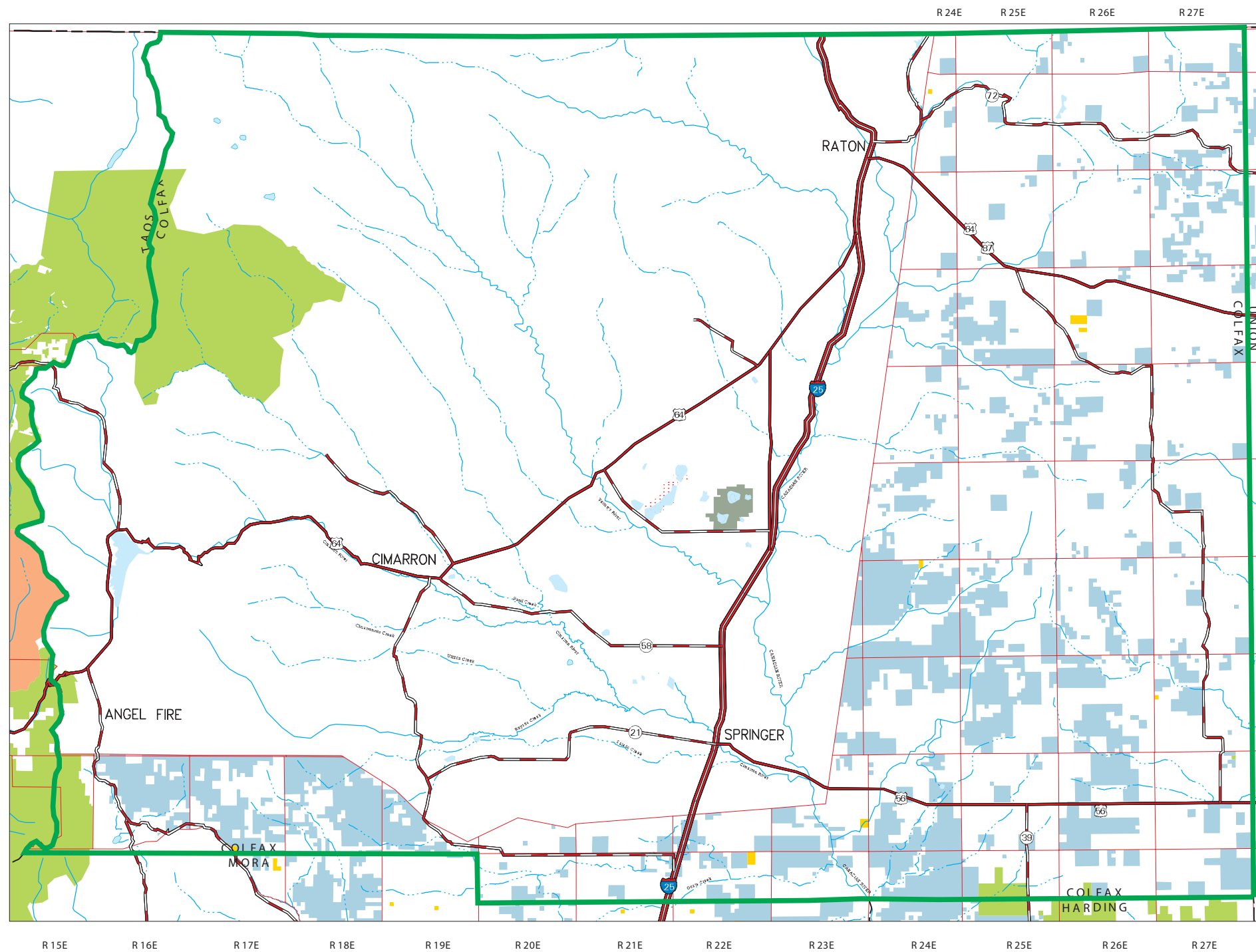
Produced by New Mexico Water Resources Research Institute, April 2002

Base map prepared by the U.S. Geological Survey

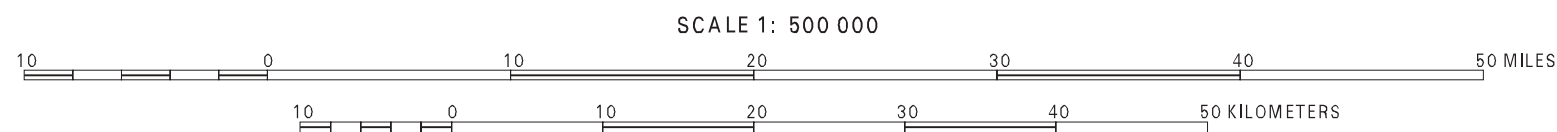
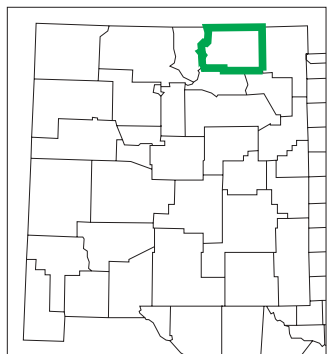
Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Land ownership coverage developed by the BLM at 1:100,000 scale. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



Explanation	
	State Line
	County Line
	Perennial Stream/River
	Intermittent Stream
	Interstate
	U.S. Highway
	State Highway
	Township/Range
	Planning Region
	Dept. of Agriculture
	BLM Public Land
	Bureau of Reclamation
	Forest Service
	US Fish & Wildlife
	Indian and Tribal Lands
	Dept. of Defense
	National Parks Service
	Dept. of Energy
	Private
	State Land
	State Park
	NM Game & Fish



Colfax County Water Plan

Landuse in the Region

Figure B-3

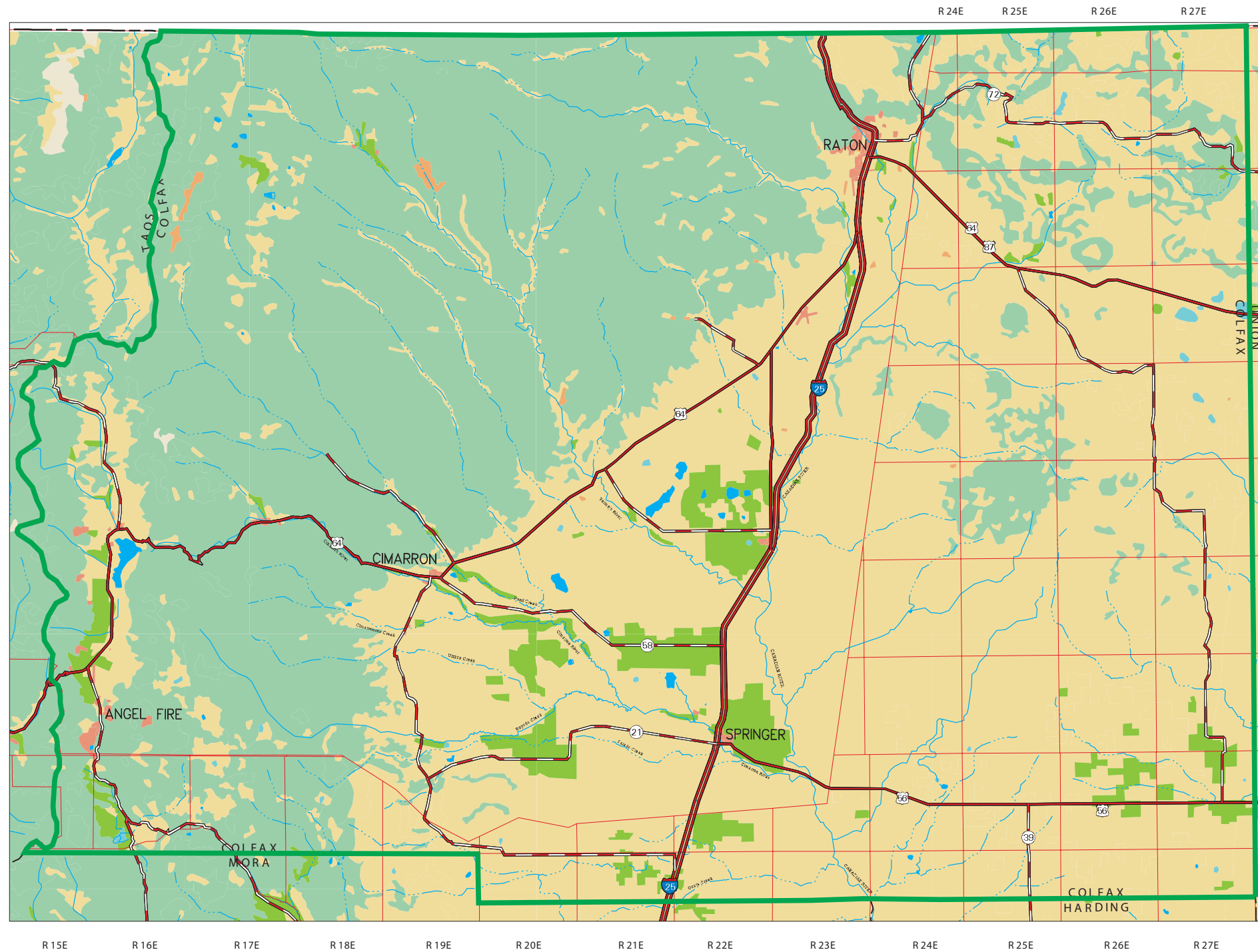
Produced by New Mexico Water Resources Research Institute, April 2002

Base map prepared by the U.S. Geological Survey

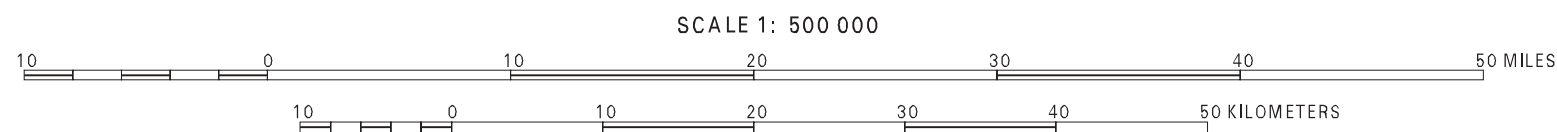
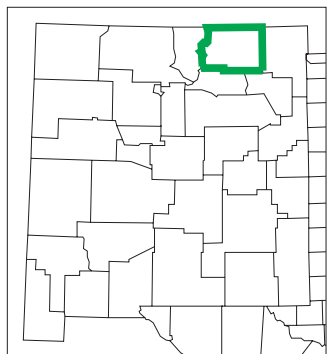
Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Landuse coverage developed by USGS/EPA at 1:250,000 scale. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



Explanation	
	State Line
	County Line
	Perennial Stream/River
	Intermittent Stream
	Interstate
	U.S. Highway
	State Highway
	Township/Range
	Planning Region
	No Data
	Agricultural Land
	Rangeland
	Forest Land
	Water
	Wetland
	Barren Land
	Tundra
	Urban

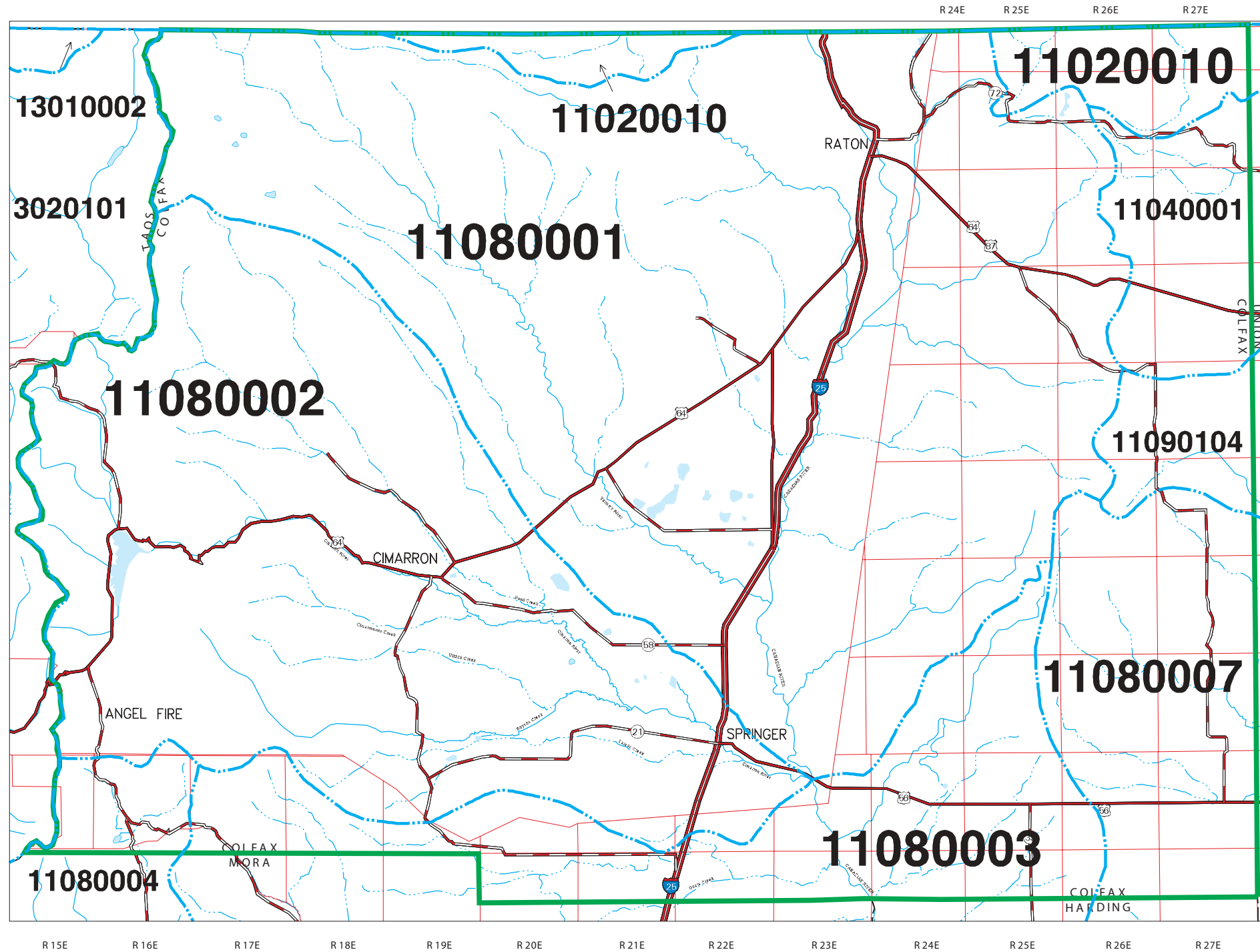


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Colfax County Water Plan

Watersheds

Figure B-4



- Explanation**
- State Line
 - County Line
 - Perennial Stream/River
 - Intermittent Stream
 - Interstate
 - U.S. Highway
 - State Highway
 - Township/Range
 - Planning Region
 - Watershed Boundary

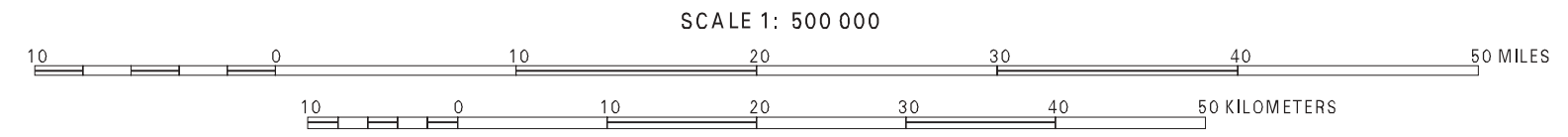
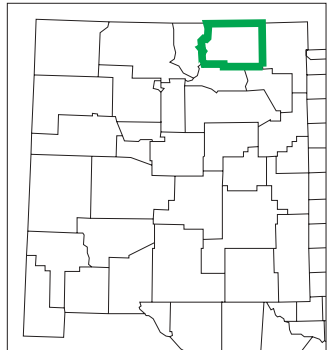
Hydrologic Unit Code	Name
11080001	Canadian Headwaters
11080002	Cimarron
11020010	Purgatorie
11040001	Cimarron Headwaters
11090104	Upper Beaver
11080007	Ute
11080003	Upper Canadian
11080004	Mora
13010002	Alamosa Trincheras
13020101	Upper Rio Grande

Produced by New Mexico Water Resources Research Institute, April 2002
 Base map prepared by the U.S. Geological Survey

Compiled from digital data provided by the New Mexico Resource Geographical Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Watershed boundaries based on USGS 1:500,000 and 1:100,000 scale maps, data provided by the RGIS program. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



Colfax County Water Plan

Reservoirs and Diversion Points For Colfax County

Figure B-5

Explanation

- Diversion Point
- Ditches and Canals
- State Line
- County Line
- Perennial Stream/River
- Intermittent Stream
- Interstate
- U.S. Highway
- State Highway
- Township/Range
- Planning Region

Produced by New Mexico Water Resources Research Institute, April 2002

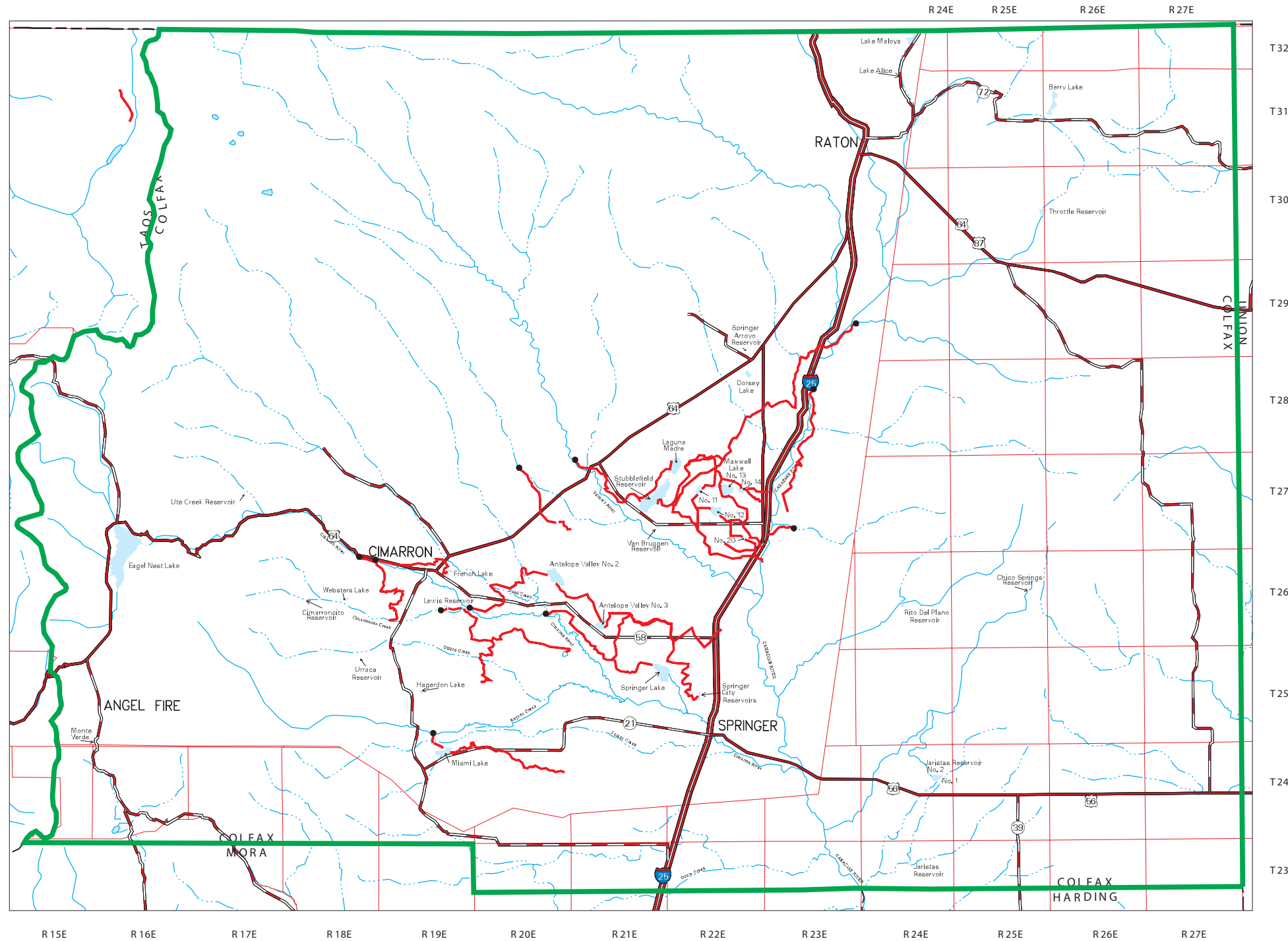
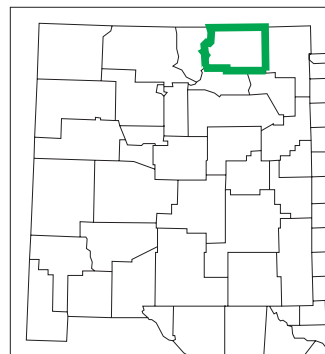
Base map prepared by the U.S. Geological Survey

Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Areal extent of lakes and reservoirs derived from USGS DLG hydrography layer. Annotation derived from USGS maps and a table compiled by B.C. Wilson, New Mexico Office of the State Engineer. Points of diversion derived from the point where water is diverted from natural streams to man made structures. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:325,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 272 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.

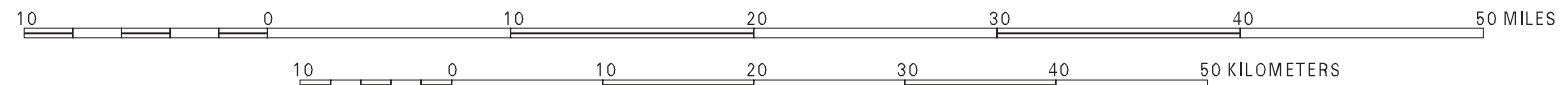
Natural Resource Conservation Service (NRCS), 1982, Soil Survey of Colfax County, New Mexico: USDA, 191p, 103 plates.



Reservoir or Lake Name	Acreage
Antelope Valley No. 2	453
Antelope Valley No. 3	156
Berry Lake	251
Chico Springs Reservoir	2
Cimarroncito Reservoir	11
Dorsey Lake	74
Eagle Nest Lake	2373
French Lake	43
Hagerdon Reservoir No 5	27
Jaristas Reservoir	18
Jaristas Reservoir No. 1	124
Jaristas Reservoir No. 2	16
Laguna Madre	340
Lake Alice	6
Lake Maloya	119
Lewis Reservoir	33
Maxwell Lake No. 11	96
Maxwell Lake No. 12	234
Maxwell Lake No. 13	305
Maxwell Lake No. 14	81
Maxwell Lake No. 20	26
Miami Lake	238
Monte Verde	27
Rito Del Plano Reservoir	26
Spinger Lake	464
Springer Arroyo Reservoir	8
Springer City Reservoirs	34
Stubblefield Reservoir	911
Throttle Reservoir	110
Urraca Reservoir	6
Ute Creek Reservoir	8
Van Bruggen Reservoir	14
Websters Lake	32

Note: Acreage derived from map extent of the respective water-body using the USGS hydrography dataset at 1:100,000 scale.

SCALE 1: 500 000



Colfax County Water Plan

Average Annual Precipitation from 1931 to 1960

Figure B-6

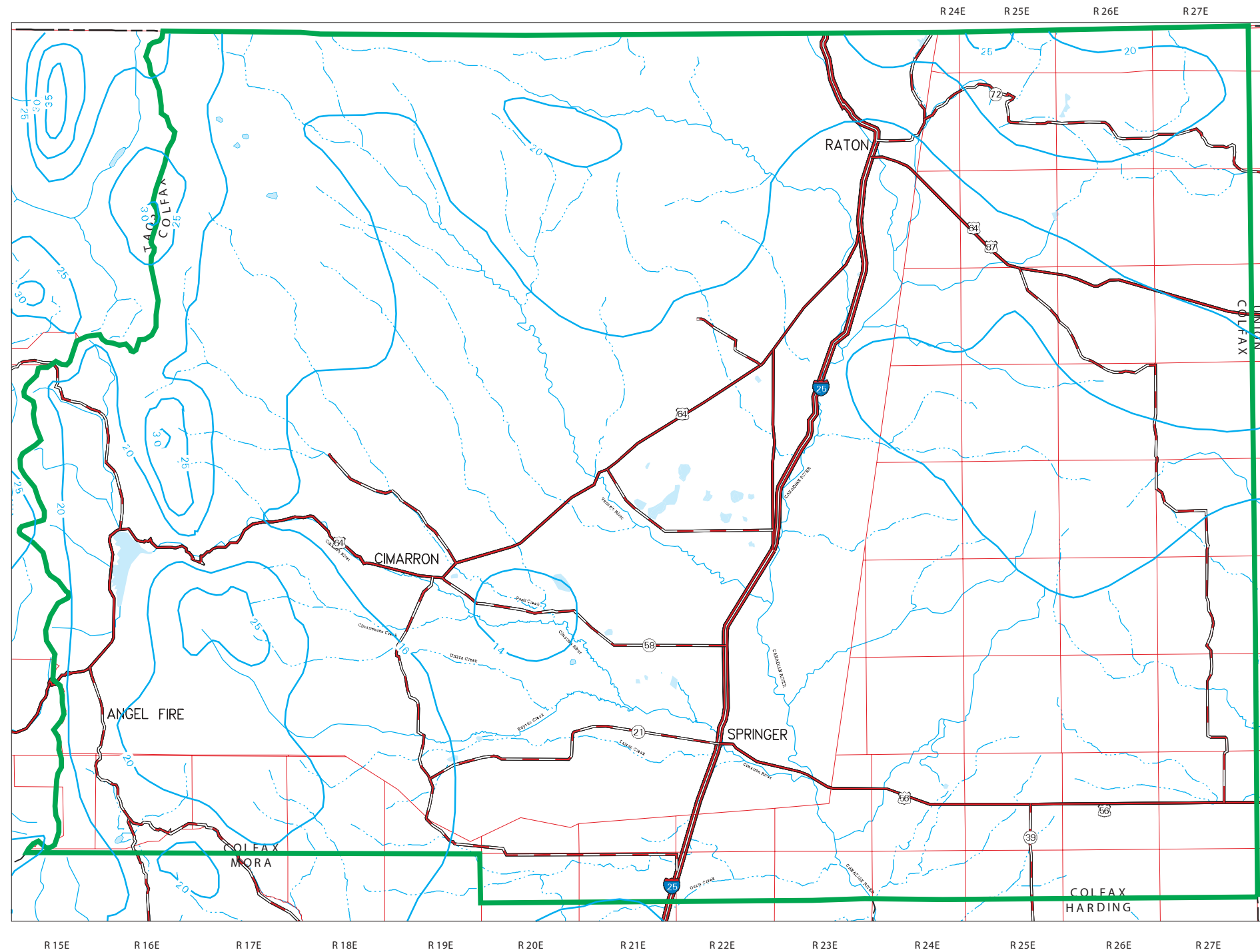
Produced by New Mexico Water Resources Research Institute, April 2002

Base map prepared by the U.S. Geological Survey

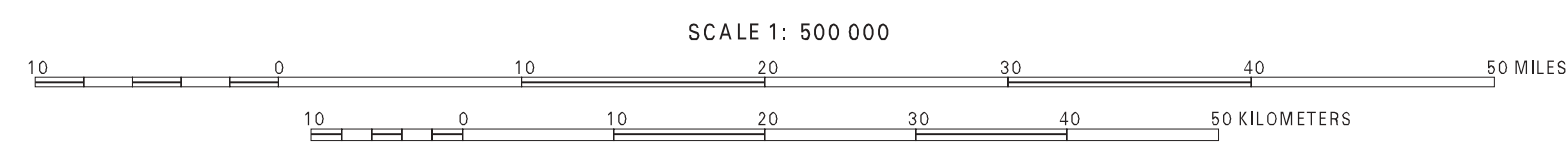
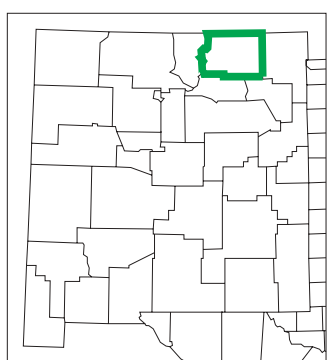
Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. This dataset contains the precipitation isopleths of the state of New Mexico. The data set was created to digitally represent the average precipitation of the state of New Mexico between the years of 1931 and 1960. The original source of the data set came from National Oceanic and Atmospheric Administration (NOAA). Earth Data Analysis Center manually digitized from the NOAA 1:500,000 scale map of the state of New Mexico. Boundary of the Colfax Water Planning Region is based on the New Mexico county boundaries. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS. The cadastral accuracy of the OSE administrative basins and the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



- Explanation**
- State Line
 - County Line
 - Perennial Stream/River
 - Intermittent Stream
 - Interstate
 - U.S. Highway
 - State Highway
 - Township/Range
 - Planning Region
 - Average Precipitation in Inches



Colfax County Water Plan

Underground Water Basins in the Basin

Figure B-7

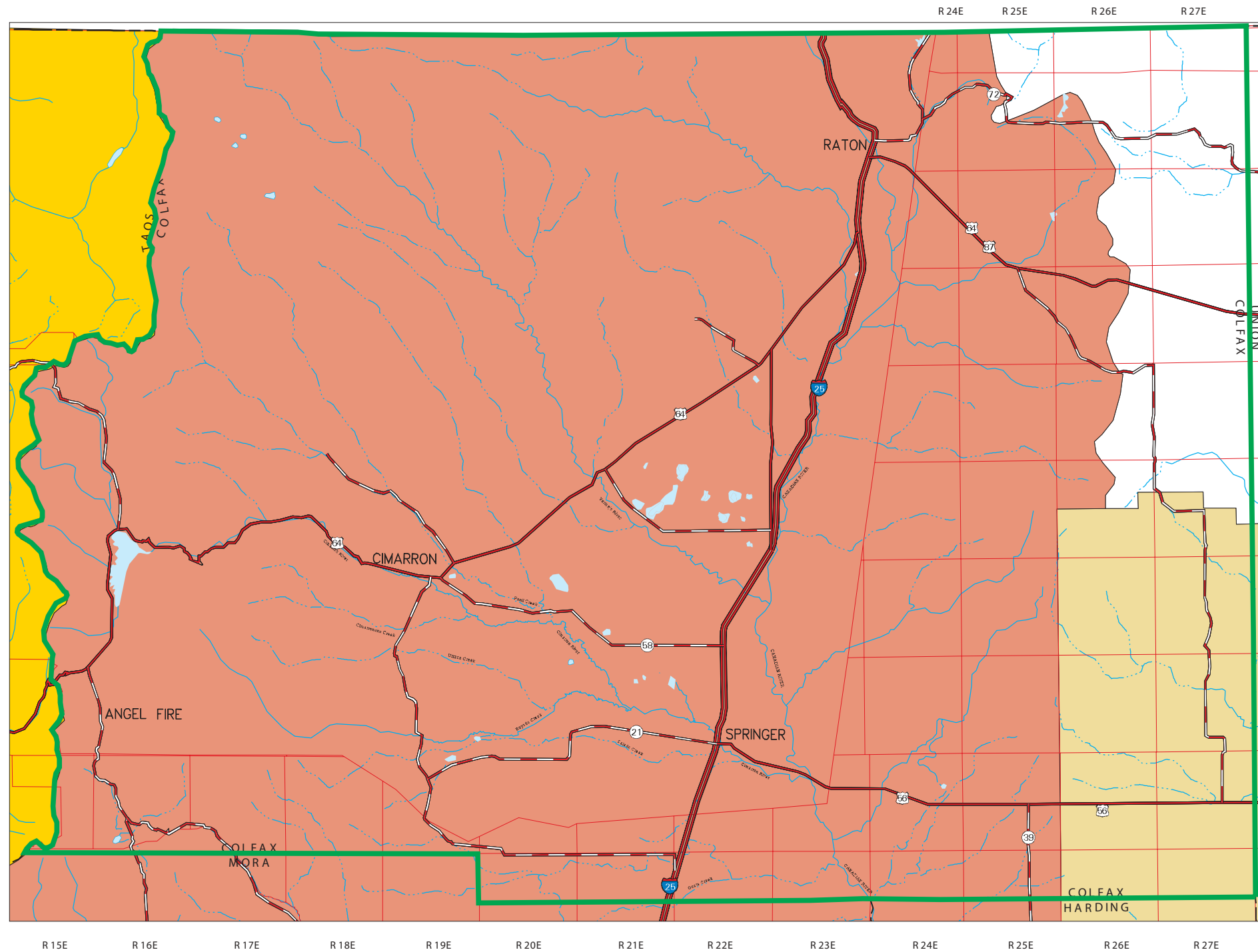
Produced by New Mexico Water Resources Research Institute, April 2002

Base map prepared by the U.S. Geological Survey

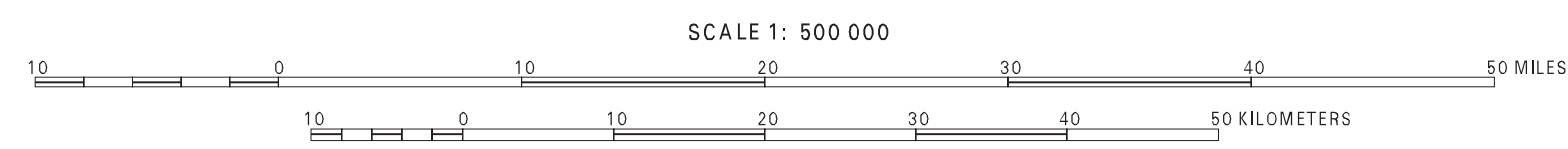
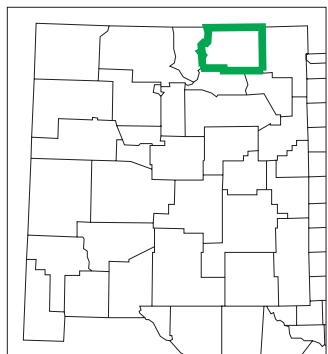
Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



- Explanation**
- State Line
 - County Line
 - Perennial Stream/River
 - Intermittent Stream
 - Interstate
 - U.S. Highway
 - State Highway
 - Township/Range
 - Planning Region
 - Undeclared GW basin
 - Rio Grande GW basin
 - Canadian River GW Basin
 - Tucumcari GW Basin



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Colfax County Water Plan Geology Map Figure B-8

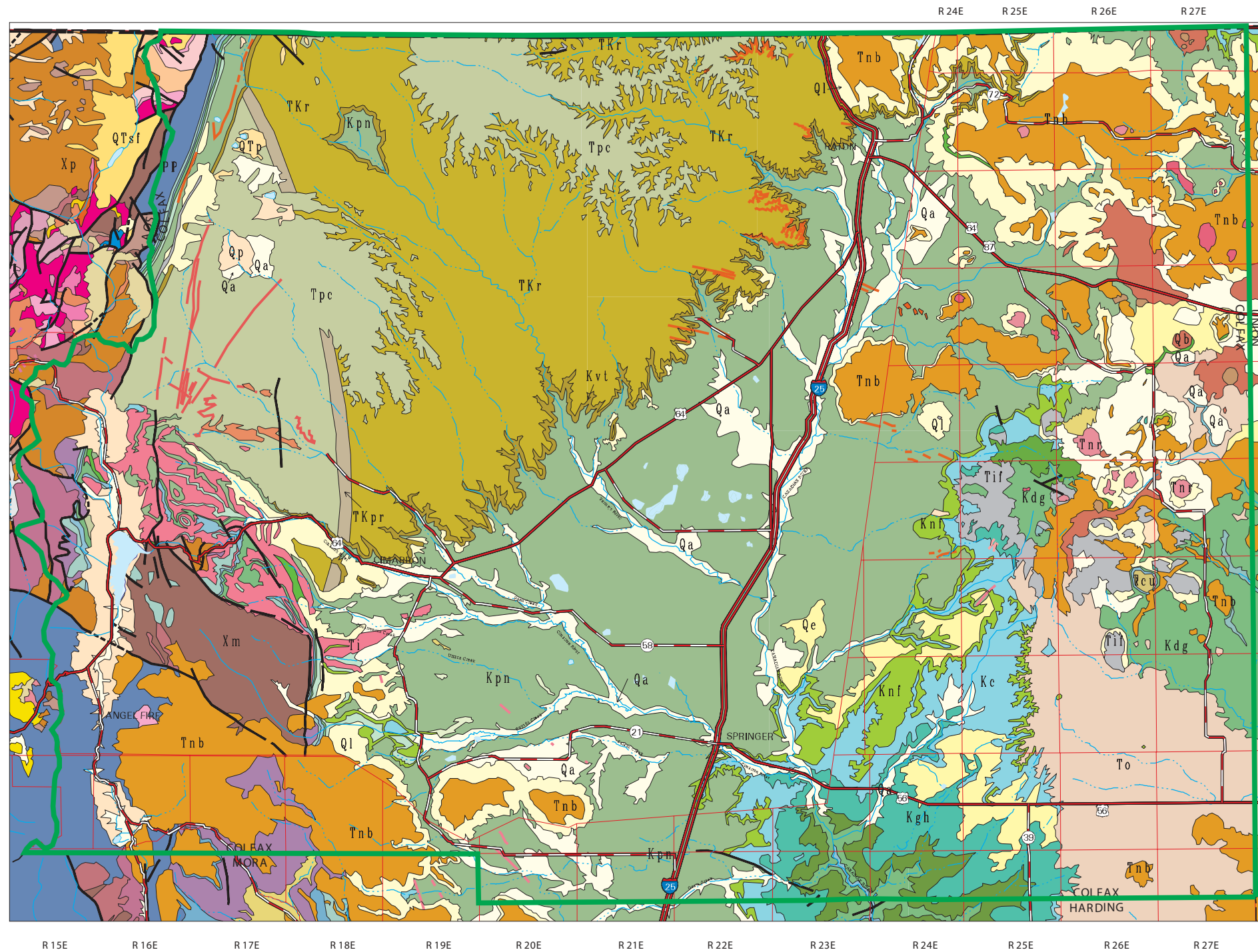
Produced by New Mexico Water Resources Research Institute, April 2002

Base map prepared by the U.S. Geological Survey

Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Surface geology provided by Green and Jones 1997, open file report 97-52. Boundary of the Colfax County Water Planning Region is based on county lines and OSE boundaries.

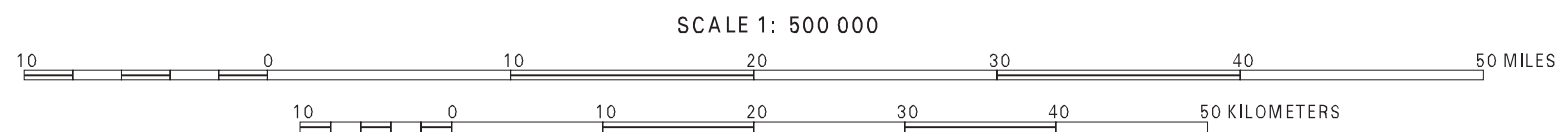
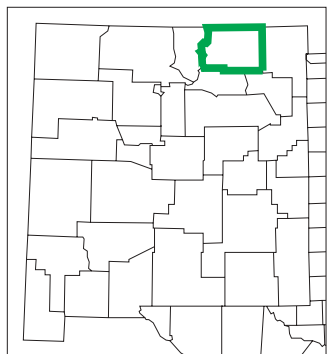
Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.0333 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.



Explanation	
	State Line
	County Line
	Perennial Stream/River
	Intermittent Stream
	Interstate
	U.S. Highway
	State Highway
	Township/Range
	Planning Region
	Contact
	Fault
	Inferred Fault
	Buried Fault
	Ti Dikes

	Qa		Tual		Pg
	Qb		Tui		Pz
	Qd		Tuim		P
	Qe		Turf		Tc
	Ql		Turp		Tcu
	Qoa		Tus		J
	Qp		Tuv		Jm
	Qv		Tv		Water
	QTb		TKpr		Xm
	QTp		TKr		Xmo
	QTsf		Kc		Xms
	Ti		Kdg		Xp
	Tif		Kgc		Yp
	Tla		Kgg		
	Tlp		Kgh		
	Tnb		Kgr		
	Tnr		Knf		
	To		Kpn		
	Tos		Ku		
	Tpc		Kvt		
	Tps		PP		
	Tsf		PPsc		



Colfax County Water Plan Riparian Areas

Figure B-9

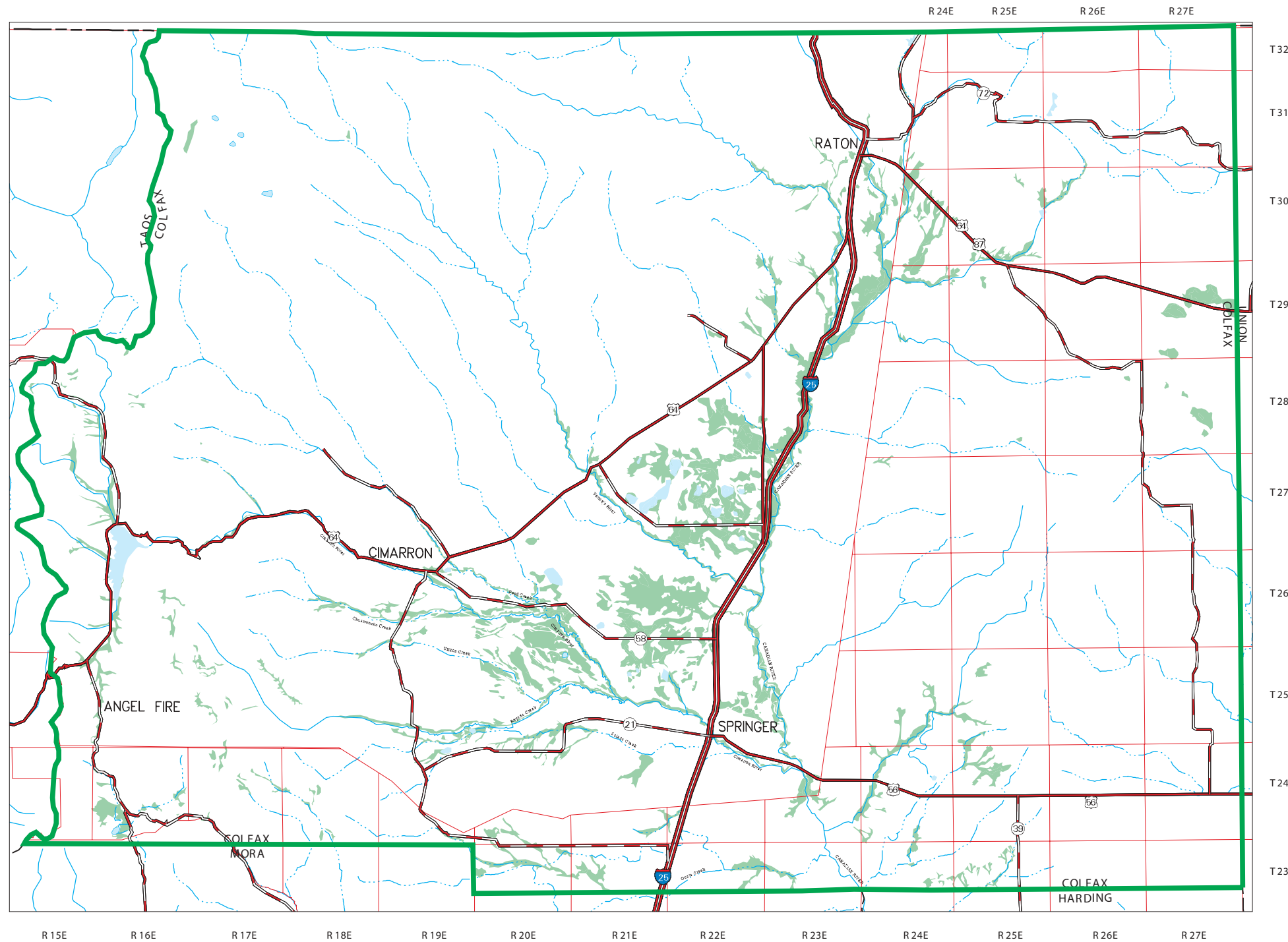
Produced by New Mexico Water Resources Research Institute, April 2002
Base map prepared by the U.S. Geological Survey

Compiled from digital data provided by the New Mexico Resource Geographical Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Water wells taken for the Ground Water System Inventory database maintain by the USGS office in Albuquerque, NM. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

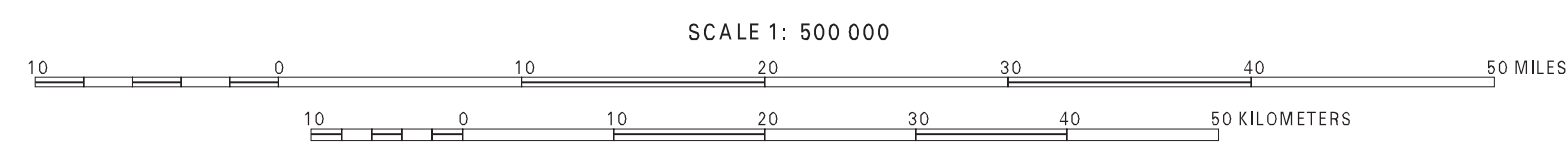
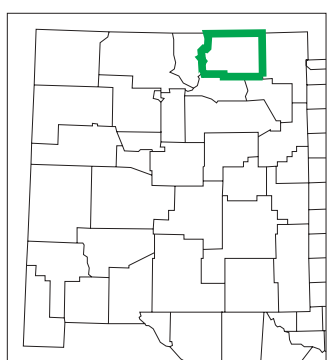
Horizontal accuracy: At the scale of 1:500,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 423 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.

Natural Resource Conservation Service (NRCS), 1982, Soil Survey of Colfax County, New Mexico: USDA, 191p, 103 plates.



- Explanation**
- State Line
 - County Line
 - Perennial Stream/River
 - Intermittent Stream
 - Interstate
 - U.S. Highway
 - State Highway
 - Township/Range
 - Planning Region
 - Riparian Areas













Colfax County Water Plan

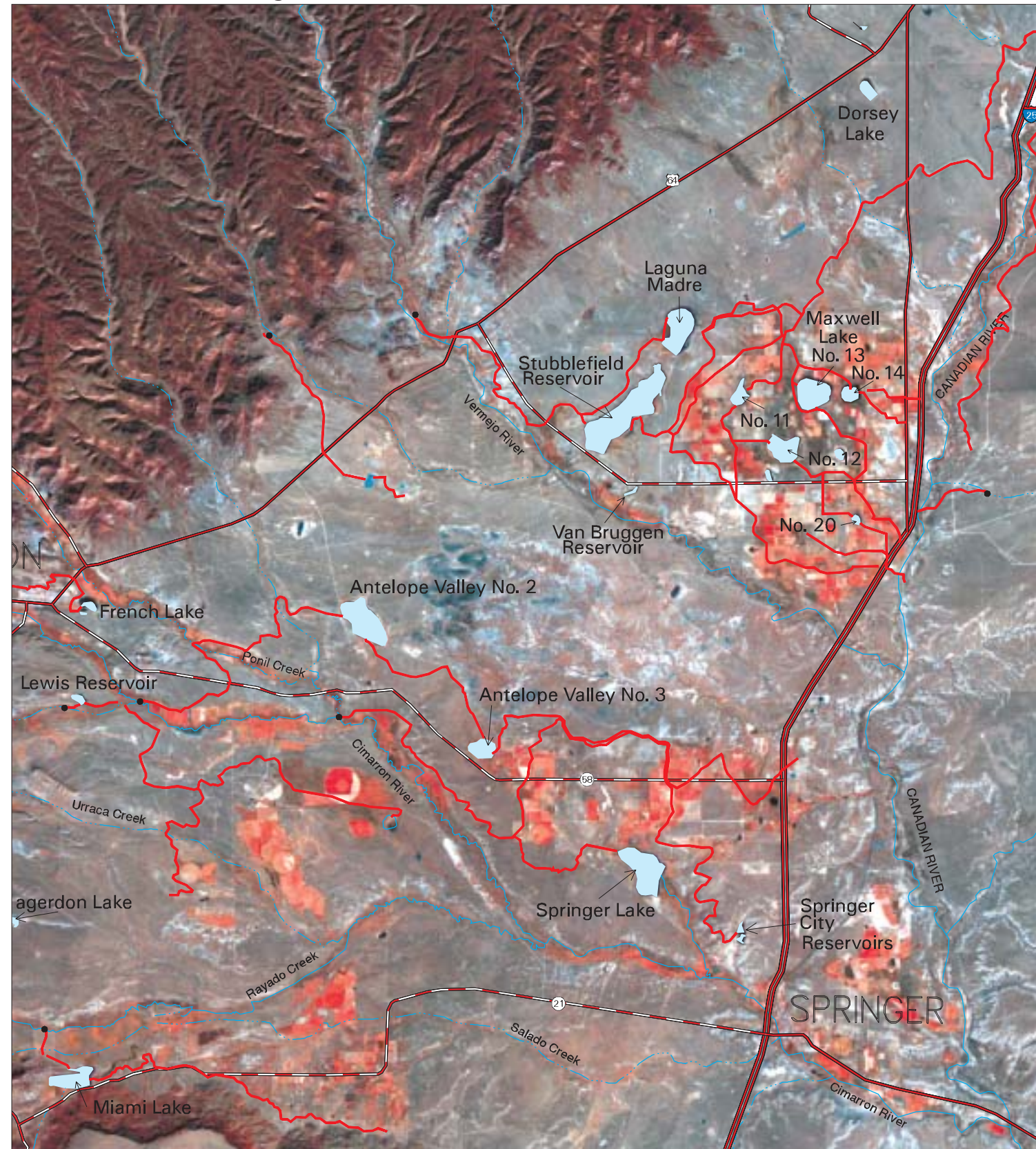
Irrigation Districts

Figure B-10

Explanation

- Diversion Point
-  Ditches and Canals
-  State Line
-  County Line
-  Perennial Stream/River
-  Intermittent Stream
-  Interstate
-  U.S. Highway
-  State Highway
-  Township/Range
-  Planning Region

Irrigation District	Acreeage
Vermejo	6800
Antelope Valley	3600
Miami	2300
Springer Ditch	2700



Produced by New Mexico Water Resources Research Institute, April 2002

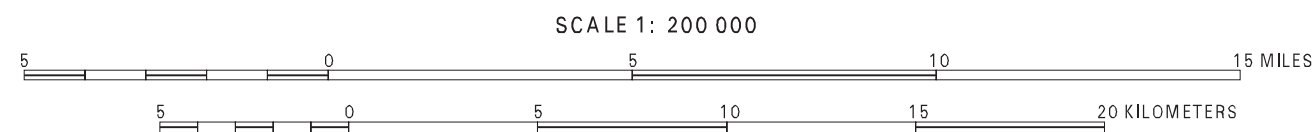
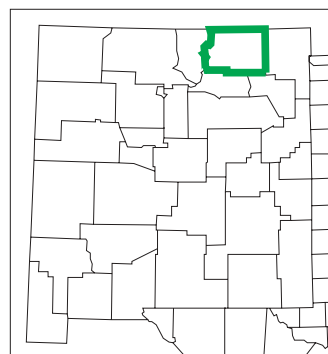
Base map prepared by the U.S. Geological Survey

Compiled from digital data provided by the New Mexico Resource Geographic Information System Program (RGIS). Original base maps digitized from 1:500,000 mylar sheets and 100,000 paper maps for New Mexico. These data meets National Mapping Accuracy Standards for 1:500,000 and 1:100,000 scale maps. Areal extent of lakes and reservoirs derived from USGS DLG hydrography layer. Annotation derived from USGS maps and a table compiled by B.C. Wilson, New Mexico Office of the State Engineer. Points of diversion derived from the point where water is diverted from natural streams to man made structures. Background image is a October 1999, LANDSAT 7 ETM satellite image using bands 4, 3, 2 for RGB. Irrigation acreage estimates derived from vegetation index classification of the LANDSAT 7 image using ArcView Image Analysest software. Boundary of the Colfax County Water Planning Region is based on New Mexico county boundaries, and surface drainage divides. The cadastral accuracy of the county boundaries where verified by the use of 1:100,000 Public Land Survey System (PLSS) from RGIS.

Horizontal accuracy: At the scale of 1:200,000 at least 90 percent of the points tested are within 1/30th inch (0.033 inch), or within 169 ground meters, of their true location.

Projection: Universal Transverse Mercator, Zone 13, Units meters, NAD83.

Natural Resource Conservation Service (NRCS), 1982, Soil Survey of Colfax County, New Mexico: USDA, 191p, 103 plates.



Colfax County Water Plan Geology Map Explanation

-  Qa - Alluvium; upper and middle Quaternary
-  Qb - Basalt and andesite flows and locally vent deposits
-  Qd - Glacial deposits; till and outwash; upper and middle Pleistocene
-  Qe - Eolian deposits
-  Ql - Landslide deposits and colluvium
-  Qoa - Older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region; includes scattered lacustrine, playa, and alluvial deposits of the Tahoka, Double Tanks, Tule, Blanco, Blackwater Draw, and Gatuna Formations, the latter of which may be Pliocene at base; outcrops, however, are basically of Quaternary deposits; upper Quaternary to uppermost Pliocene(?)
-  Qp - Piedmont alluvial deposits; upper and middle Quaternary; includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans
-  Qv - Basaltic volcanics; tuff rings, cinders, and proximal lavas
-  QTb - Basaltic and andesitic volcanics interbedded with Pleistocene and Pliocene sedimentary units
-  QTp - Older piedmont alluvial deposits and shallow basin fill; includes Quemado Formation and in northeast, high level pediment gravels
-  QTsf - Santa Fe Group, undivided. Basin fill of Rio Grande rift region; middle Pleistocene to uppermost Oligocene
-  Ti - Tertiary intrusive rocks; undifferentiated
-  Tif - Tertiary intrusive rocks; undifferentiated
-  Tla - Lower Tertiary, (Lower Oligocene and Eocene) andesite and basaltic andesite flows, and associated volcanoclastic units. Includes Rubio Peak Formation, and andesite of Dry Leggett Canyon
-  Tlp - Los Pinos Formation of Lower Santa Fe Group (Miocene and upper Oligocene); includes Carson Conglomerate (Dane and Bachman, 1965) in Tusas Mountains-San Luis Basin area
-  Trb - Basalt and andesite flows; Neogene. Includes flows interbedded with Santa Fe and Gila Groups
-  Trr - Silicic to intermediate volcanic rocks; mainly quartz latite and rhyolite Neogene; may locally include flows interbedded with Santa Fe Group
-  To - Ogallala Formation, alluvial and eolian deposits, and petrocalcic soils of the southern High Plains; Lower Pliocene to middle Miocene (locally includes unit Qoa)
-  Tos - Mostly Oligocene and upper Eocene sedimentary and volcanoclastic sedimentary rocks with local andesitic to intermediate volcanics; includes Espinosa, Spears, Bell Top, and Palm Park Formations
-  Tpc - Poison Canyon Formation; Paleocene, Raton Basin
-  Tps- Paleogene sedimentary units; includes Boca, Galisteo, El Rito, Blanco Basin, Love Ranch, Lobo, Sanders Canyon, Skunk Ranch, Timberlake, and Cub Mountain Formations
-  Tsf - Lower and Middle Santa Fe Group. Includes Hayner Ranch, Rincon Valley, Popotosa, Cochiti, Tesuque, Chamita, Abiquiu, and other Formations; Miocene and uppermost Oligocene
-  Tual- Upper Oligocene andesites and basaltic andesites (26-29 Ma); includes La Jara Peak Basaltic Andesite, Uvas Basalt, the basaltic andesite of Poverty Creek, and Squirrel Springs Andesite, the Razorback, Bear Springs Canyon, Salt Creek, Gila Flat, and Middle Mountain Formations, and the Alum Mountain Group; locally includes more silicic flows
-  Tui - Miocene to Oligocene silicic to intermediate intrusive rocks; dikes, stocks, plugs, and diatremes
-  Tuim - Upper and Middle Tertiary mafic intrusive rocks
-  Turf - Upper Oligocene silicic (or felsic) flows and masses and associated pyroclastic rocks; includes Taylor Creek, Fanney, and Rocky Canyon Rhyolites
-  Turp- Upper Oligocene rhyolitic pyroclastic rocks (ash-flow tuffs); includes Davis Canyon Tuff, South Crosby Peak Formation, La Jencia, Vick's Peak, Lemitar, South Canyon, Bloodgood Canyon, Shelley Peak Tuffs, tuff of Horseshoe Canyon, Park Tuff, Rhyolite Canyon Tuff, Apache Springs Tuff, Diamond Creek, Jordan Canyon, Garcia Camp Tuffs, the Turkey Springs Tuff, the tuff of Little Mineral Creek, the Amalia Tuff, and others. Some contain volcanoclastic and reworked volcanoclastic rocks, and eolian sandstone; (24-29 Ma)
-  Tus - Upper Tertiary sedimentary units; includes Bidahochi Formation, the Picuris Formation, and Las Feveas Formation, and locally conglomerates; Pliocene to upper Miocene
-  Tuv - Volcanic and some volcanoclastic rocks, undifferentiated; lower Miocene and Upper Oligocene (younger than 29 Ma)
-  Tv - Middle Tertiary volcanic rocks, undifferentiated
-  TKpr - Poison Canyon and Raton Formations; undivided
-  TKr - Raton Formation; in Raton Basin; unit contains conformable K/T boundary
-  Kc - Carlile Shale; limited to northeastern area; Turonian-Coniacian
-  Kdg - Dakota Group of east-central and northeast New Mexico; in ascending order, Mesa Rica Sandstone, Pajarito Shale, and Romeroville Sandstone; includes the underlying Tucumcari Shale in Tucumcari area and Glencairn Formation in Union County. Encompasses both Upper and Lower Cretaceous rocks
-  Kgc - Greenhorn Formation and Carlile Shale, undivided; locally includes Graneros Shale
-  Kgg - Graneros Shale and Greenhorn Formation; limited to northeastern area; lower Turonian and Cenomanian
-  Kgh - Greenhorn Formation; limited to northeastern area. The Upper member (Bridge Creek Limestone) can be traced into western area where it is commonly shown as a bed-rank unit in Mancos Shale on detailed maps
-  Knf - Fort Hays Limestone Member of Niobrara Formation
-  Kpn - Pierre Shale and Niobrara Formation
-  Ku - Upper Cretaceous, undivided. Includes Virden Formation in northern Hidalgo County, Ringbone Formation in Hidalgo and Luna and Grant Counties, and locally Beartooth and Sarten, Mancos in Silver City area; Cenomanian - Maastrichtian for most part, although Beartooth is pre-Cenomanian
-  Kvt - Vermejo Formation and Trinidad Sandstone; Maastrichtian
-  J - Jurassic rocks, Middle and Upper, undivided
-  Jm - Morrison Formation; Upper Jurassic nonmarine rocks present only in northern one-third of state
-  Ttc - Chinle Group; Upper Triassic; includes Moenkopi Formation (Middle Triassic) at base in many areas
-  Ttcu - Upper Chinle Group, Garita Creek through Redonda Formations, undivided
-  Pz - Paleozoic rocks, undivided
-  PIP - Permian and Pennsylvanian rocks, undivided; includes Horquilo Limestone, Earp Formation, Epitaph and Scherrer Formations, and Concha Limestone
-  PIPsc - Sangre de Cristo Formation, in Sangre de Cristo Mountains
-  Pg - Gorieta Sandstone; texturally and mineralogically mature, high-silica quartz sandstone
-  IP - Pennsylvanian rocks, undivided; in Sangre de Cristo Mountains may include Sandia Formation, Madera Limestone, La Pasada, Alamitos, and Flechado Formations; elsewhere may include Bar-B, Nakaye, Red House, Oswaldo, and Syrena Formations
-  Yp - Middle Proterozoic plutonic rocks (younger than 1600 Ma)
-  Xms - Lower Proterozoic metasedimentary rocks (1650-1700 Ma). Essentially equivalent to Hondo Group; locally includes high-grade quartzite-peitic schist of unknown age
-  Xm - Lower Proterozoic metamorphic rocks, dominantly felsic volcanic, volcanoclastic and plutonic rocks (1650-1700+ Ma); includes Vadito Group; locally includes high-grade felsic gneisses of unknown age
-  Xp - Lower Proterozoic plutonic rocks (older than 1600 Ma)
-  Xmo - Lower Proterozoic metamorphic rocks, dominantly mafic (1720-1760 Ma)

Appendix C

Public Involvement Information

Appendix C1
Meeting Notes

NOTES FROM JANUARY 2001 PUBLIC MEETINGS

Public meetings were held on consecutive nights (January 23-25, 2001) in Angel Fire, Raton, and Springer, respectively. The meetings had been advertised in area newspapers, noticed in calendar listings, and announced on the radio. Meetings began at 7 p.m. and ended no later than 9 p.m. There were 12 attendees at Angel Fire, 18 at Raton, and 21 at Springer.

Joanne Hilton of Daniel B. Stephens & Associates and Bruce Poster of Southwest Planning & Marketing made a PowerPoint presentation and involved the audiences in discussions of regional water planning. After the presenters describing the purpose of regional water planning and the process being used in Colfax County, the audience shared its vision for the region and suggested goals for regional water planning. After a further presentation on regional water supply and regional water demand, the audience had an opportunity to offer suggestions for strategies to be incorporated into the plan.

In the balance of these notes, we document the comments made during each of the meetings regarding vision, goals, and strategies.

ANGEL FIRE MEETING

Regional Vision

- Thriving communities
- Sustainable communities and environment
- Preserve open spaces, forests, and the rural appearance
- Keep lands intact in the face of development pressures
- Healthy environment/community/economy
- Protect watershed and water quality

Regional Goals

- Long-term balance across demanding elements—within and outside the region
- Water quality
- Adequate availability of water
- Balance supply and demand (with growth)
- Increase groundwater recharge and streamflow
- Healthy forests (through thinning)
- Reduce losses (with infrastructure)
- Use effluent efficiently
- Respect private property rights
- Regional oversight and planning
- These goals should be prioritized
- Conserve and recycle
- Provide germane, accurate, and available data at the regional level, including analysis of trends
- Cooperation and public notification and education regarding data available

Strategies

- Revegetate to conserve water
- Motivate conservation with higher rates
- Obtain data on inventory of wells and on all new wells
- Focus on large use categories
- Create synergy, e.g. thin forests and burn the biomass
- Take a statewide perspective
- Broaden public education and involvement, e.g. with a newsletter
- Continuing funding to complete, implement, evaluate, and update the plan
- Interact with congressional delegation to gain support
- Identify implementation actions
- Link strategies to goals and criteria
- Pitch the plan (via spokespersons)
- Set targets
- Reduce flows out of the County

RATON MEETING

Regional Vision

- Bring all the elements together
- Not much change from today
- “Healthy communities” sums it all up
- Continue agricultural economy
- Growth/suburbs
- Improved water quality and increased quantity
- Conservation

Regional Goals

- Adequate funds to realize the vision
- Identify the mechanisms needed for creating the vision
- Cooperation is the key

Strategies

- Salt cedar and brush control
- Involve the agricultural community
- Watershed management and improvement (e.g. thinning)
- Research on how forests affect water quantity and quality
- Educate the public to conserve water
- Install pipelines to conserve water
- Clarify water rights
- Involve the public in planning for growth and development
- Municipalities need to get their systems in order
- Recycling (e.g. golf courses and parks)
- Wetlands for water purification
- Ditch lining
- Funding

SPRINGER MEETING

Regional Vision

- Long range planning and cooperation (vs. litigation)
- Cooperation between agriculture and municipalities

Regional Goals

- Obtain storage rights
- Provide more storage
- Stop development
- Increase availability and manage use
- Range management

Strategies

- Build a pipeline to Cimarron to share water
- Create a lake for Antelope Valley and Springer
- Predict snowfall
- Recycle wastewater for cropland applications (as per Springer plan)
- Place a film or sealant over lakes to prevent evaporation
- Artificial wetlands and tertiary treatment to protect groundwater from septic tanks
- Install pipelines to conserve
- Contain rainfall in reservoirs
- Dredge ponds to increase storage
- Funding to implement the plan
- Cloudseeding and prayer
- Address competition among users (e.g. Angel Fire vs. Springer)

NOTES FROM AUGUST 2002 PUBLIC MEETINGS

Public meetings were held on consecutive nights (August 26-28, 2002) in Raton, Springer, and Angel Fire, respectively. The meetings had been advertised in area newspapers, noticed in calendar listings, and announced on the radio. Persons who had previously attended the first round of public meetings in January 2001, any steering committee meeting, or a focus group had received written invitations. Notifications were also sent out to members of the Raton and Angel Fire chambers of commerce. Flyers were posted on bulleting boards and distributed by the County Extension Agent at the County Fair. Meetings began at 7 p.m. and ended no later than 9 p.m. There were 8 attendees at Raton, 11 at Springer, and 6 at Angel Fire

Joanne Hilton of Daniel B. Stephens & Associates and Bruce Poster of Southwest Planning & Marketing made a PowerPoint presentation and involved the audiences in discussions of regional water planning. Mike McGovern of Daniel B. Stephens & Associates also made a presentation on agricultural water conservation at the Springer meeting.

The presenters described the purpose of regional water planning, the process being used in Colfax County, findings on regional water supply and regional water demand, and the results of an analysis of alternatives for meeting future water demand.

After the presentation, the audience had an opportunity to respond to each of the following questions:

1. Do you have any questions about the alternatives?
2. Have we left out any alternatives that should be included in the plan?
3. Do any of the proposed alternatives have important social or environmental impacts?
4. Are any of the proposed alternatives politically unacceptable?

In the balance of these notes, we document the questions and comments (and responses) made during each of the three meetings.

Raton

- It would be helpful to show reservoir dredging costs in dollars per acre-foot. Will do.
- Doe cloud seeding really produce benefits? Some experts say that it does, especially at high elevations with enough moisture. It is hard to prove without many years worth of data.
- Can one drill wells without a permit? It is easy to drill domestic wells (with a \$5 permit) or in the undeclared Capulin Basin.

- Water pumped from methane gas wells should be considered as a resource. There were questions about whether that water is lost (due to the depth of the wells) and about its quality. This issue will be incorporated into the lower priority alternatives.
- Has there been any research on desalinization in the U.S.? El Paso is currently looking into it, and the issue was recently raised in the Estancia Valley.
- It is necessary to protect Colfax County water from the big cities who might try to acquire it. Protection of the Capulin Basin would be a good first step.
- It seems like we are on the right track here.
- The handouts are helpful.

Springer

- There is interest in removing salt cedar. There is uncertainty about how much is present.
- The water situation is changing rapidly due to the drought.
- There should be promotion of conservation in the homes via tax incentives that encourage point of use water heaters and a dual water system that uses gray water.
- The question of fairness was raised in relationship to declaring the Capulin Basin. This must be balanced against the potential loss of this resource to Texas.

Angel Fire

- Is reservoir evaporation an acceptable use of New Mexico water (per the El Paso lawsuit)? It's a necessary consequence of having storage.
- How will regional water plans influence the State Engineer regarding policy on water rights transfers? This is an open question.
- Will the state let municipalities regulate domestic wells? Not yet, but legislation has been previously introduced to allow this. Perhaps such legislation should specify that water lines must be readily available (e.g. within 300 feet).
- Can a regional plan be more restrictive than state law? It could be, but the specifics must be worked out at the local level.
- Does the regional plan address enforcement of water quality regulations? Project funding (as the plan is implemented) could lead to enforcement.
- The plan should encourage the County to regulate septic tanks and do enforcement.
- The County has delayed the burning of slash in a burn pit.
- The plan should focus on agricultural water conservation (given its large share of usage) and require more efficient use of water by agriculture.
- What is the advantage of leasing out water rights? It keeps water rights in the community and may facilitate a sale in certain years. It may serve as an intermediate measure until new infrastructure is in place. It is not a universal solution for all municipalities.
- All 16 regional water plans should push for state restrictions on domestic wells and the use thereof.
- Is the Collin-Neblett management area owned by the state? Will check on this.

- There should also be restoration dollars in legislation that provides money to fight fires.
- Define “appropriate.” To gain legal right to use water, as in the Capulin Basin. It does not mean to take it away from others.
- The state water plan should solve the problem of unadjudicated rights.
- There should be regional cooperation to conserve during a drought. This could be addressed in the drought plan.

NOTES FROM FOCUS GROUPS **October 2001 and November 2002**

The steering committee identified four stakeholder groups to involve in more detailed discussion as part of the regional water planning effort. Based on suggestions from committee members on when and where to meet, the following four focus groups were convened:

- Oct. 23, 1-3 p.m., Recreation/tourism industry, Cimarron City Hall
- Oct. 23, 4-6 p.m., Local officials, Cimarron City Hall
- Oct. 24, 2-4 p.m., Businesses, Raton Post Office
- Oct. 24, 6-8 p.m., Agriculture/livestock industry, Springer City Hall

Committee members also offered advice on whom to invite. With the assistance of local governments, chambers of commerce, and farm and livestock groups, we developed lists of potential participants. We personally contacted each potential participant and also made follow up reminder calls to confirmed participants. Attendance ranged from a low of two at the business group to six at the recreation/tourism group, eight (representing three cities and the County) at the local officials group, and eleven at the agriculture/livestock group. (In the future, it would be better to hold business focus groups in the evening.)

Each focus group began with a statement of the purpose of the group and introductions. Joanne Hilton and Bruce Poster provided a PowerPoint presentation on regional water planning and the Colfax County effort to date. A number of handouts were provided, including materials on regional vision and goals, the process for selecting alternatives, and the preliminary list of alternatives to be evaluated. The bulk of the meeting was spent obtaining feedback about which alternatives were of the greatest interest and feasibility. At the end of the meeting, participants were informed about opportunities for staying involved in the regional water planning process.

Summaries of comments at each focus group follow:

Recreation/Tourism Industry

Their concerns about regional water planning relate to the following:

- Protecting water quality, including fisheries (4 people)
- Maintaining stream flows
- Water quantity, for future growth (2 people)
- Water costs

The group expressed the following comments about the alternatives under consideration:

- Water planning should be separated from acquiring water.
- Watershed management planning may be hard to sell to land owners; emphasize the involvement of the landowners and voluntary participation.
- The word “appropriate” sounds threatening.

- A central water authority sounds like more government.
- There is a need for in-stream flow protection.
- Utility rates are already too high in Springer.
- Say “plan” for growth, rather than “manage” growth. (2 people)
- A conservation ordinance is important, even if voluntary; include education, especially through the school districts (3 people)
- Septic tank and water quality ordinances are important.
- Cloud seeding could hurt those who are farther downwind -this should be researched.
- Say “protect and restore” rather than “manage” watersheds.

Local Officials—Meeting #1

The group expressed the following comments about the alternatives under consideration:

- It is important to develop and implement 40-year water plans; funding is needed for implementation.
- There is concern re exporting bottled water from the Moreno Valley, i.e. monitoring transfers of water.
- There is a county and regional interest in appropriating and reserving groundwater.
- Enforce existing EID laws on septic tanks, rather than develop sole source aquifer designation.
- Do tree thinning to protect forests and water quality/quantity.
- Delay action on a central water authority.
- Instead of requiring water quality study for development projects, have a county ordinance to require hooking into available sewage systems.
- A pipeline to Springer to conserve water would be beneficial.
- Adopt a county land use plan to help manage growth.
- Antelope Valley already does water banking.
- Recycling municipal wastewater is important.
- A conservation ordinance is important.
- Take into account which projects are most implementable in the short term.

Regarding the drought planning effort:

- Ensure that the task force has authority.
- The task force should include representatives from the steering committee and the Intergovernmental Council (the mayors and county commission chairman)

Regarding public education:

- Apathy is a problem.
- Educate youth.
- Keep it ongoing.
- Use the word “conserve,” rather than “restrict.”

Businesses

Because of the low turnout, discussion was limited. Major concerns were:

- Conservation and recycling
- Water losses in the pipeline
- Water quality
- Water rates
- Water availability

Agriculture/Livestock Industry

The group expressed the following comments about drought planning:

- Triggers for declaring a drought may need to be local, rather than countywide.
- Include agricultural water users on the task force.
- Reps could include the three FSA (Farm Service Agency) reps (Bill Sauble, Steve Fernandez, Alice Moore), along with NRCS, Soil Conservation District, Jim Hollis, Sandra Barraza, individual water rights holders, and one of the County Commissioners.

Regarding watershed groups:

- Involve landowners and the New Mexico Environment Department.

Regarding agricultural water conservation:

- 50% of the water is lost in open ditches; pipes (not ditch lining) are needed, but require funding.
- Salt cedar should be eradicated.
- Short growing season makes investments in conservation too expensive.
- Developed piping systems for complete Miami project.
- Facilitate quicker water transfers at the OSE.
- Drip irrigation would be great, but is costly.
- Change the state policy on gated pipe to encourage it.
- Field leveling would also be nice, but costly.

Regarding the alternatives for regional water planning:

- There can be problems delivering water that is transferred or leased.
- A central water coordinator is needed, e.g. in Maxwell.
- There should be voluntary efforts to improve private watersheds, while addressing environmental concerns.
- Dredging is a good idea if funds are available.
- Removing invasive vegetation should be part of watershed improvement.
- Implementing non-point sources should be part of the watershed group work.
- Recycling wastewater requires cheap delivery systems, which may not be available.

Local Officials—Meeting #2

A second meeting with local officials was held in Raton on November 14, 2002.

COLFAX COUNTY REGIONAL WATER PLANNING STAKEHOLDERS MEETING—MAY 9, 2000

Introductions

The meeting was begun shortly after 10 a.m. in the post office building in Raton. Approximately 30 people were in attendance. Bruce Poster of Southwest Planning & Marketing went over the agenda. Participants introduced themselves and briefly stated why water planning was important to them.

Ground Rules

The group agreed upon the following ground rules:

- No interruptions
- Be brief
- Work toward consensus (and record minority positions)
- Stick to the point
- Have a goal for each meeting and evaluate its achievement

Background Information

Joanne Hilton of Daniel B. Stephens & Associates provided background on the regional water planning process and also described the role of the stakeholders. She then answered questions.

Formation of the Steering Committee

Bruce Poster facilitated the formation of the steering committee. The first step was the identification of interests that needed representation. The group developed the following initial list:

- Colfax County
- Municipalities
- State Engineer
- NRA-Whittington
- Agriculture (irrigated farming and ranching)
- Industry
- Mining and power generation
- Conservation district
- N.M. Game & Fish
- Maxwell Wildlife Refuge
- Endangered species
- Environmental organizations
- Recreation
- Highways

- Subdivisions/realtors
- Water rights holders
- Private water shed management
- Water quality (EPA, N.M. Environment Dept.)
- Rural domestic suppliers
- Flood control
- Bureau of Reclamation

The group next refined the list, to name some of the organizations that could represent the various interests and came up with this list:

- Senior water rights holders
- Large water rights holders
- Irrigated agriculture
- Grazing
- Industry
- Mining and power generation
- Subdivisions
- Environment and recreation (NRA, Philmont)
- Small businesses
- State Engineer
- State Parks
- N.M. Environment Dept.
- N.M. Game & Fish
- State Land Office
- Bureau of Reclamation
- State Forestry
- U.S. Forest Service
- Colfax Soil & Water Conservation District
- Natural Resource Conservation Service (USDA)
- City of Raton
- Angel Fire and Eagle Nest
- Springer, Miami, Maxwell, and Cimarron
- Irrigation districts (Miami, Springer, Vermejo, Antelope Valley)

The group then prioritized the interests, with an intent to have most participants be in the private sector, rather than bureaucrats. The following members were nominated for the steering committee (several still need to be contacted to see if they accept).

- James Marchetti, Colfax County
- Dan Campbell, Raton Water Works
- Tony Searer, Miami Domestic Water Users
- Bill Sauble, rancher
- Linda Libby, Village of Angel Fire
- Mary Lou Kern, Colfax Soil & Water Conservation District
- Julia Stafford, C S Cattle Company

- Ralph Schubert, rancher and developer
- Jeremy Michaels, Pittsburg & Midway Coal Company
- Leslie Skinner Fernandez, environmentalist
- Bob Ricklefs, Philmont Scout Ranch
- Jim Hollis, Office of the State Engineer
- Florence Higgins or Jan Dye, N.M. Environment Department
- Gretchen Sammis, Colfax Soil & Water Conservation District
- Charlie Walker, Natural Resource Conservation Service
- Jim Baker, Vermejo Park Ranch

It was decided that steering committee members would appoint alternates to attend in their places. Several alternates were identified during the meeting, with the others to be identified during the next week.

Public Participation Process and Meeting Schedule

After lunch, Mr. Poster discussed the public participation process and the schedule of meetings. It was decided that public meetings would be held on a weeknight evening at 7 p.m., set to avoid local sporting events or other conflicts. Meetings will be held in Raton, Springer, and Angel Fire.

Public meetings will be announced in newspapers (*Raton Range*, *Sangre de Cristo Chronicle*, *Springer Tribune*, *Journal North*) and on radio stations (KRTN in Raton and KAFR in Taos). In addition, notices will be posted at post offices and stores in several of the communities (Cimarron, Miami, Maxwell, Eagle Nest). Laura will help with posting notices.

Steering committee meetings will be held on Thursday (first choice) or Wednesday from 10 a.m. until 2:30 p.m. at the Raton post office. The next meeting is tentatively scheduled for July 13th.

Regional Vision

Participants were given time to individually vision how they would like the county to be over the next 40 years. They then wrote down key words from their vision on up to three cards. The cards were passed to the front, where they were placed on the wall. Similar cards were grouped and the groups were then named. The following is the result of the visioning exercise. We list the eight major elements of the vision and the subcomponents of each element.

1. Healthy Environment

Clean healthy environment
 No litter
 Environmentally compatible
 Water quality
 Good water quality
 Watershed protection

Clean air
Pure water

2. Open Space Protection

Open spaces
Planned open space development

3. Quality Recreation

Recreation facilities
Heavy water demand for recreation
Recreation and fishing

4. Natural Resource Conservation

Catch excess water for use later downstream
Rebuilt Hebron Dam for storage
Efficiency
Underground drip irrigation
No way to make more water
Cleaner, leaner living practices
More xeriscaping
Recycle water

5. Adequate Water Availability

Distribution systems
Adequate water quantity

6. Respect For Private Property Rights

Fair and equitable distribution of water
Priority of water rights
Private land respected
New priority of water users

7. Multiple Use Cooperation

Cooperative urban and rural development
Cooperation between land, city, environment
Multiple resource use

8. Healthy Communities

More individual tolerance
Keep life simple
Strong communities: prosperous and progressive

Organized (managed) community and rural population growth
Rural lifestyle/atmosphere
Quality schools
Local control
Rural/small town atmosphere
Housing that isn't substandard
Jobs that pay a living wage
Support for the area's history, arts, and culture
Raton as the hub of northeast New Mexico
A four-lane east/west highway

Goals For Regional Water Planning

Finally, individuals wrote down the long-range regional water planning goals that would allow the regional vision to be realized. Goals were written on cards, passed to the front, organized by like topics, and then wordsmithed. The following nine goals were developed, along with the supporting subpoints.

1. Cooperation

Cooperation
More mediation; less litigation
Determine the most beneficial uses for our water

2. Optimize Natural Occurrence

(Take advantage of) Mother Nature
Catch and hold excess
Sub-surface water storage

3. Protect Water Rights

Protect current water/rights
Secure existing water rights
Just compensation for water rights

4. Locally Planned Growth

Control urban growth (sprawl)
Controlled development
Maintaining local/individual control
Better distribution systems
No loss of agricultural lands/water to houses
Thought-out and supported local growth plans (zoning)
Planning

5. Conserve and Recycle

Recycle water

Recycle

Control of the growth of recreation facilities

Use recycled water where possible

Efficient use; reduce water

Practice not wasting water in personal use

Water use efficiency

6. Provide Accurate Data

Accurate and adequate information to base decisions on

Quantify the amount of water available

Water quality monitoring (non-federal)

7. Healthy Resource Management

Stop the waste of city and agricultural water

Healthy land management practices lead to healthy watersheds

New ways to deal with silt and salinization

Water-hungry trees along rivers must go

8. Enact Necessary Legislation

Funding for projects

Growth management

Resource protection

Enabling legislation

Funding for efficiency and conservation measures

Streamline water transfer system (code)

Regulations on watershed use

9. Educate the Public

Education on all water resource aspects

Education on water use systems

Education of all parties

**NOTES FROM STEERING COMMITTEE MEETING #1
AUGUST 8, 2000**

A total of 20 Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Review Of Regional Water Planning Process And Role Of Steering Committee

For the benefit of newcomers Joanne Hilton and Bruce Poster provided a review of the regional water planning process and outlined the role of the steering committee.

Designation Of Alternates To The Steering Committee

Several steering committee members designated their alternates.

Public Participation Process

The steering committee generally agreed with the content of the draft Public Involvement Plan regarding the public involvement process. Members offered suggestions regarding how to notify the public via the media. It was also decided to allow the public to fully participate during the steering committee meetings, rather than restricting their participation to making comments at the end.

Review Of Regional Vision And Goals

The steering committee reviewed the regional vision and goals that had been developing during the stakeholder meeting on May 9, 2000. Some changes were made to the vision and goals, as reflected below.

Regional Vision

1. Healthy Environment

- Clean healthy environment
- No litter
- Environmentally compatible
- Water quality
- Good water quality
- Watershed protection
- Clean air
- Pure water
- Healthy forests

2. Open Space Protection

- Open spaces
- Planned open space development

3. Quality Recreation

Recreation facilities
Heavy water demand for recreation
Recreation and fishing

4. Natural Resource Conservation

Catch excess water for use later downstream
Rebuilt Hebron Dam for storage
Efficiency
Underground drip irrigation
No way to make more water
Cleaner, leaner living practices
More xeriscaping
Recycle water
Healthy forests

5. Adequate Water Availability

Distribution systems
Adequate water quantity

6. Respect For Private Property Rights

Fair and equitable distribution of water
Priority of water rights
Private land respected
New priority of water users

7. Multiple Use Cooperation

Cooperative urban and rural development
Cooperation between land, city, environment
Multiple resource use

8. Healthy Communities

More individual tolerance
Keep life simple
Strong communities: prosperous and progressive
Organized (managed) community and rural population growth
Rural lifestyle/atmosphere
Quality schools
Local control
Rural/small town atmosphere
Housing that isn't substandard

Jobs that pay a living wage
Support for the area's history, arts, and culture
Raton as the hub of northeast New Mexico
A four-lane east/west highway

9. Healthy Regional Economy

Create jobs
Healthy agriculture economy

Goals For Regional Water Planning

1. Cooperation

Cooperation
More mediation; less litigation
Determine the most beneficial uses for our water

2. Optimize Natural Occurrence

(Take advantage of) Mother Nature
Catch and hold excess
Sub-surface water storage

3. Protect Water Rights

Protect current water/rights
Secure existing water rights
Just compensation for water rights

4. Locally Planned Growth

Control urban growth (sprawl)
Controlled development
Maintaining local/individual control
Better distribution systems
No loss of agricultural lands/water to houses
Thought-out and supported local growth plans (zoning)
Planning

5. Conserve and Recycle

Recycle water
Recycle
Control of the growth of recreation facilities
Use recycled water where possible
Efficient use; reduce water
Practice not wasting water in personal use

Water use efficiency

6. Provide Accurate Data

Accurate and adequate information to base decisions on

Quantify the amount of water available

Water quality monitoring (non-federal)

7. Healthy Resource Management

Stop the waste of city and agricultural water

Healthy land management practices lead to healthy watersheds

New ways to deal with silt and salinization

Water-hungry trees along rivers must go

Forest management for fire prevention and watershed management

8. Enact Necessary Legislation

Funding for projects

Growth management

Resource protection

Enabling legislation

Funding for efficiency and conservation measures

Streamline water transfer system (code)

Regulations on watershed use

9. Educate the Public

Education on all water resource aspects

Education on water use systems

Education of all parties

Approach To Water Supply and Demand Analysis

Joanne and Bruce outlined the approaches to be used in conducting the regional water supply and demand analyses. The following issues were identified by the committee:

- Siltation of reservoirs
- Coal methane exploration and production (and related water supply data)
- Water in old mine shafts
- Possible new irrigation circle at T O Ranch
- Adjudicated vs. consumptive water rights and reasons for differences (e.g. siltation or drought)
- Validity of water rights
- Impacts of threatened and endangered species on water supply

Set Date For Next Meeting

The next meeting was scheduled for November 2, 2000 in Raton.

NOTES FROM STEERING COMMITTEE MEETING #2 NOVEMBER 2, 2000

A total of 27 Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Water Rights in Regional Water Planning: Issues and Approach

Dominique Cartron of Daniel B. Stephens & Associates (DBS) made a presentation on Water Rights in Regional Water Planning: Issues and Approach. The following questions and comments were made about the presentation.

- Presentation focused mostly on water suppliers, but should include more information on other types of water rights and uses, especially agriculture
- Need to find out about regulation of water use and disposal and water rights in coal methane production (wells have gone dry in Trinidad due to methane extraction); concern in Bear Canyon
- Domestic use is important, with 3,500 domestic wells in the Canadian basin; Eagle Nest has specific requirements about hookups to domestic wells. These additional domestic wells raise concerns for senior water rights holders
- Irrigated agriculture conservation opportunities. Municipalities noted that most of the water used in the region is in irrigated agriculture and therefore regional water planning focus should reflect that

Colfax County Surface Water Supply: Preliminary Results

Next, Joanne Hilton of DBS made a presentation on Colfax County Surface Water Supply: Preliminary Results. The following comment was made about the presentation.

- Inflows to Eagle Nest Lake should be analyzed
- Combine the two stations above Eagle Nest: Cieneguilla, Six Mile
- 120 month moving graph: years are not consistent with 5 year intervals; last interval jumps to 10 years

Interim Economic and Demographic Data

After lunch, Bruce Poster of Southwest Planning & Marketing presented a report on Interim Economic and Demographic Data. As part of that presentation, he identified the following factors that could affect future growth within Colfax County:

Short Term Factors

- Coal gas production
- Reopening of the race track

- Growth of Angel Fire Resort

Long Term Factors

- Water availability
- Rural migration (telecommuting, second homes, retirement) trends
- Constructing a power plant
- Closing the coal mine
- Tourism growth
- Selling off ranch land for subdivisions
- Expansion of N.M. Boys School

The steering committee added the following factors to the list:

- Residential development projects
- Logging
- Biomass power plant proposal
- Fate of the Highway 87 corridor in Raton
- Moratoriums on new water meters in Maxwell, Springer, Miami
- Internet access for job creation
- Possible closing of the N.M. Boys School

Other comments on the report:

- Eagle Nest has a 40 year water plan
- Much of the growth in Eagle Nest is seasonal
- The agricultural acreage figures from the state seem too low

Preliminary List of Alternatives

Dominique Cartron presented and explained a Preliminary List of Alternatives to be considered in the water plan. Those alternatives are listed below.

Water Supply Conservation

- Improve water storage to reduce evaporation
- Implement efficiencies in municipal water supply management (e.g. leak detection)
- Develop county and city ordinances for conservation (e.g. water supply requirements for subdivisions, water restrictions during drought)
- Identify feasible conservation measures for non-municipal uses (industrial, agricultural, tourism etc.)

Public Education

- Educational ads, brochures
- Organize public events - Water Day
- Outreach to schools
- Create a part-time water coordinator position in the region

Water Supply Development & Infrastructure

- Municipalities conduct 40-year water plans and appropriate water to meet future demand
- Other entities conduct 40-year water plans and appropriate or contract for future water supplies.
- Identify transfers or leases that could supply projected demand
- Identify unappropriated groundwater to meet projected demand
- Identify infrastructure necessary to store or carry water to meet future water demand

Water Supply Quality Protection

- Reducing contamination: point source and non-point source
- Nonpoint source projects (319 funding through New Mexico Environment Department (NMED))
- Establish a watershed group to undertake projects and obtain funding
- Draft watershed management plan
- Source water protection assessment through NMED to identify threats to water quality
- Draft source water and wellhead protection plans for key water supplies

Bruce Poster facilitated a discussion, which resulted in the following comments on each of the four categories of alternatives:

Water Supply Conservation

- In certain types of soil, developers should, through contract negotiations, be required to provide bedding above and below water pipes, as is done in Eagle Nest
- Address dredging siltation from reservoirs or building new reservoirs
- Reduce losses through lining ditches and encasing delivery systems (this will reduce return flow credits)
- Consider a central water authority for more efficient delivery (which may be difficult to do due to water quality requirements)

Public Education

- The coordinator could be located in the Office of the State Engineer
- Since most water is consumed by agricultural, education should address conservation in agricultural use
- Education would keep conservation in people's consciousness, e.g. through coordination with local governments
- The coordinator could also seek funding for projects
- The coordinator could also do public outreach regarding water quality

Water Supply Development and Infrastructure

- Infrastructure should be provided to reduce agricultural losses, e.g. for siphons and ditch linings)
- Adequate water supply reduces ISO ratings and provides savings on homeowners insurance premiums (e.g. Eagle Nest residents realized a savings of one-third by going from an ISO rating of 9 to 6).
- Springer needs a treatment plant and to upgrade mains to Springer Tract and French Tract

Water Supply Quality Protection

- Communities should require a watershed management study on development projects, as is done in Eagle Nest
- Eagle Nest has annexed rural areas to eliminate septic tanks
- Need forest management for fire protection
- Need cooperative arrangements for managing municipal water sheds on private property
- Need authority to control wells within City limits
- May need sole source aquifer designation by EPA
- Protection is needed for high quality water sources
- Protect and improve vegetation (eliminate noxious weeds)

Additional Funding for Water Planning

Dominique Cartron explained that it was necessary to submit a proposal for supplemental funding for water planning the following day. The group agreed to request \$130,000 for the following items:

- An in-depth evaluation of agricultural water supply management alternatives
- Drought management planning and coordination
- Local watershed planning activities
- Public education and communication on regional water management issues

**NOTES FROM STEERING COMMITTEE MEETING #3
JANUARY 24, 2001**

A total of 20 Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Update On Demand Analysis

Bruce Poster handed out a report “Projection of Colfax County Growth: 2000-2040” and presented the major findings from the report. A discussion followed, during which the following points were made:

- The population of Eagle Nest in 1960 was not zero; however, that population is included in the rural population
- The rural areas may experience more growth under the high scenario; however, annexation could push that population into the cities
- The water use of visitors needs to be considered; it is incorporated into per capita usage figures, which will be pointed out in the final report
- Questions were raised about the status of the racetrack and the logging industry
- Increased efficiency in irrigation would not reduce water use; instead, it would allow more acres to be irrigated with the same amount of water

Joanne Hilton then handed out “Future Water Use Projections: Preliminary for Discussion Purposes” and presented her findings to date. The following comments were made:

- The number of wells in the database is thought to be inaccurate
- A scenario with reduced acreage and drought should be considered
- Declining agricultural acreage may not free up water (per comment above)
- Base agricultural demand on decreed rights and investing declaring additional rights
- Some irrigated agriculture water is actually used by livestock
- Be sure to include the summer water use from grazing in the Moreno Valley
- Enlarging/cleaning reservoirs would reduce the evaporation rate (but not the losses)

- Water re-injected in coal-bed methane gas extraction is not supposed to affect shallow wells

Discussion Of First Public Meeting In Angel Fire

The three steering committee members who attended were pleased with the first public meeting held in Angel Fire the previous night.

Suggestions For Remaining Two Public Meetings

No changes were suggested for the remaining public meetings.

Work Plan For Phase 2, Including Public Involvement

Joanne providing an overview of activities planned for Phase 2. Bruce asked for suggestions for public involvement. The committee supported holding focus groups with representatives of the following interests:

- Irrigated agriculture and livestock
- General businesses
- Recreational users of water

There was also discussion of ensuring that irrigated agriculture was adequately represented on the steering committee.

Funding Application For Phase 3

Joanne described the status of a proposal for additional funds for Phase 3. Mary Helen Follingstad of the Interstate Stream Commission indicated that a bill was being introduced to provide funding for additional regional water planning, which would pay for the Phase 3 effort. It was suggested that the steering committee seek support for the bill from their legislators.

Schedule Next Meeting

The next meeting was scheduled for 1:00 to 3:30 on Wednesday, April 18th in Raton. Carol will obtain a room for the meeting.

NOTES FROM STEERING COMMITTEE MEETING#4 APRIL 18, 2001

About 20 Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Update on Funding Application

Joanne Hilton updated the group on the Phase III application, which was funded for the requested \$130,000, and handed out copies of the scope of work and budget. It was suggested that more funding be allocated to agricultural water conservation and less to the drought planning. There was also discussion regarding readings on the Rayado.

Discussion Of Public Meetings

Bruce Poster summarized some attendance information and some of the comments that were heard at the three public meetings in January. Participants felt that the public meetings had been successful and elicited a number of useful comments. It was suggested that more advance notice be given, possibly using water bills. It was also suggested that the purpose of the meetings be clarified.

Process For Reviewing Draft Report

Joanne asked for suggestions on where draft reports should be made available to the public. It was decided that drafts would be left at the following locations:

- Raton: water utility office and SWCD office
- Cimarron: City Hall and library
- Springer: City Hall
- Maxwell: Vermejo Conservancy Building
- Eagle Nest: library
- Angel Fire: Village Hall
- Philmont: administration office

The public will be notified of the availability of the drafts when the next steering committee meeting is announced. Comments should be sent in to DBS&A before the next meeting in July if possible.

Suggestions For Public Participation

After a discussion of whether to split up the agriculture/livestock group, it was agreed that there would be four focus groups, with three held in October and a group with local officials, which might be held in July or October. The fourth group is to be funded out of the Phase III dollars.

1. Agriculture/livestock

2. Recreation and tourism
3. General business interests
4. Local officials

The following suggestions were offered regarding participants and scheduling.

Agriculture/livestock. The group should be held in Springer in the evening (however a couple of participants preferred an earlier meeting time). Participants should be solicited from the following:

- New Mexico Cattle Growers (Bill Sauble)
- New Mexico Farm and Livestock Bureau (John Van Sweden)
- Sandra's list at the Cooperative Extension Service
- Ditch companies.

Recreation and tourism. The group should meet in Cimarron in the afternoon. Some of the following representatives should be invited, although it is most important to involve organizations not already involved in the water planning process.

- State Forestry
- State Parks
- State Game & Fish (Raton)
- Vermejo Park
- Maxwell Wildlife Refuge
- Philmont Ranch
- Angel Fire Resort
- Whittington Center
- Miami Water Users
- Springer Ditch
- Carson National Forest
- Colorado Department of Wildlife
- Raton Lodgers Tax Advisory Committee
- Individual businesses identified by chambers of commerce (see below)

General business interests. This group should meet in Raton and include representatives of heavy water users (including the mine; the Burlington, Northern & Santa Fe Railway; and BTU Concrete) and other businesses. The following chambers of commerce will be asked to invite participants.

- Raton
- Raton-Colfax Hispano Chamber
- Cimarron
- Springer
- Eagle Nest
- Angel Fire

Local officials. Senator Lyons, Representative Regensberg, County Commissioners, and city/village officials will be invited to attend a meeting in Cimarron.

Census Data For 2000

Bruce handed out a table comparing the 2000 census figures for Colfax County with the estimates used in projecting future water demand. The county total was about 400 persons less than the estimate from UNM that was utilized. Population was lower in Angel Fire, Raton, and Springer than estimated, but higher in the rural areas. The new data will be utilized to revise the earlier projections. It was pointed out that the Boys School is not counted into the Springer population, despite the fact that the school uses about one-third of the water consumed.

Criteria For Selecting Alternatives

Participants broke into three smaller groups to brainstorm criteria for selecting alternatives. The consultants will refine and edit the list and work with the committee to develop weights for the criteria. The following criteria were suggested:

- Other supplemental funding is available for implementation
- Legality (e.g. protection of water rights)
- Efficient use of water
- Regional benefit to more than one interest
- Technologically feasible and outside help is available
- Economic feasibility
- Minimum cost impact to the public (e.g. in water rates, impact fees)
- Water quality (filtration and treatment)
- Public acceptance: urban (municipal and wells) and rural (full-time and seasonal)
- Environmentally friendly
- Physically possible
- Politically feasible
- Sufficient water availability in region
- Measurable benefits
- Multiple goals addressed
- Long-term benefits
- Short-term benefits

Schedule Next Meeting

The next meeting was scheduled for Wednesday, July 18th in Raton, possibly from 10 to 3. Bruce will contact the bank about sponsoring lunch.

NOTES FROM STEERING COMMITTEE MEETING #5 JULY 18, 2001

Seventeen Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Comments On Draft Regional Water Plan

Bruce Poster reviewed the schedule for getting comments on the draft regional water plan and informed attendees that comments (preferably in writing) could still be submitted within the next four weeks. Several people have submitted written comments. The following questions were posed:

- What follow-up had been done to update the status of leaking underground storage tanks? Joanne Hilton stated that she will update the status report when the revised report is issued.
- What is the vehicle for addressing old septic systems? Joanne stated that this will be addressed through the analysis of alternatives.

Projecting Agricultural Water Demand

Joanne discussed the fact that some citizens have questioned the accuracy of agricultural acreage figures used in projecting agricultural water demand. The following points were made:

- Use the adjudicated irrigation acreage as a minimum figure for basis of projecting demand.
- A mechanism for leasing agricultural water rights to municipalities is needed (currently there is a statutory 10-year limit on leases).
- Most streams are over-adjudicated in most years.
- There is a need for legislation to provide incentives to farmers to increase efficiency.
- As the U.S. population increases, there is an increasing need for water to grow agricultural products.
- It is important to protect the agricultural economy and communities.

It was agreed that the agricultural acreage numbers will be left in the report, along with comments regarding questions about their accuracy. But, the adjudicated acreage numbers will be used for projecting demand.

Protecting Agricultural Interests

Joanne stated that some of the comments about the plan addressed the need to protect agricultural water rights. The following points were made:

- There is a concern regarding condemnation by municipalities.
- A proposal to change use from agricultural may not be approved by the State Engineer.
- There is concern regarding loss of water rights to protect threatened or endangered species.

- There are no threatened and endangered fish in the county at this time.
- Some people would like to head off any such designations in advance, probably via a political action committee.

Overview of Process for Evaluating Alternatives

Bruce provided a handout with an overview of the process for evaluating water planning alternatives and walked people through the process. He also distributed a handout that summarized the Vision and Goals for regional water planning in Colfax County.

The group then broke for lunch, which was sponsored by International Bank.

Criteria and Weights for Evaluating Alternatives

Bruce passed out definitions of 22 criteria for evaluating alternatives, each of which will be scored 1 to 3 for each alternative. The criteria came out of the committee's work at the April meeting. The group made the following changes to the criteria:

- Drop conflicting laws as a criterion.
- Adding “local or state” to likelihood of legislation.

The participants were then given a handout on how to weight the importance of each criterion on a scale of 1 to 5 and went through the process of weighting each of the 21 criteria.

Initial Ranking of Alternatives

Dominique Cartron provided handouts with definitions of each of the 34 possible alternatives and showing how the alternatives came to be on the list (e.g. from past committee meetings or public meetings). The following changes were made to the list of alternatives:

- “Declare Capulin Basin” was added.
- “Appropriate and reserve groundwater for the region” was added.
- “Build a pipeline to Cimarron” was changed to “Build a consolidated manifold system to tie in municipal systems (Cimarron, Springer, and Maxwell)
- “Establish a watershed group” was changed to “Implement watershed groups to undertake projects and obtain funding

Joanne provided two handouts, a blank alternative selection matrix and one that had been partially filled out by the consultants. The participants were then divided into three smaller groups for purposes of applying the five remaining criteria to each of the 36 alternatives. Two of the groups completed their work in the time allotted. The members of the third group were invited to complete the evaluation on their own and send their sheets in. All participants were asked to evaluate the scores for the legal, economic, and technical criteria filled out previously by the consultants and to indicate any areas of disagreement.

Watershed Planning

Joanne described the watershed planning work to be included in Phase 3 of the project, as well as other watershed planning work being initiated under a contract with the New Mexico Environment Department. Participants supported the idea of having watershed planning groups in the Moreno/Cimarron basin and in the Raton/Sugarite area. It was suggested that existing stakeholders, as well as State Parks and State Game and Fish, be invited to participate in watershed planning on the Cimarron.

Schedule Focus Groups and Next Meeting

The next meeting will be held in October, in conjunction with four focus groups, as identified by participants at the April meeting:

- Agriculture and livestock
- Recreation and tourism
- Other business interests
- Local officials

The focus groups will be used to educate stakeholders and get their input as to which alternatives they prefer. To avoid a conflict, the next committee meeting will not be held on October 2 or 9. The meeting with local officials will be scheduled to avoid the Angel Fire council meeting on October 18th.

NOTES FROM STEERING COMMITTEE MEETING #6 OCTOBER 24, 2001

Twenty Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Update on Regional Water Planning Process

Joanne Hilton reviewed the progress of the Phase I and II work to date. She also described the focus group work taking place on October 23 and 24. Members indicated that they would like to receive copies of the notes from the focus groups. One member indicated that he had comments on the draft report; Joanne indicated that there was still time to submit comments.

Selection of Alternatives

Bruce Poster described the process that had been used to provide an initial ranking of alternatives, including the work at the July, 2001 steering committee meeting. He then distributed the list of alternatives, in order of numeric ranking. Bruce then facilitated a process to clarify the wording of alternatives and to upgrade or downgrade alternatives, based on further consideration and discussion. The following thirteen alternatives were selected for more detailed evaluation in the water plan.

1. Municipalities and other entities develop 40-year water plans and acquire water to meet future demand.
2. Seek funding for continued planning and implementation projects.
3. Implement outreach and public education program (materials, events, brochures, hire coordinator).
4. Interact with political leaders to develop support (state and federal legislators).
5. Appropriate and reserve groundwater for the region.
6. Adopt voluntary watershed management plans.
7. Identify water rights transfers or leases that could supply projected demand.
8. Protect and restore watersheds to improve yield.
9. Adopt county and municipal land use plans that are coordinated with water planning.
10. Implement dredging projects to improve storage in reservoirs.
11. Develop and implement model city and county conservation ordinances.
12. Recycle municipal wastewater for agricultural and recreational use.
13. Develop and implement county septic tank and other water quality control ordinances, and construct artificial wetlands to protect groundwater.

Other alternatives will be included in the plan, but will not receive the same detailed level of evaluation. In addition, several alternatives on the original list (watershed planning, drought mitigation, and agricultural water planning) are already being implemented in Phase III. Additional comments follow:

- Public education should address the problem of flushing antifreeze into sewage systems.
- There should be a coordinator for the public education.

- Instead of focusing on sole source aquifer designation, place initial focus on enforcement of existing regulations.
- Establishing a central water authority should be delayed; there is a need for a county coordinator to coordinate deliveries outside of the Cimarron basin.
- As part of the dredging effort, lakes should be prioritized.
- Ditch lining should be incorporated into the agricultural water conservation effort.
- Enhancing watersheds should improve both yield and water quality.

Phase III Scope of Work: Drought Planning

Joanne described the scope of work related to drought planning. Committee members made the following comments:

- There should initially be a task force to establish the process for drought planning; later, there should be a coordinator to announce the stages of drought and do education.
- The work of the coordinator should be combined with the work on biomass and fire prevention.
- Colfax County is always in, at best, a mild drought.
- Refer to the FSA drought standards.
- Range condition surveys are done in Colfax County, but not soil moisture surveys.
- The task force should be comprised of representatives of the County, municipalities, and conservation districts, as well as Jim Hollis.

Phase III Scope of Work: Watershed Planning

Joanne described the scope of work related to watershed planning. Committee members made the following comments:

- Proceed with the two watershed groups: the Cimarron and Upper Canadian.
- Don't duplicate the work of the Environment Department task force in the Cimarron; combine into one effort.
- There was a discussion of breaking out the Rayado separately, which was not agreed to.
- The efforts should move toward implementation.
- Major landowners should be asked to participate. Jim Hollis will help identify them. Bill Sauble offered to participate.

- The initial Upper Canadian meeting should be held in February or March in the afternoon in Maxwell. (The initial Cimarron meeting, organized by the Environment Department, will be held from 7 to 9 p.m. on November 7 in Cimarron.)

Phase III Scope of Work: Agricultural Water Conservation

Joanne described the scope of work related to agricultural water conservation. Committee members made the following comments:

- Good contacts are Joe Bob Hronack, Vermejo Conservancy District; Leroy Gadero or Tommy Crawford, Springer Ditch; Montoya Fernandez Ranch; and large irrigators.
- Consider plastic pipes in ditches.
- Conduct measurement at the headgate.

Phase III Scope of Work: Public Education

Joanne described the scope of work related to public education. Committee members made the following comments:

- Use electric bills (Kit Carson and Springer coops) to distribute information.
- Use County tax bills (November) or assessments (January or February).
- Keep messages short and do not use acronyms or bureaucratic language.

Schedule Next Meeting

The next meeting will be held in February 2002. (The last week of January would not be a good time to meet.)

**NOTES FROM STEERING COMMITTEE MEETING #7
FEBRUARY 12, 2002**

Twenty-five Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

Alternatives for Meeting Future Water Demand

Dominique Cartron presented the final list of alternatives and made a presentation on some of the non-technical alternatives. Bruce Poster then facilitated a discussion regarding the alternatives, during which the following points were raised:

- It was suggested that the plan provide support to municipalities in how to do 40-year water plans.
- It was suggested that there be more coordination with the Meridian watershed group work.
- There was not a desire to form a subcommittee to work on the alternatives at this time; this matter could be reconsidered, in light of future coordinated efforts with Meridian.
- It was suggested that the Colfax County alternatives be compared with those in other regional water plans to see if anything important has been left out.

Drought Planning

Dominique Cartron made a presentation on drought planning, which addressed the elements of a drought plan and work already done on drought planning in Colfax County. The group did not feel the need to form a subcommittee on drought planning at this time, but might consider doing so in the future. Bruce Poster facilitated a discussion around the following questions:

What do you see as the biggest vulnerabilities during a drought?

- Areas that are surface water dependent
- Irrigated agriculture and grazing
- Springer, Miami, Raton, Cimarron
- Downstream users
- County-wide
- Those dependent on stream-flow (vs. reservoirs)
- Those with junior water rights
- Domestic well users who could be restricted

During a previous drought, what would have helped you prepare for it?

- Early monitoring system
- More local indicators of snow-pack and rainfall (perhaps using new county fire prevention staff person)
- Correlation of actual runoff data with predictions

- Coordination among municipalities and agriculture, e.g. in reducing acreage to free up water for municipalities, with blessing of ISC (have done transfers via Permit 71)
- Line ditches and build pipelines
- Add storage, but avoid losses from storage
- Provide storage on Chicorica and Ponil
- Use catchments to slow runoff
- Remove silt

What programs are currently in place to deal with drought?

- Drought ordinance in Angel Fire
- Drought ordinance in Springer with surcharges for high usage
- Landscape meters in Eagle Nest
- Voluntary program (phase 1) with surcharges for high usage (phase 2) in Raton
- Permanent surcharges for high usage in Miami
- No programs at county level or for agriculture

How well have the current programs worked?

- Springer saved 40% from surcharges and other measures
- Agriculture has reduced acreage, changed crops, added sprinklers (now at 10% of acreage)
- The Cimarron pipeline was originally a drought measure

What would be useful to you in a drought management plan?

- Method for selling water to neighbors with higher value crops
- Method for addressing transfers within the Vermejo (subject to Bureau of Reclamation approval)
- Task force in place and ready to go when needed
- Sharing information on needs
- Triggers identified
- Sub-regions established with their own triggers

What measures might be helpful?

- See items discussed above
- Education beforehand on xeriscaping, conservation, etc.

Schedule Next Meeting

The next meeting will be held on May 16, 2002, in conjunction with the watershed planning meetings.

**NOTES FROM STEERING COMMITTEE MEETING #8
MAY 16, 2002**

Twenty Colfax County residents were in attendance. The meeting began with introductions and a review of the agenda.

ALTERNATIVES FOR MEETING FUTURE WATER DEMAND

DBSA staff (Joanne, Dominique, and Beth) made presentations on the alternatives under consideration (as previously prioritized by the committee). After each presentation, there was an opportunity to ask questions, make comments, and identify potential social, cultural, political, and environmental impacts, as documented below.

Watershed Management

- Increased yield is a secondary benefit relative to the primary benefits of habitat improvement and fire suppression
- Watershed groups can support applications for thinning to increase chances for funding
- Thinning may be controversial in urban areas in need of education, but there is high local acceptance
- Watershed management enhances forest health, wildlife habitat, and water yields
- There could be social impacts in the Cimarron basin from restrictions on development to protect the watershed
- Removing exotics may not increase yield if they are replaced by willows and cottonwoods
- Willows provide cattle feed in dry years and lead to beaver ponds
- Watershed groups will help with fire suppression and protect water quality, to the benefit of municipalities

Municipal Water Conservation

- Springer domestic water is being used by livestock; there should be alternate sources
- Shallow wells are drying up around cities
- Low flow toilets or high water rates are expensive and therefore have social impacts
- Education is the key
- Requiring mandatory conservation for new construction could reduce growth within communities
- Curbs on growth could set up competition among communities; instead, there should be a county-wide approach to conservation

Agricultural Water Conservation

- The value of water in the County, for purposes of measuring cost-effectiveness of conservation, varies depending on priority and storage availability
- Value also varies between municipal and agricultural uses
- Large purchases have been going for \$5,000 per acre-foot
- It is difficult to change crops, as some are less suitable for the environment or require more labor than is available
- State legislation is needed so that farmers get the benefits of their own conservation (especially if they have a high priority)
- It will not always be cost-effective to expand acreage to utilize the water that is conserved
- Farm Services wants too much control in return for assistance
- Ditch lining may reduce return flow credits
- Sprinkler use should be addressed, as it improves yield and is cost-effective
- Concrete ditch lining is less cost-effective than plastic pipe
- It may be difficult to maintain ditches if members start to sell their water
- Farm Services should pay for gated pipe
- More stock ponds could be built to conserve water used by livestock
- The environmental impacts of ditch lining on wetlands should be considered

Forty-Year Water Plans

- Plans should be reviewed at five-year intervals
- It would be costly to fund plans without CDBG or other grants
- Without plans, there is the possibility of forfeiture of unused water
- The public welfare should be considered as a part of all water plans

Water Rights Transfers

- The County would be a good vehicle for acquiring water rights
- The rights belonging to the mine should be examined, although they appear to have limited rights
- Water should be kept within the basins

Appropriate and Reserve Groundwater

- There could be opposition from existing users, although their senior rights would be protected
- Pipeline costs are considerable
- The extent of the resource in the Capulin is uncertain
- The County should proceed to get the Capulin declared
- Senior users should be consulted with

Integrate Land Use and Water

- A municipality should not take cash from developers in lieu of water rights without setting up a fund for that purpose
- Standards should be uniform throughout the County
- The political climate may be ripe
- It is important to manage and direct growth
- There is a need for research

Wastewater Reuse

- Wastewater reuse is expensive and has some perception problems
- Wastewater cannot be given to cattle or used on hay intended for cattle

County Water Quality Ordinance

- The focus should be on new construction, not existing buildings
- It is important to prevent future problems
- There is a lack of building inspectors to enforce codes
- There could be a joint powers agreement for an ordinance in the extraterritorial zone around a city, rather than throughout the entire county
- There is a need for consistency throughout the county

Sediment Removal in Reservoirs

- It may be difficult to store sediment on site

PUBLIC WELFARE

The committee reviewed the statement of regional vision and goals that they had previously developed and adopted it as the basis for defining public welfare in the county. Participants felt that the public welfare should be considered as a part of all water plans.

SCHEDULE MEETINGS

Public meetings will be held after August 18th in Springer, Raton, and Angel Fire, ideally from 7 to 9 p.m. The various city councils can help publicize the meetings. It was suggested that the local official focus group take place during the Intergovernmental Council Meeting if possible. A steering committee meeting will also take place during the week of the public meetings. The draft plan will not be released to the public until it has been distributed to the steering committee.

**NOTES FROM STEERING COMMITTEE MEETING #9
AUGUST 28, 2002**

Ten Colfax County residents and Mary Helen Follingstad of the Interstate Stream Commission were in attendance. The meeting began with introductions and a review of the agenda.

INITIAL PUBLIC MEETINGS

Bruce Poster summarized the results of the initial two public meetings in Raton and Springer, with a third meeting scheduled for that evening in Angel Fire.

LOWER PRIORITY ALTERNATIVES

Bruce Poster facilitated a discussion of the lower priority alternatives that had not been evaluated as part of the plan. The group determined whether to retain, drop, consolidate, or modify each of the alternatives. The revised list of alternatives is attached. In addition, a general schedule for implementing the alternatives was agreed to:

- Tier 1: Start implementing immediately; includes agricultural conservation, drought planning, and watershed management.
- Tier 2: Implement in 3 to 10 years; includes all the other priority alternatives (see attached list)
- Tier 3: Start studying at any time, implement in 10 to 40 years; includes all the other, lower priority, alternatives (see attached list).

COLFAX COUNTY LAND USE PLANNING

Kathy Trujillo, Colfax County Manager, and Rayetta LeDoux, Assistant County Manager, made a presentation on the county comprehensive plan, to be created with the assistance of the Western Environmental Law Center and Anita Miller. The plan will provide guidance on development and be adopted by the county as an ordinance. There is a desire to have considerable public input, including from members of the steering committee. The regional water plan could be adopted as part of the comprehensive plan.

APPLICATION TO WATER TRUST BOARD

The committee continued a discussion which had begun at the Canadian Watershed Group meeting the previous day as to whether to apply for a Water Trust Board grant. It was determined that the steering committee, through the SWCD, would apply for the grant (in lieu of a 319 grant). The grant would provide funds for supporting the watershed group, education and outreach, and specific projects (e.g. a Sugarite watershed project initiated by the City of Raton). Bill and Mary Lou will support the application, which will be co-sponsored by the Adelante RC&D, Colfax County, and the City of Raton.

FINAL STEPS TO COMPLETE PROJECT AND PLAN IMPLEMENTATION

Joanne Hilton outlined the final steps in getting the plan completed, reviewed by the steering committee, accepted by local governments, and adopted by the Interstate Stream Commission.

The committee would like to continue meeting quarterly after the completion of the plan to continue implementation efforts. SWCD will take the lead in supporting the efforts, with assistance from the County (which will be briefed on progress periodically at Commission meetings) and other participants. An executive committee may be formed to guide the efforts. There is the possibility of additional state funding (pending approval of a bill at the next session) for implementation of regional water plans. This item will be discussed further at the next meeting.

SCHEDULE NEXT MEETING

The next steering committee meeting will be held on the afternoon of October 28, 2002, subject to being able to make a presentation on the plan that morning at the Colfax County Intergovernmental Council meeting.



Alternatives for Meeting Future Water Supply Needs

Priority Alternatives

Other Alternatives

Water Supply Conservation

- Develop county and city water conservation ordinances
 - Increase water rates
 - Xeriscape to conserve (municipal) water
 - Implement efficiencies in industrial uses such as mining
- Implement agricultural water conservation measures (e.g., laser leveling, drip irrigation)

- Implement efficiencies in municipal water supply management (e.g., leak detection)
- Reduce losses by lining ditches and encasing delivery systems
- Remove invasive vegetation; revegetate to reduce riparian evapotranspiration

Water Supply Development and Infrastructure

- Implement dredging projects to improve storage in reservoirs and ponds
- Recycle municipal wastewater for agricultural and recreational use

- Develop unappropriated groundwater to meet projected demand
- Implement cloud seeding projects
- Build a regional delivery system to tie in municipal systems (Cimarron, Springer, Maxwell, Miami, and Raton)
- Maintain treatment plant in municipalities and upgrade mains and other infrastructure
- Build additional storage capacity

Water Supply Quality Protection

- Manage watersheds to improve yield, implement watershed groups to undertake projects, and obtain funding and adopt watershed management plans that address private and public lands
- Develop and implement county septic tank and other water quality control ordinances
- Require water quality study for all development projects

- Implement nonpoint source projects
- Draft and implement source water and wellhead protection plans for key water supplies
- Pursue sole source headwaters aquifer designation (e.g., Cimarron, Sugarite, Canadian Headwaters)
- Construct wastewater treatment systems to replace septic tanks in the Moreno Valley
- Monitor methane gas extraction activities for potential impacts to groundwater quality

Water Resources Management

- Develop 40-year water plans and appropriate water to meet future demand (municipalities and other entities)
- Pursue water rights transfers or leases that could supply projected demand
- Implement growth management and land use planning
 - Develop and implement city ordinances to control private wells
- Appropriate and reserve groundwater for the region
- Implement drought contingency plan

- Establish a mechanism to manage delivery throughout region
- Establish local water banking (accounting) source for drought periods
- Declare Capulin Basin
- Establish a Canadian River Water Master

Actions that Span Multiple Alternatives

- Outreach and public education (materials, events, brochures, hire coordinator)
- Seek funding for continued planning and implementation projects
- Interact with political leaders to develop support (state and federal legislators)

NOTES FROM COLFAX MEETINGS OF 11/14/02

STEERING COMMITTEE

- 17 in attendance.
- Add to plan language re limiting and metering domestic wells.
- Comments on plan due by 1/20/03.
- Changes made to proposed resolution, will be emailed with a revised executive summary to each community.

Implementation: Leadership

- SWCD will call meetings (beginning in March 2003); officers to be elected at first meeting.
- Steering committee and drought task force to be combined.
- County Fire Marshall will work on drought issues.
- Add Colfax County, State Parks, and State Game & Fish to list of members (from drought plan).
- Mary Lou, Richard, Dan, Carol, and Julia would like to attend ISC meeting.

Implementation: Responsibilities

1. Conservation ordinance--cities and county
2. Agric. water conservation—irrigation districts, NRCS, SWCD, extension agent
3. Dredging—cities, irrigation districts, ISC/OSE
4. Recycle—cities
5. Watersheds—watershed groups, NRCS, extension agent
6. Septic ordinance—cities, county, NMED
7. Plan and secure—cities, county, water users
8. Transfer/leases-- cities, county, water users
9. Land use planning—cities, county
10. Appropriate and reserve—county, Raton
11. Drought planning—see membership of drought task force, as amended today
12. Outreach/education—cities, county, SWCD, watershed groups, county extension
13. Funding-- cities, county, SWCD, watershed groups
14. Gain support-- cities, county, SWCD

LOCAL OFFICIALS FOCUS GROUP

- 13 in attendance
- Reps from county and 4 cities (Angel Fire, Raton, Maxwell, Springer)
- DBS&A will email resolution and executive summary
- The Capulin Basin is also in Union County, whose residents need to be consulted

**NOTES FROM CANDIAN WATERSHED GROUP MEETING #1
MAY 15, 2002**

Twenty-one watershed residents were in attendance. The meeting began with introductions and a review of the agenda.

Presentation

Dominique Cartron of DBSA made a presentation on how and why to form a watershed group. She addressed the purpose of a watershed group, who should participate, the benefits of such a group, funding through federal 319 funds and other sources, experiences in other watersheds, and the relationship to the regional water planning effort.

One of the participants indicated that his primary interest was to improve water quality, not just to tap into available funding. It was agreed that obtaining funding would facilitate improving water quality, but that it was not an end objective in itself.

Other Participants

Bruce Poster of SPM facilitated a discussion to identify the following persons who will be invited to participate in future meetings:

- Julia Davis of the CS Ranch
- NM Environment Department in Raton
- Mike Bellew of the NRA
- Jack Walton, Rancher
- Patricia and Evelyn Jung, Ranchers
- Van Sweens Ranch
- Bob Dye of Sugarite State Park
- George Myers Ranch
- T O Ranch
- NM Game & Fish in Raton
- Dan Estrada of State Land Office in Roy
- NM State Highway Department in Las Vegas

Goals

Bruce Poster facilitated a discussion that resulted in identifying the following goals for the watershed group:

- Increase yield
- Maintain local control in the County
- Education and outreach, especially to promote conservation
- Maintain and enhance water quality
- Improve the quality of the habitat

- Reduce fire risk
- Identify water sources for fire suppression
- Protect the watershed as land is developed

Issues/Concerns

Bruce Poster facilitated a discussion that resulted in identifying the following issues and concerns:

- Salt cedar
- Declare/appropriate Capulin ground water
- Baseline assessment of conditions
- Monitoring usage
- Bank erosion/siltation
- Flooding/siltation

Potential Actions/Projects

Bruce Poster facilitated a discussion that resulted in identifying the following potential actions and projects:

- Gather and consolidate baseline data
- Salt cedar control
- Thinning in Sugarite Canyon, Raton Creek, and Una de Gato Creek
- Erosion control and restoration in Sugarite Canyon
- Pipelines for irrigation
- Organizing the watershed group
- Stream bank stabilization and revegetation

Future Meetings

The participants agreed that it would be worthwhile to continue the watershed group. They authorized Dominique to develop an application for 319 funds and possibly for other available funds.

The funding conduit should be a local organization that is representative of the various stakeholders. It will be one of the following organizations, subject to approval of the board of that organization. If possible, funds will be obtained to offset the administrative costs of the organization.

- Adelante RC&D
- Colfax Soil & Water Conservation District
- Vermejo Conservancy District

The grant application will be reviewed by representatives of the three organizations listed above, as well as by

- David Vackar, Vermejo Park
- Dan Campbell, City of Raton
- Sam Montoya, Pittsburgh and Midway
- Rick, U.S. Fish & Wildlife

The next meeting of the watershed group will be held in August or September, in conjunction with the regional water plan public meetings.

NOTES FROM CANDIAN WATERSHED GROUP MEETING #2
AUGUST 27, 2002

Eleven watershed residents were in attendance. The meeting began with introductions and a review of the agenda. Bruce Poster reviewed the notes from the previous meeting.

Presentations

Dr. Lee MacDonald of the Watershed Science Program from Colorado State University made a presentation on “Restoration and Management of Forests, Pinyon-Juniper Woodlands, and Riparian Zones: Effects on Water Yields and Water Quality.” The presentation generated considerable discussion regarding the implications for management of the Canadian watershed.

Joanne Hilton of DBSA made a presentation on the origins of the Canadian Watershed Group, water quality issues in the watershed, and potential funding for ongoing watershed efforts via federal 319 funds and the New Mexico Water Trust Board.

Funding For Ongoing Activities

There was considerable discussion of whether to pursue both 319 and Water Trust Board funding. There is great uncertainty about the probability of getting funding under either program. Water Board funding would probably be for a larger amount, if funds are distributed at all. Colfax SWCD had already volunteered to be the lead entity for one application. Bill Goebel offered to be the “sparkplug”, with support from Mary Lou and Richard. It was felt that the application should include education and outreach to the following entities, as well as facilitation support for the watershed group:

- Northeast Cattle Growers Association
- Colfax County Farm Bureau
- The irrigation districts
- Agricultural Extension/4H
- Municipal water boards
- Elected officials

The Water Trust Board application would be more regional in nature and could also include the Cimarron watershed. There was discussion of how to prioritize the two applications (which would partially overlap), given the limited timeframe for the application and the limited resources to submit the applications and administer the projects.

The subject of the Water Trust Board application was deferred until the regional water plan steering committee meeting the next day. (Note: At that meeting, it was determined that it would not be possible to submit both applications and that the SWCD would prefer to be the lead entity on only the Water Trust Board application. As no other entity stepped forward to lead the 319 application effort, it will not be pursued.)

Future Meetings

The watershed group will continue meeting, perhaps quarterly, until funding can be obtained to support the effort. The next meeting of the watershed group will be called by Bill, in consultation with Mary Lou.

Appendix C2

Press Release, Advertising Summary, and Example Stakeholder Letter

PRESS RELEASE AND ADVERTISING SUMMARY

Press Releases

May 9, 2000 Kickoff Meeting – “Public Meeting Announcement” (*Exhibit 1*)

August 8, 2000 – Steering Committee meeting #1 (*Exhibit 2*)

November 2, 2000 – Steering Committee meeting #2 (*Exhibit 3*)

January, 2001 – Steering Committee meeting #5 (*No press release due to concurrent public meeting*)

April , 2001 – Steering Committee meeting #4 (*Exhibit 4*)

July 18, 2001 – Steering Committee meeting #5 (*Exhibit 5*)

October 24, 2001 – Steering Committee meeting #6 (*Exhibit 6*)

February , 2002 – Steering Committee meeting #7 (*Exhibit 7*)

May 15, 2002 – Canadian Headwaters Water Shed kick-off meeting (*Exhibit 8*)

May 16, 2002 – Steering Committee meeting #8 (*Exhibit 9*)

August 27, 2002 – Canadian Headwaters Water Shed meeting (*Exhibit 10*)

August 28, 2002 – Steering Committee meeting #9 (*Exhibit 10*)

November 14, 2002 – Steering Committee meeting #10 (*Exhibit 11*)

Distribution of Press Releases:

KRTN Radio Station

Journal North - Calendar

Raton Range

Sangre de Cristo Chronicle

Springer News Bulletin (No longer publishing @ July 2002)

Angel Fire Chamber of Commerce (Beginning January, 2001)

Raton Chamber of Commerce (Beginning January, 2001)

Other Publicity

Public Meetings – 2001: January 23 (Angel Fire), 24 (Raton), and 25 (Springer)

Flyers sent to Steering Committee Members for posting on community bulletin boards and to Raton Chamber of Commerce for e-mail broadcast to members (*Exhibit 12*)

Phone calls made to key people in Angel Fire

Key people personally invited in Springer

Display ads in:

Raton Range (*Exhibit 13a*)

Springer News Bulletin (*Exhibit 13b*)

Press Release / request for publicity (*Exhibit 14*) faxed or e-mailed to:

Angel Fire Chamber of Commerce

Angel Fire City Hall

KRTN Radio Station

Journal North – Calendar

Raton Chamber of Commerce

Raton Range

Sangre de Cristo Chronicle

Springer News Bulletin

Review of Regional Water Planning Documents – July - August, 2001

Press Release / request for publicity (*Exhibit 15*) faxed or e-mailed to:

Angel Fire Chamber of Commerce

KRTN Radio Station

Journal North – Calendar

Raton Chamber of Commerce

Raton Range

Sangre de Cristo Chronicle

Springer News Bulletin

Flyers sent to Angel Fire City Hall for postings in Angel Fire and Eagle Nest (*Exhibit 16*)

Public Meetings - 2002: August 26 (Raton), 27 (Springer), and 28 (Raton)

Flyers sent to Raton Chamber of Commerce, Springer City Hall, Angel Fire City Hall, and Eagle Next City Hall for posting on community bulletin boards; Sandra Barraza of Colfax County Extension Service for distribution at Colfax County Fair. (*Exhibits 17 & 18*)

Display ads in:

Raton Range (*Exhibit 19*)

Sangre de Cristo Chronicle (*Exhibit 20*)

Press Release / request for publicity (*Exhibit 10*) faxed or e-mailed to:

Angel Fire Chamber of Commerce

Angel Fire City Hall

KRTN Radio Station

Journal North – Calendar

Raton Chamber of Commerce

Raton Range

Sangre de Cristo Chronicle

Newspaper Articles Identified

Raton Range, 08/01/'00, "Water efforts key to future of resource" (*Exhibit 21*)

Raton Range, 01/26/'01, "Future water needs under review" (*Exhibit 22*)

Raton Range, date unknown, "Conservation District protects key resources"
(*Exhibit 23*)

**The remainder of this appendix is available in
hard copies of the *Colfax Regional Water Plan***

Appendix C3

Examples of Meeting Materials and Handouts


**CANADIAN WATERSHED GROUP
AGENDA
1:30-4:00 P.M. ON AUGUST 27, 2002
RATON POST OFFICE**

1. Introductions and agenda
2. Review previous meeting
3. Presentation on "Effects of Forest Management and Fires on Runoff and Erosion"
4. Status of application for 319 funding and other potential funding
5. Priority watershed projects
6. Schedule next meeting

*Summary of Water Supply,
Demand, and
Alternatives Analysis
Colfax Regional Water Plan*

Joanne Hilton
Daniel B. Stephens & Associates, Inc.


Bruce Poster
Southwest Planning and Marketing



Daniel B. Stephens & Associates, Inc.

Regional Water Planning


- Initiated in 1987
- Overall purpose of regional water planning in New Mexico is to protect our water resources
- 16 Planning Regions in New Mexico
- Results of all Planning Regions will contribute to the State water plan



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Regional Water Planning

- A regional water plan answers the following questions
 - ◆ How much water is available?
 - ◆ How much water will be needed?
 - ◆ What alternatives can be implemented so that demand can be met?



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Public Participation

- Steering Committee
- Public Involvement Plan
- Public meetings
- Focus groups
- Communication with the public
- Documentation of public participation



Daniel B. Stephens & Associates, Inc.

Regional Water Planning Process

- Steering committee and public provided input on regional vision and goals and on water supply and demand reports last year
- Tonight we want to hear input on alternatives for meeting future water supply needs



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Regional Water Planning Process

- Public input will be incorporated into alternatives analysis.
- Draft plan will be prepared this fall (will be available for public review).
- Draft plan will be finalized by steering committee.



Daniel B. Stephens & Associates, Inc.

Regional Water Planning Process

- Final plan will be presented to ISC.
- County, municipalities, agencies and others will implement the plan.



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Regional Vision

- Healthy environment
- Open space protection
- Quality recreation
- Natural resource conservation
- Adequate water availability



Daniel B. Stephens & Associates, Inc.

Regional Vision

- Respect for private property rights
- Multiple use cooperation
- Healthy communities
- Healthy regional economy



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Goals for Regional Water Planning

- Cooperation
- Optimization of natural occurrence
- Protection of water rights
- Locally planned growth
- Conservation and recycling



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Goals for Regional Water Planning

- Provide accurate data
- Manage resources while preserving public health
- Enact necessary legislation
- Educate the public



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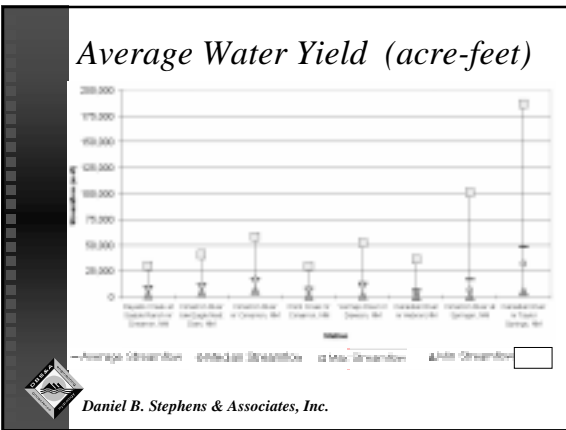
Water Supply Availability

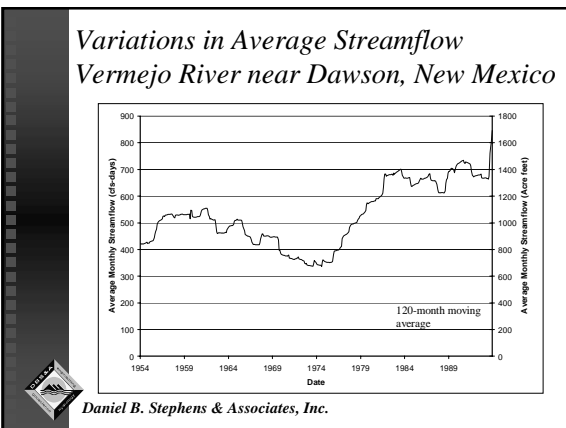
- Surface water supply assessment
- Groundwater supply assessment
- Water quality assessment



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Surface Water Summary

- The last 20 years have been a period of above normal water yield.
- Future conditions could be below normal yield, at least in some years.
- An understanding of drought vulnerability leads to better planning for meeting demand in drought years.



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Groundwater Resources

- Moreno Valley
- Capulin Basin
- Dakota Sandstone
- Ogallala Aquifer (in eastern part of the County)
- Localized alluvial deposits along river valleys
- Localized limestone or basalt aquifers



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Water Quality

- Impaired surface water reaches identified by New Mexico Environment Department
 - ◆ Cieneguilla, Six-Mile, and Moreno Creek above Eagle Nest Lake
 - ◆ North Ponil Creek
 - ◆ Portions of Rayado and Cimarron Rivers
 - ◆ Portions Coyote Creek and Little Coyote Creek
 - ◆ Portions of Raton Creek and Chicorica Creek



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Water Rights

- Adjudications on the Cimarron, Vermejo, and other areas define who owns the water.
- Water rights are for a defined quantity.
- Water rights have a priority date; the earliest priority dates receive preference in times of drought.



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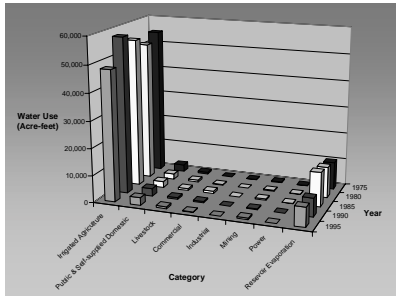
Water Demand

- Water supply is approximately 95% surface water and 5% groundwater
- Most of the water is used for irrigated agriculture
- The second highest category of water use is evaporation from storage reservoirs
- Demand for public water supply is lower, but is growing in some areas (e.g., the Moreno Valley)



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Total Withdrawal by Category



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Alternatives Selected for Analysis

- List of alternatives developed at steering committee and public meetings
- Alternative matrix (ratings) completed by technical team and steering committee
- List of priority alternatives to be evaluated revised by focus groups and steering committee



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Alternatives Analysis Format

- Based on ISC water planning template
- Each alternative analysis includes
 - ◆ Technical feasibility
 - ◆ Financial feasibility
 - ◆ Social, political and cultural issues
 - ◆ Physical, hydrological, and environmental impacts
 - ◆ Implementation schedule



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Actions That Span Several Alternatives

- Public education and outreach
 - ◆ Schools
 - ◆ Distribute materials (i.e., through water bills)
 - ◆ Possible coordinator
- Interaction with political leaders to develop support for water plan implementation and any needed legislation
- Funding for continued planning and implementation projects



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Priority Alternatives for Inclusion in Regional Water Plan

- Prepare a drought plan
- Initiate watershed groups for the Cimarron and Canadian watersheds
- Protect and restore watersheds to improve yield; adopt voluntary watershed management plans



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*Priority Alternatives for
Inclusion in Regional Water Plan*

- Develop and implement city and county water conservation ordinances
- Prepare an agricultural water conservation plan
- Develop 40-year water plans



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*Priority Alternatives for
Inclusion in Regional Water Plan*

- Identify water rights transfers or leases that could supply projected demand
- Appropriate and reserve groundwater for the region
- Adopt land use plans that integrate water planning elements



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*Priority Alternatives for
Inclusion in Regional Water Plan*

- Recycle municipal wastewater for agricultural and recreational uses
- Implement water quality ordinances (septic tanks)
- Dredge sediment in reservoirs



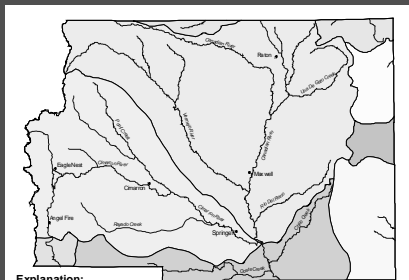
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Watershed Management

- The watershed management alternative includes
 - ◆ Establishment of watershed groups (Cimarron and Canadian Headwaters)
 - ◆ Management actions that protect water quality
 - ◆ Management actions that enhance yield



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Explanation:
USGS hydrologic unit

Swatara	Canadian Headwaters	Upper Canadian Mora	Uta
Cimarron Headwaters	Cimarron		Carrizo



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Potential to Increase Water Yield

- Limited by annual precipitation
- High interannual variability (less in dry years)
- Decline over time results in lower long-term average
- Timing of increase may limit usefulness (depending on storage availability)



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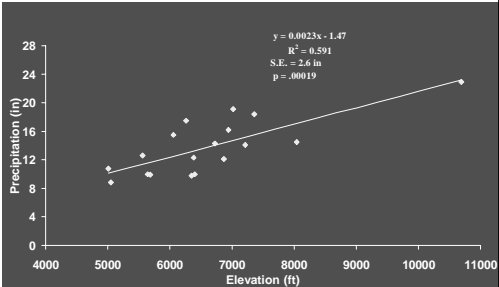
Potential to Increase Water Yield

- Need to remove 20 to 25% of basal area to detect changes in flows
- Difficult to “own” or claim increase in flow due to forest harvest
- Careful treatments should minimize adverse effects on water quality and downstream aquatic resources



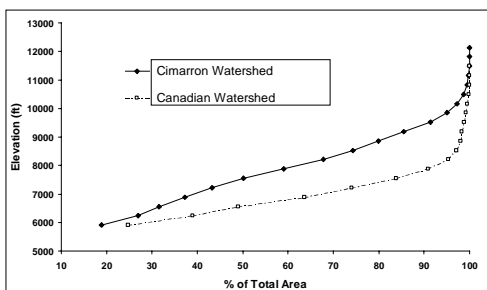
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Average Annual Precipitation vs. Weather Station Elevation



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Hypsometric Curve for Cimarron River and Canadian River Watersheds



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Water Conservation

- Highest potential water savings are in agricultural conservation
 - ◆ High capital outlay for long-term savings
- Municipal conservation
 - ◆ Ordinance provides direction and authority.
 - ◆ Public education is the key element.
 - ◆ Costs little to implement but may lead to loss of utility revenue.
 - ◆ Block rate restructuring rewards conservation and may help defray lost revenue.



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Water Conservation

- Water conservation is cheaper per acre-foot than obtaining new supply.
- Municipal conservation has small impact on entire regional water supply, but can be important for individual communities.
- Greatest potential demand reduction is in communities that currently have a high per capita water use rate.



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Improvements to Conserve Water and Increase Efficiency

- Management measures
- Infrastructure improvements
- On-farm improvements



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Business Perspective

- Cost of improvements versus value of the water
- Improvement cost estimates
 - ◆ Canal lining: \$0.76 to \$4.33 per square foot
 - ◆ Reservoir dredging: \$1.85 per cubic yard



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Water Savings from Improvements

- Canal lining
 - ◆ Reduce seepage by 70 to 95 percent
- Reservoir dredging
 - ◆ Regain lost storage capacity
- On-farm improvements
 - ◆ Decrease water use by 50 percent



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Benefit / Cost Analysis

- Decision making process
- Value of water savings for the project divided by the cost of the project
- If result is greater than 1, project has greater benefit than cost



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Benefits of Improved Water Supply

- Increased irrigated acreage
- Planting additional crops
- Planting higher value crops
- Increased annual income



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Sources of Funding

- State Agencies
 - ◆ Office of the State Engineer grant program
 - ◆ Interstate Stream Commission loan fund program
- Federal Agencies
 - ◆ U.S. Army Corps of Engineers grant program
 - ◆ U.S. Department of Agriculture grant program



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Water Rights Transfers to Supply Projected Demand

- Permanent or short-term transfers to deal with water shortages
- Issues:
 - ◆ Permanent transfers unpopular, especially if moving water from agricultural to municipal and industrial uses
 - ◆ Likely to incur a protest, which can increase cost



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Water Rights Transfers to Supply Projected Demand

- Technical feasibility
 - ◆ Hydrologic investigation may be necessary
 - ◆ Engineering feasibility for new diversion structures
- Cost
 - ◆ \$50,000 to \$200,000 for simple hydrologic investigation
 - ◆ Technical and legal fees if transfer is protested



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Appropriate and Reserve Groundwater for Future Use

- Declared basin
 - ◆ Submit notice of intent to appropriate
 - ◆ Three years to file completed application
 - ◆ Diversion not required if 40-year plan in place
- Undeclared basin
 - ◆ No OSE jurisdiction
 - ◆ Would require diversion and application of water to beneficial use to create the water right



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Technical Feasibility of Groundwater Appropriation

- Declared basin
 - ◆ Hydrologic investigations required to identify best locations for wells
 - ◆ If uncertainty exists regarding impact of appropriation on surface water supplies, more complex study will be needed to overcome presumption of impairment



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Technical Feasibility of Groundwater Appropriation

- Undeclared basin
 - ◆ Need to petition OSE to declare
 - ◆ May not be politically popular



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Cost of Groundwater Appropriation

- Notice of intent: Minimal
- Application to appropriate: Legal fees (~5K), time spent coordinating efforts among parties to the appropriation (may require some written agreements), basic hydrological study (~30K to 150K)
- Delivery system (wells, pipelines, pumping stations, etc.): ~200K to \$2M



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Integrate Land Use and Water

- Incorporate water decisions in land use process
 - ◆ Timing, location of new developments
 - ◆ Designs that incorporate water conservation
- Incorporate water service decisions into land use plans (i.e., size pipes large enough for future growth, wastewater planning)



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Integrate Land Use and Water

- Can require developers to provide water rights
- Can adopt impact fees to cover the costs of providing rights and infrastructure
- Inexpensive and financially efficient (i.e., doesn't require more infrastructure than can be maintained)



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Wastewater Reuse

- Currently no NMED standards for wastewater use
 - ◆ Draft standards were developed but not adopted.
 - ◆ Wastewater standards may be adopted in the future.
 - ◆ Must obtain an NMED permit to discharge to groundwater.
 - ◆ NPDES permit required for surface water discharge.



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Colfax County Wastewater Treatment Plants

- Raton
- Cimarron
- Eagle Nest
- Maxwell
- Springer
- Angel Fire



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Smaller Treatment Plants

- Plants producing small or seasonal flows
 - ◆ Eagle Nest Reintegration Center
 - ◆ Russell's Truck Stop
 - ◆ Cimarron Canyon State Park
 - ◆ Philmont Boy Scout Ranch
 - ◆ Angel Fire Mobile Home Park
 - ◆ Inn at Angel Fire
 - ◆ Elliot Barker Girl Scout Camp



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Current Wastewater Reuse

- Raton
 - ◆ From February to November, 50% of effluent waters golf course, parks, and sport fields
 - ◆ Water not reused directly is discharged to the Canadian river and used by downstream irrigators
- Cimarron
 - ◆ Effluent discharged to French Lake, used by ranchers
- Maxwell
 - ◆ Effluent discharged to the Canadian River



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Wastewater Reuse Costs

Treatment Process	Annual Cost (\$/ac-ft)
Activated sludge	245 – 682
Trickling filter	268 – 711
Rotating biological contactors	379 – 728
Activated sludge, filtration	291 – 903
Tertiary lime treatment	404 – 1334
Infiltration-percolation	108 – 260
Activated sludge, filtration, carbon adsorption, reverse osmosis	1166 – 3271



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County Water Quality Ordinances

- On-site wastewater disposal ordinances regulate domestic/commercial wastewater disposal (septic tanks)
- Purpose is to protect groundwater quality
- Sets up a potential for establishing a return flow credit



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County Water Quality Ordinances

- Could integrate wellhead protection
- Primary concern is the Moreno Valley and other areas with concentrations of septic tanks



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County On-Site Wastewater Ordinances

- NMED currently regulates on-site systems
- County-specific regulations can be adopted (e.g., Bernalillo County)
- Alternative on-site system regulations now being proposed by NMED
- Can regulate traditional on-site (septic) systems (e.g., spacing, construction)



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County On-Site Wastewater Ordinances

- Alternative on-site systems include small aeration, filtration, evaporation, and other biological/disinfection units prior to disposal facility (leach field)
- Ordinance development and implementation requires technical inputs and public participation



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County On-Site Wastewater Ordinances

- Ordinance development and implementation would cost about \$100,000 to \$150,000
- Alternative on-site systems may cost \$5,000 to \$8,000 per residence compared to about \$2,000 for a conventional septic tank/leach field
- Annual county administration costs for enforcement, inspection, recordkeeping



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Sediment Removal in Reservoirs

- Purpose of the alternative is to increase available storage space
- Types of dredging for sediment removal include:
 - ◆ Wet dredging: Removal of sediment while reservoir is still full of water
 - ◆ Dry dredging: Removal of sediment (excavation) while reservoir is drained



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Sediment Removal Costs

- Anticipated range of costs (per reservoir):
 - ◆ Dry dredging = \$2,000,000 to \$12,000,000
 - ◆ Wet dredging = \$5,000,000 to \$20,000,000
- Estimated value of lost water due to decreased reservoir storage capacity: \$3,500,000 to \$13,000,000 (based on value of new water rights to replace lost water)



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Additional Alternatives for the 40-Year Plan

- Implement efficiencies in municipal water supply management (e.g., leak detection)
- Increase water rates
- Xeriscape to conserve (municipal) water
- Reduce losses by lining ditches and encasing delivery systems
- Remove invasive vegetation; revegetate to reduce riparian evapotranspiration



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Additional Alternatives for the 40-Year Plan

- Implement efficiencies in industrial uses such as mining
- Develop unappropriated groundwater to meet projected demand
- Implement cloud seeding projects
- Build a consolidated manifold system to tie in municipal systems (Cimarron, Springer and Maxwell)



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Additional Alternatives for the 40-Year Plan

- Build treatment plant in Springer and upgrade mains
- Build reservoir for Antelope Valley and Springer
- Require water quality study for all development projects
- Implement nonpoint source projects



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Additional Alternatives for the 40-Year Plan

- Draft and implement source water and well-head protection plans for key water supplies
- Pursue sole source aquifer designation (Moreno Valley)
- Construct wastewater treatment systems to replace septic tanks in the Moreno Valley
- Construct wetlands to protect groundwater from septic system contamination



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Additional Alternatives for the 40-Year Plan

- Establish central water authority to manage delivery throughout region
- Establish a local water bank (accounting)
- Develop and implement city ordinances to control private wells
- Declare Capulin Basin



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Public Welfare in Water Planning

- OSE has the authority to deny, change, or transfer an in-state or out-of-state water rights application if it is contrary to “public welfare of the state”
- OSE has not defined this phrase, and little case law exists to clarify how and when this concept will be applied



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Public Welfare in Water Planning

- Identifying public welfare in the absence of OSE regulation
 - ◆ Regional in nature
 - ◆ Regional water plans incorporating regional goals and vision
 - ◆ County and municipal planning documents and ordinances
 - ◆ Watershed plans



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Examples of Public Welfare Concerns

- Keeping water in the region
- Preserving water for the future
- Maintaining water quality
- Integrating regional goals and visions into all types of planning and regulation



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Fact Sheet

WATER SUPPLY

Identification and understanding of the available water supply is essential to water planning. For Colfax County regional water planning activities, existing sources of information about surface and groundwater supplies — including federal and state agencies, academic research, and local resources — were used to help determine the existing and future quantity and quality of regional water supply.

Surface Water

Colfax County currently meets more than 90 percent of its water supply needs with surface water. Nearly all of the surface waters in the county lie within the Arkansas/White/Red River basin, which ultimately drains to the Mississippi River. Surface water originates primarily in the mountains in the western and northern parts of the county and flows generally east and south to the Canadian River.

As shown in Figure 1, the Canadian River originates in southern Colorado and flows east then south through the county. The Vermejo and Cimarron

Rivers, which originate in the northern and/or western parts of the county, join the Canadian River as it passes through the county. Ponil and Rayado Creeks are important tributaries to the Cimarron River below the Eagle Nest Reservoir. Most of the surface water supply in Colfax County is associated with these major drainages.

Colfax County has a number of dams, reservoirs, and lakes, all of which influence the surface water hydrology and have important storage benefits. However, none has as great an effect on surface flows as Eagle Nest Reservoir, the largest.

The surface water supply for Colfax County was evaluated using a combination of historical and statistical analyses of climate and streamflow data for the period from 1950 through 1999. Using several analytical approaches, the following values were identified as the best overall characterization of the surface water supply for Colfax County:

- Median flow of 47,400 acre-feet per year
- Minimum flow of 11,400 acre-feet per year
- Maximum flow of 123,800 acre-feet per year

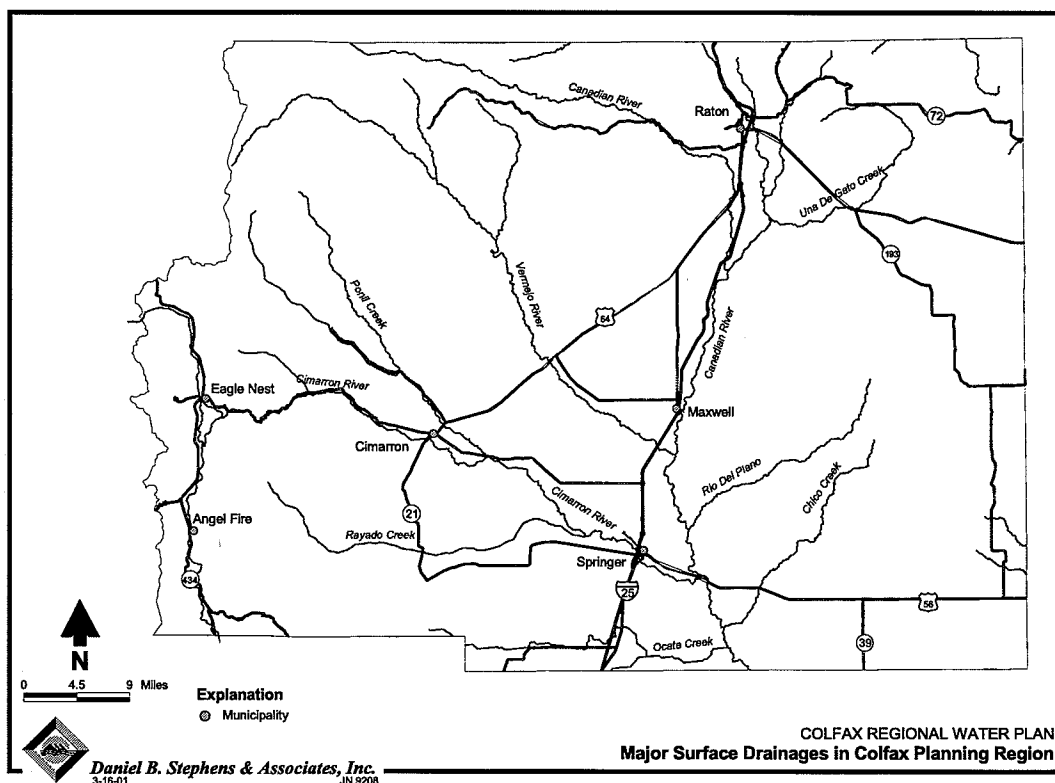


Figure 1

Climate data indicate that the last 20 years have been wetter than normal, which suggests that planning efforts should anticipate drier conditions than those recently experienced. Streamflow data indicate that surface water flows vary extensively from year to year. Based on historical streamflow data, there is a 25 percent probability that the region will experience drought (that is, streamflows of less than half the normal flow) for two years in a row.

Groundwater

Water well records obtained from the USGS and the New Mexico OSE WATERS database (the most complete electronic databases available) were used to determine areas with significant groundwater development activity and to help evaluate hydrogeologic conditions. Two areas where previous well drilling has identified viable groundwater resources that will likely support additional future development are the Moreno Valley and the Capulin Basin.

The most intensive groundwater development has occurred in the Moreno Valley, in the southwestern corner of the county. Located in the southern Sangre de Cristo Mountains, the Moreno Valley includes the resort communities of Angel Fire and Eagle Nest. Recent population growth in this area has led to the most intense groundwater development in the county. Though there is considerable groundwater stored in the Moreno Valley, its use is constrained by water rights.

The Capulin Basin is south of Johnson Mesa and southwest of Capulin National Monument in eastern Colfax County and western Union County. It is an interior-draining topographic basin that was defined exclusively by records from the U.S. Geological Survey database for wells drilled prior to 1990. Volcanic features in this area are highly porous and can serve as conduits to transmit large amounts of precipitation into the subsurface, where it is trapped as groundwater within the closed basin.

Groundwater in the Capulin Basin has not been declared by the OSE. Though incompletely defined, the aquifer likely underlies at least 105 square miles and varies from less than 20 to about 180 feet in thickness. A conservative average porosity of 25 percent yields an estimated resource of about 550,000 acre-feet for this aquifer.

Other groundwater resources in the region that have the best potential for future groundwater development are alluvial deposits near stream channels, the Ogallala Formation, and the Dakota Sandstone Formation. Naturally poor water quality renders much of the groundwater in the area unusable without treatment.

Water Quality

Meeting future water demands requires not only sufficient quantities of water, but water of sufficient quality for the intended use. To meet drinking water quality standards, most water supplies require at least minimal treatment.

Though surface water resources in Colfax County are generally of high quality, several stream reaches in the region have been listed as impaired, primarily due to stream bottom deposits, turbidity, and plant nutrients. This does not necessarily mean these sources are unacceptable for irrigation or municipal use, but does indicate that watershed protection should be a priority in developing a regional water plan.

The greatest threats to groundwater quality are leaking underground storage tanks and septic tanks. Most of the recorded underground storage tank sites are located in areas where groundwater is not currently used. On the other hand, leaking septic tanks in the Moreno Valley could degrade a widely used groundwater source.

Supply versus Demand

The water supply and demand information for Colfax County were compared to evaluate the ability of the supply to meet demands. This evaluation indicated that the water supply was greater than or equal to the average consumptive use in the region in 27 of the past 50 years (54 percent of the time). The supply was greater than or equal to the average withdrawals in the region in only 11 of the past 50 years (22 percent of the time). Since some irrigation water is returned for reuse within the region, the entire withdrawal amounts may not need to be met to supply the demand. However, the consumptive demands of the region are met only about half of the time. The remainder of the time, releases from storage must be used to meet the needs of the region.

Fact Sheet

WATER DEMAND

As prescribed by the New Mexico Interstate Stream Commission, a regional water plan should include a compilation of historical and current water demand as well as projected water demand by category of use. Current and historical water demand in the Colfax County planning region was evaluated by synthesizing records provided by the New Mexico Office of the State Engineer (OSE), water utilities, and others. Historically, the largest demand sector is irrigated agriculture, followed by reservoir evaporation and public water supply.

Current demand for water in Colfax County is about 70,000 to 90,000 acre-feet per year. The variance in demand from year to year is based on crop requirements and reservoir evaporation, both of which depend on climatic conditions. Projected future demand ranges from about 70,000 to more than 100,000 acre-feet per year.

Historical and Current Demand

Every five years, the OSE inventories water use in each of the categories listed below:

- Public water supply
- Self-supplied domestic
- Irrigated agriculture
- Self-supplied livestock
- Self-supplied commercial
- Industrial
- Mining
- Power
- Reservoir evaporation

Figure 1, based on published OSE reports, shows historical water withdrawals for use in each major category (some categories were combined because of low use or changes in reporting methods). Figure 2 shows the total amount actually consumed by category, that is, the amount withdrawn minus any water that returns to the surface or groundwater systems (such as flow from agricultural drainage ditches). The average of the total withdrawals (demand) in the county

for the five water years as recorded by the OSE was 78,800 acre-feet (for all sectors), and the average consumptive use was 44,500 acre-feet.

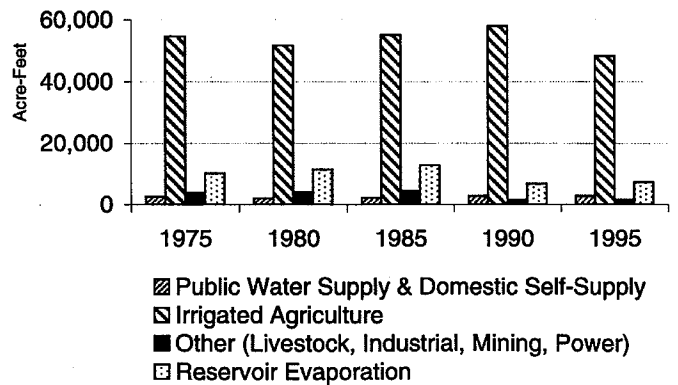


Figure 1. Historical Withdrawal by Category

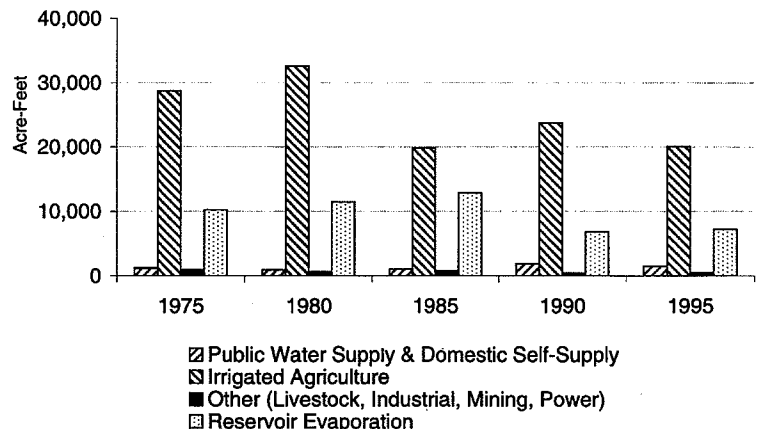


Figure 2. Historical Consumption by Category

Future Demand

To determine the future demand for water in the region, historical water use as well as projected demographics and economics of the region were examined. Factors affecting potential growth were presented for each category. Since assumptions are somewhat uncertain, both high

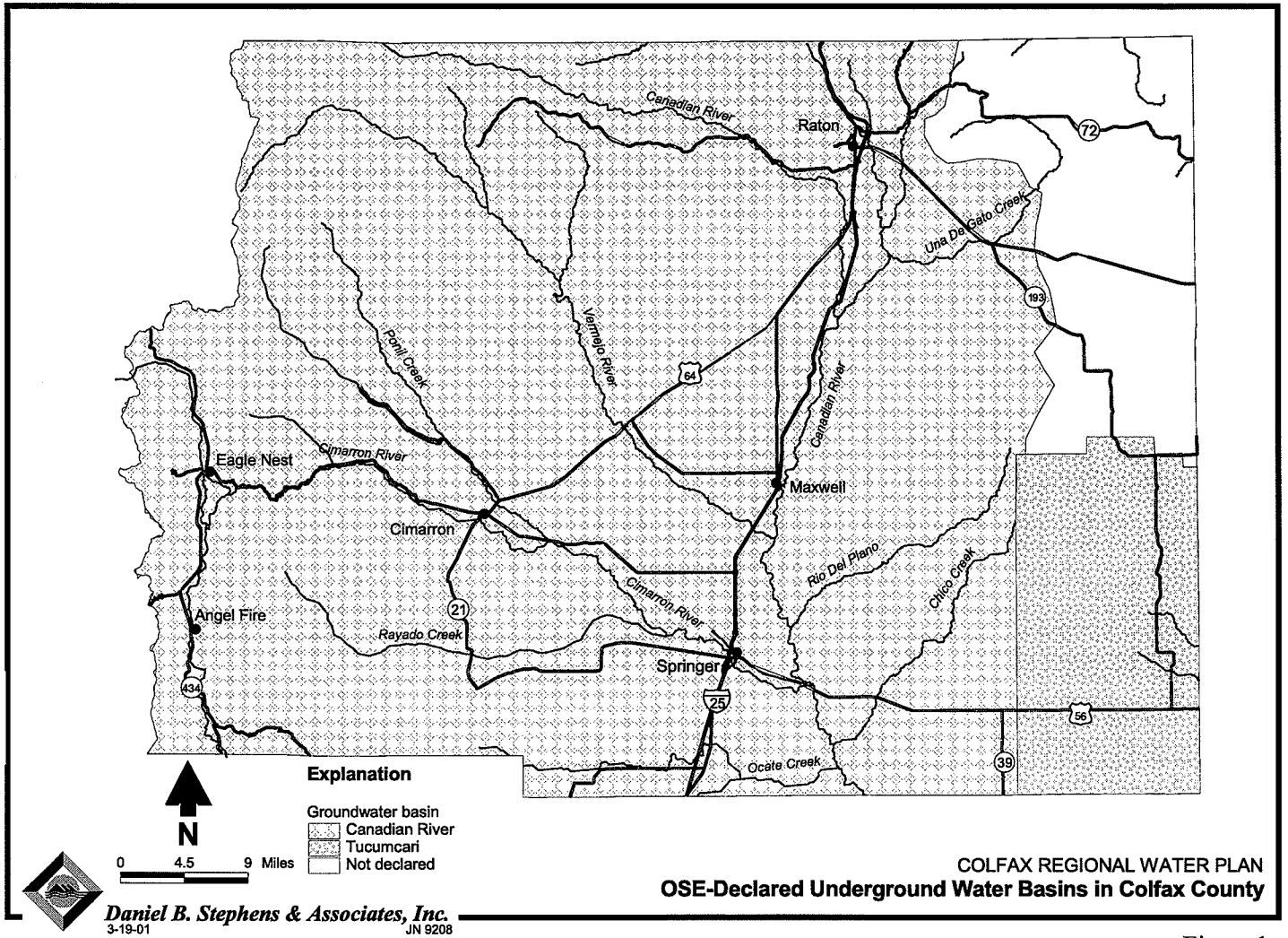


Figure 1

Fact Sheet

WATER RIGHTS

Principles of New Mexico Water Law

The right to use water in New Mexico is governed by two main principles:

- The right to use ground and surface waters is based on beneficial use. Examples of beneficial use include agricultural, municipal, domestic, and industrial uses.
- Priority establishes the better right, which means that, in times of shortage, older (more senior) water rights will be fulfilled before newer (more junior) water rights.

Water Rights Management

The Office of the State Engineer (OSE) is responsible for managing water rights recognized under State law. To withdraw groundwater or divert surface water, a user must have an established water right or obtain a water permit from the OSE. The permit specifies among other things:

- How much water a user can withdraw during any given year
- The amounts of water that can be diverted and consumed under the permit
- How the water will be used

Water rights may be transferred, sold, or leased. However, any transactions involving water rights must not impair existing water rights or be contrary to public welfare or conservation.

Surface water. Surface water provides over 90 percent of the water in Colfax County, even though surface water supply varies from year to year. In Colfax County, most major streams have been fully appropriated, which means that no water rights are available for new permits. Thus, water rights can be obtained only through purchase or lease from an existing water rights holder. Water rights have been adjudicated (that is, finalized and decreed by the courts) for Cimarron, Rayado, Dry Cimarron, Sugarite/Chico Rico, and Vermejo streams. Although a portion of the Canadian River in Colfax County has not been adjudicated, the OSE considers it fully appropriated and no new water rights are available.

Most established rights in Colfax County are for irrigation, but some have been transferred to other uses such

as domestic or municipal. All storage rights from Eagle Nest Reservoir on the Cimarron River, the largest reservoir in the county, had been held until recently by one user, which had contracted out a portion of its rights for irrigation and municipal use. The reservoir has recently been purchased by the New Mexico Department of Game and Fish.

Groundwater. To help manage groundwater resources, the OSE has delineated “declared underground water basins” throughout the state (Figure 1). Unless an established pre-basin water right exists, a permit is needed to withdraw groundwater from a declared basin.

Western Colfax County lies within the declared Canadian River Basin. Because most of the groundwater in this area is stream-related, the basin is subject to limitations set by the OSE to ensure that groundwater use will not affect stream water availability. The southeastern corner of the county lies within the Tucumcari Basin. Groundwater in the northeastern part of the county is currently undeclared, which means no permit is required to withdraw groundwater in that area.

Water Rights versus Water Supply

During many years, the available surface water supply is not sufficient to fulfill all existing water rights. Furthermore, the growing demand for water in Colfax County may soon outstrip the supply available through existing water rights. Most water in Colfax County is used for agricultural purposes, with municipal water supply being the second largest beneficial use. Evaporation of water from reservoirs, although not a beneficial use, also affects overall water supply. According to recent estimates, regional water demands are met by the existing surface water supply only about half of the time. The rest of the time, releases from storage must be used to meet the needs of the region.

Projected future demand may increase by 35 percent over current demand, depending on crop requirements and reservoir evaporation, both of which vary with climatic conditions. This level of demand could be met by the current water supply only 10 percent of the time. Since there are few areas in the county where new water rights can be obtained, the issue of demand versus existing rights must be addressed during regional water planning efforts.

and low growth rates were used to bracket the likely range of future conditions.

Another means of projecting future water use is to consider the amount of water needed to fulfill all of the decreed water rights in the basin. Historical withdrawals may underestimate the need for water because in many years the full allocation allowed is not applied because water is not physically available. The total of decreed rights in the county is slightly higher than the “high use” future projection and may provide a better upper bound on the amount of water that will be required for future use in the county.

Figure 3 shows the projected future water demand for each water use category from 2000 to 2040. This projection, based on the highest estimated growth for the region, indicates that by 2040, total water demand will be more than 100,000 acre-feet per year. Assuming that the total decreed rights are fulfilled, however, increases the projected demand to approximately 120,000 acre-

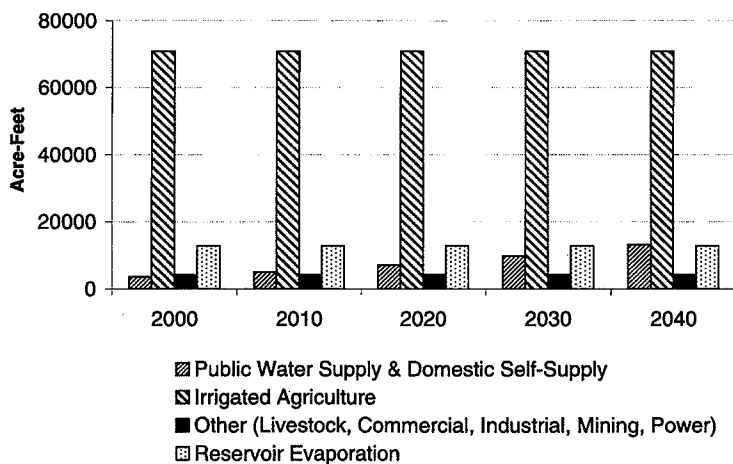


Figure 3. Future Use Scenario

feet per year, most of which will still be for agricultural use.

High Demand Sectors

Both historically and in future projections, the highest water use categories in Colfax County

are irrigated agriculture, reservoir evaporation, and public water supply.

Irrigated agriculture. Most of the water demand in Colfax County is for irrigated agriculture. According to estimates based on crop water needs, approximately 70 percent of the total water withdrawn in 1995 (60 percent of the total consumptive use) was for agriculture. In the future, the amount of irrigated land is expected to remain stable or experience a moderate decline. However, because the historical supply has not always met the historical demand, projections of future water demand show an increase over historical agricultural use.

In the Colfax planning region, irrigated agriculture relies primarily on surface water supplies. During 1995 surface water supplied more than 90 percent of the water used for irrigation (based on OSE estimates).

Reservoir Evaporation. The second greatest historical and projected use of water in the Colfax planning region is reservoir evaporation. Monthly evaporation rates (directly measured and estimated) are combined with monthly rainfall values and used to calculate the volume of evaporation (in acre-feet) at each reservoir. All reservoir evaporation is a consumptive use.

Public water supply. Colfax County has 65 public water systems producing a total of about 3 million gallons per day (approximately 3,300 acre-feet per year). These systems include both incorporated municipalities and smaller campground and recreation systems. Most municipalities experience increased use in the summer, and Angel Fire has increased water use in the winter months, when ski resort operations are in full swing.

To project future water use, an average water use rate in gallons per capita per day was determined for each community. This rate was multiplied by the projected population to estimate a future projected water demand. The assumption is that average rates of use will be steady during the projection period. If water conservation measures are implemented, water demand should be adjusted accordingly.

Appendix D
Water Rights Information

Appendix D1

New Mexico Water Law



Appendix D. Water Law and Regional Water Planning

D.1 Introduction

For purposes of the regional water plan and to provide general information for stakeholders in the region, this section outlines the basic concepts of water law in New Mexico. This information is particularly important for regional water planning, because all regional planning efforts are subject to “laws relating to impact on existing water rights” (NMSA 72-14-44C(7)). New Mexico water law is codified in Chapters 72 (Water Code) and 73 (Special Districts) of New Mexico Statutes Annotated (NMSA Chapter 72, Articles 1-19; Chapter 73, Articles 1-23). Chapter 73 details the powers and authorities of various water management agencies in the State such as conservancy districts, irrigation districts, and soil and water conservation districts, among others.

Article XVI of the New Mexico Constitution establishes the basic principles underlying New Mexico water law, including prior appropriation and beneficial use:

- The concept underlying the principle of prior appropriation is that the first person to use the water beneficially has a prior right. “First in time, first in right” is the phrase often used to describe prior appropriation. Until appropriated, all water belongs to the State of New Mexico. The State then has the sole authority to grant or recognize rights to use that water. “Water rights are subject to appropriation for beneficial use, in accordance with the laws of the state” and “Priority of appropriation shall give the better right” are two tenets arising out of the Constitution (N.M. Constit. Art. XVI S 3). Water rights acquired through this system of prior appropriation are a type of property right and may be sold or leased. In all cases, however, the essential basis of water right ownership is “beneficial use.”
- The principle of beneficial use is that rights to groundwaters and surface waters in New Mexico arise out of uses that are productive or beneficial, such as agriculture, municipal, industrial, and domestic uses, among others. “Beneficial use shall be the basis, the measure and the limit of a water right” (N.M. Constit. Art. XVI, S2). This provision has



been incorporated into case law as well. As ruled in *State ex rel. Reynolds v. Mendenhall*, beneficial use is the “measure and limit of the right to the use of waters” (68 N.M. 467 (1961)).

The Office of the State Engineer (OSE) administers water rights for the State of New Mexico, as discussed in Sections D.2 through D.5.

D.2 Administration of Groundwater and Surface Water in New Mexico

In order to actively manage groundwater resources in New Mexico, the Water Code gives the OSE the authority to delineate groundwater basins that require a permit for groundwater withdrawals, referred to as “declared underground water basins.” Those basins that fall within the Colfax planning region are depicted on Figure 3 in the body of this report. In order to withdraw water from these declared basins, a user must have put water to beneficial use prior to the declaration of the basin, have a declared water right, or obtain a water permit from the OSE that specifies (1) how much water a user can withdraw within any given year, (2) the location and type of well that will be used to withdraw the water, and (3) the use to which the water will be put. Methods of obtaining water rights are discussed in Section D.3.

General information about groundwater rights for New Mexico basins is compiled in the OSE WATERS database. The database is a useful tool for understanding general information about the water rights. However, because water rights files are complex, not all pertinent information, such as priority date, is listed in the database.

Diversion of water from New Mexico’s surface waters also requires obtaining a water permit from the OSE. Surface water appropriations follow the same standards as groundwater rights in that a transfer, sale, or lease cannot impair existing water rights and must not be contrary to public welfare or conservation.

Many of New Mexico’s surface waters are governed by interstate compacts that require set amounts of water to be delivered to specific delivery points specified in the compacts. In particular, the Canadian River is subject to compact requirements for delivery of water to the



State of Texas. The Interstate Stream Commission, an adjunct commission to the OSE, has responsibility for ensuring that specific rivers in New Mexico meet their obligations under the interstate compacts.

D.3 Water Right Ownership

Ownership of water rights is created by diversion and application to beneficial use. It may be demonstrated administratively through the declaration or permit process. In the case of groundwater rights, a declaration may be filed for water uses that arose prior to the declaration of the groundwater basin. A water right declarant “may make and file in the office of the state engineer a declaration in a form with the date of first application to beneficial use, continuity thereof, location, and description of the land where used” (NMSA 72-1-3). However, this declaration constitutes only claim of ownership and does not guarantee that the individual filing the declaration will be entitled to the entire amount of water claimed.

Individuals who wish to acquire a new water right must file a permit application with the OSE and go through the entire permitting process (described in Section D.3.1). Permits are granted only for unappropriated waters of the State.

The judicial recognition of water rights on a stream system takes place through an adjudication. An adjudication is "a suit for the determination of a right to use the waters of any stream system" (NMSA 72-4-17). Upon completion of the adjudication proceeding, an order and decree is entered establishing the priority, amount, purpose, periods and place of use, and specific tracts of land to which the right is appurtenant.

The water right permitting process is discussed in more detail in Section D.3.1. Although the permitting process is the primary method of obtaining water rights for water in declared groundwater basins and for all surface water, the right to use water may also be obtained through purchase or lease, as discussed in Section D.3.3. The loss of ownership of a water right is discussed in Section D.3.4.



D.3.1 Water Right Permitting Process

The water right permitting process includes the following steps:

- To obtain a new water right, the applicant must submit the application form to the OSE.
- The OSE must then determine whether unappropriated water is available, whether the appropriation would be consistent with public welfare and conservation, and whether it would impair existing water rights.
- The OSE also publishes the filing of the application in order to provide public notice so that individuals who believe their rights would be impaired by the approval of the permit are provided the opportunity to submit a protest to the application.
- If no protest is submitted and the OSE determines that the water exists and that appropriation of it would not adversely impact public welfare and conservation, the OSE approves the water right application.
- If settlement is not reached, then the application proceeds to an administrative hearing with the Hearings Unit of the OSE.
- In the case of a protest, the OSE Hearings Unit must evaluate whether the applied-for water right would impair an existing water right(s). Through the examination of the specific conditions of the application and the protestants, the OSE makes a determination, and the application is either granted or denied.
- If a water right is granted, the OSE may place specific conditions in the permit to protect surrounding water rights holders (*City of Albuquerque v. Reynolds*, 71 N.M. 428 (1962)). Examples of conditions placed on permit holders may include monitoring or metering requirements, restricting use to certain months of the year, or disallowing use under specific conditions (low flow, for example).



D.3.2 Other Types of Water Rights

Many water rights have been established outside the permitting process in two different ways, as discussed in the following subsections.

D.3.2.1 Prebasin Wells

Since many of the underground water basins were declared after water rights holders had drilled wells and put that water to beneficial use, the Water Code recognizes these rights as valid. Section 72-12-4 states that “existing water rights based upon application to beneficial use are hereby recognized.” Even if actual beneficial use does not take place prior to the declaration, actions that demonstrate an intent to appropriate will be sufficient to establish a prebasin water right. The priority date of this water right will “relate back” to these actions (*State ex rel. Reynolds v. Mendenhall*, 68 N.M. 467 (1961)).

D.3.2.2 Domestic and Livestock Watering Wells

As in many other western states, each New Mexico homeowner with a private well is allowed to use up to 3 acre-feet per year (af/yr) of groundwater (NMSA 71-12-1). Although a homeowner must file a document indicating that they will use the water, these “applications” are granted automatically and are neither published nor subject to protest (NMSA 72-12-1). The OSE does not allow a change in place of these domestic well uses; that is, it does not allow moving the right to another location. In that sense, the domestic well is a right of use only and is not intended to be sold separately from that intended location and purpose of use. However, non-permitted prebasin domestic wells (Section D.3.2.1) are not subject to this limitation and may therefore be transferred.

D.3.3 Water Rights Transactions

Water rights transactions include transfers to other users, through sales or leases, and changes in point of diversion or in purpose or place of use. These transactions must follow an administrative procedure similar to the one used for appropriating a new water right. An application is filed, and notice is published with a certain time limit within which a protest must



be submitted. The standard for reviewing these applications is impairment, public welfare, and conservation.

D.3.4 Loss of Water Rights

The Water Code specifies that nonuse for a period of four consecutive years when water is available may lead to forfeiture of the water right. Prior to 1965, water rights were automatically forfeited for a four-year period of nonuse. Legislation passed in 1965 requires the OSE to notify a water rights holder that the right is subject to forfeiture. After the OSE has provided notice, the water user has one year to put the water to beneficial use; however, if the nonuse continues after the OSE has provided notice, the water right is forfeited (NMSA 72-12-8).

The forfeiture provision of the statute contains a few exceptions. Of particular interest to the regional water planning community is the exemption for placing water in “state engineer approved water conservation plans” (NMSA 72-12-8(D) and (E)). This provision applies to conservancy and irrigation districts, acequia and community ditch associations, municipalities, counties, water user associations, and state universities (Section D.4).

Water rights may also be lost through abandonment. Abandonment requires an intent to abandon in addition to discontinued use by the owner of the water, whereas forfeiture does not require an intent to relinquish the right (*State ex. rel. Reynolds v. South Springs Col.*, 80 N.M. 144 (146-47)). An example of abandonment would be to develop land formerly used for irrigation into a building, parking lot, or housing complex, thus clearly demonstrating that the owner of the land no longer intends to put their irrigation water right to use.

D.4 Setting Aside Water for Future Use

Through various provisions in the Water Code, the New Mexico legislature has created a mechanism to allow certain organizations to set aside water for use in the future. Although this notion is contrary to the well known “use it or lose it” concept at the heart of the prior appropriation system, it is essential for long-term water planning.



The entities that have acquired special status for water planning under the code are “municipalities, counties, state universities, member-owned community water systems, municipal water users’ associations and public utilities supplying water to municipalities or counties . . . which shall be allowed a water use planning period not to exceed 40 years, and water rights for these entities shall be based upon a water development plan the implementation of which shall not exceed the forty-year period” (NMSA 72-1-9 Cum Supp. 2000). This provision of the statute will allow entities in the Colfax regional water planning area to legally appropriate and preserve water that they cannot currently use, but will need to meet projected water requirements for the region. These entities will be required to develop a 40-year water plan for their individual water supplies. The future demand study component of a 40-year plan can serve as partial justification for the appropriation. The Colfax regional water plan’s future demand study (Section 8 of the main body of this report) could also support an application to appropriate water for future use.

These organizations are exempt from forfeiture of unused water rights if those rights have been appropriated for the implementation of a water development plan or for preservation of water supplies (NMSA 72-12-8 (H)). These provisions are the same for both surface water and groundwater (NMSA 72-5-28).

Conservancy districts also have special provisions that allow them to manage water without application of the forfeiture provisions. NMSA 72-5-28 (G) allows “periods of non use when water rights are acquired and placed in a state engineer approved water conservation program by a conservancy district organized under 73 -14-19.”

D.5 Conjunctive Use

Conjunctive use is the legal and administrative recognition that a hydrologic connection exists between surface water and groundwater. Because of this recognition, New Mexico water law has evolved to incorporate a system whereby the OSE can manage groundwater and surface water in conjunction, as opposed to other western states such as Texas and California, which manage groundwater and surface water resources separately (Archer and Patrick, 1994,



p. 152). From a water resources management perspective, the authority to manage these resources conjunctively has great benefit.

The recognition of the impact of groundwater pumping on surface flows extends back to early cases in New Mexico. For example, in *Templeton v. Pecos Valley Conservancy District* (65 N.M. 59 (1958)), groundwater pumping reduced the flow of the Rio Felix such that a senior surface water right holder could not fully exercise his water right. The water right holder applied to drill for water in the aquifer that was hydrologically connected to the river. The Court agreed that exercising the water right by drilling a well was merely a change in point of diversion of the surface water right, thus recognizing the interconnection between the shallow aquifer and the river itself.

The OSE incorporated the concept of conjunctive management by requiring applicants for groundwater in stream-related basins to purchase surface water rights in an amount equivalent to the proposed application in order to offset the impacts the groundwater pumping would have on the river. The City of Albuquerque challenged these conditions when its application for 6,000 acre-feet of groundwater was conditioned upon an offset of surface water. In *City of Albuquerque v. Reynolds* (379 P. 2d 73 (1962)) the court upheld the OSE decision, stating that the OSE has the authority to impose these conditions.

The OSE has subsequently integrated this policy into its groundwater regulations, which state that “applications to appropriate water will not be granted in declared underground water basins that are stream related, if the State Engineer finds that the appropriation will take 0.1 acre-feet or more from a fully appropriated stream within the year the permit may be exercised” (N.M.A.C. 1-15.6.4). Based on this rule, certain declared groundwater basins have been closed to new appropriations. In other stream-related basins, the OSE has developed criteria to manage groundwater appropriations in order to protect surface water rights.

References

Archer, K.E., and K.L. Patrick. 1994. A comparison of state groundwater laws. *30 Tulsa L.J.* 123.

Appendix D2

**Tabulated Water Rights for
Cimarron and Rayado Decrees**



Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
Moreno West (Butler)	1895	42	---	---	Irrigation	West Moreno Creek	1.5	63	7 (Heck)	1
Moreno East (Murray)	1895	---	ac-ft to wells	---	Irrigation	North Moreno Creek	11.25	11.25	6 (Heck)	1
Gallagher	1901	10	---	---	Irrigation	Sixmile Creek	1.5	15	14	1
	1890	6	---	---	Irrigation	Sixmile Creek	1.5	9	14	1
Gorman	1882	134.5	---	---	Irrigation	Sixmile Creek	1.5	201.75	16 (Witt)	1
Eagle Nest Village	1885	42	---	---	Irrigation	Irwin Creek	1.5	63	30 (Dugan)	1
	1995	---	---	71	---	Irwin Creek	---	30	---	1
Zink	1885	13.1	---	---	Pasture	Irwin Creek	1	13.1	30 (Dugan)	1
Monte Verde (Angel Fire Corp.)	1906	35	acres to wells	---	Irrigation	Agua Fria	1.5	52.5	37	1
G. Clay Trust	1887	4.4	---	---	Irrigation	Moreno Creek	1.5	6.6	20	2
Turner (Butler)	1887	158	---	---	Irrigation	Moreno Creek	1.5	237	20	2
Mutz John (Mutz)	1891	23.4	---	---	Irrigation	Moreno Creek	1.5	35.1	9	2
Monte Verde (Angel Fire Corp.)	1904	103.7	acres to wells	---	Irrigation	Nine Mile Creek	1.5	155.55	36	2
	1904	42.7	acres to wells	---	Irrigation	Nine Mile Creek	1.5	64.05	34	2
Mutz John (Mutz)	1882	20.4	---	---	Irrigation	Hollenbeck Creek	1.5	30.6	10	3
Monte Verde (Angel Fire Corp.)	1904	82.5	acres to wells	---	Irrigation	Cieneguilla Creek	1.5	123.75	36	3
	First	35.9	acres to wells	---	Irrigation	Cieneguilla Creek	1.5	53.85	32	3
McBride (Phil Mutz)	1868	13.9	acres to wells, west side	---	Irrigation	Moreno Creek	1.5	20.85	23	4
	1890	50.8	---	---	Irrigation	Moreno Creek	1.5	76.2	24	4
Monte Verde (Angel Fire Corp.)	First	41.6	acres to wells	---	Irrigation	Saledon Creek	1.5	62.4	34	4
Mutz Robert (Mutz)	1882	100	---	---	Irrigation	Comanche Creek	1.5	150	8	5
	1882	137.93	---	---	Irrigation	Comanche Creek	1.5	206.895	8	5
McBride (Phil Mutz)	1876	58.3	---	---	Irrigation	Comanche Creek	1.5	87.45	25	5
	1890	40.4	---	---	Irrigation	Comanche Creek/ Deadman Creek	1.5	60.6	27	5
	1868	130.16	---	---	Irrigation	Comanche Creek	1.5	195.24	26	5
	1868	13.2	---	---	Pasture	Comanche Creek	1	13.2	26	5

Note: Information on this table does not reflect changes in water rights since April 2001.

ac-ft/yr = Acre-feet per year
--- = None

cfs = Cubic feet per second



Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
Monte Verde (Angel Fire Corp.)	First	90.7	acres to wells	---	Irrigation	Garcia Creek	1.5	136.05	33	5
	First	27.7	acres to wells	---	Irrigation	Garcia Creek	1.5	41.55	35	5
McBride (Phil Mutz)	1890	43.6	---	---	Irrigation	Graney Creek	1.5	65.4	28	6
Moreno East (Murray)	1912	25	---	---	Irrigation	Graney Creek	1.5	37.5	11 (Graney)	6
	1886	50.9	---	---	Irrigation	Graney Creek	1.5	76.35	11 (Graney)	6
	1891	103.8	---	---	Irrigation	Graney Creek	1.5	155.7	11 (Graney)	6
Monte Verde (LeBus)	First	9.6	---	---	Irrigation	American Creek	1.5	14.4	34	6
	First	44.8	---	---	Irrigation	American Creek	1.5	67.2	33	6
	1895	76.4	---	---	Irrigation	American Creek	1.5	114.6	33	6
LeBus	1895	68.8	---	---	Irrigation	American Creek	1.5	103.2	---	6
Angel Fire Corp. Wells	1895	22.7	---	---	Irrigation	American Creek	1.5	34.05	---	6
Village of Angel Fire (Robert S. Gordon)	1985	---	Eagle Nest contract	71	---	Cieneguilla Creek	---	2	---	6
	1994	---	Eagle Nest contract	71	---	Cieneguilla Creek	---	25	---	6
	---	---	Eagle Nest contract	71	Storage	Eagle Nest Reservoir	---	7,564	---	6
PICS Investment Co.	1985	---	Eagle Nest contract	71	---	Cieneguilla Creek	---	15	---	6
	---	---	Eagle Nest contract	71	Storage	Eagle Nest Reservoir	---	45	---	6
Valley Mix Ltd.	1985	---	Eagle Nest contract	71	---	Cieneguilla Creek	---	3	---	6
	---	---	Eagle Nest contract	71	Storage	Eagle Nest Reservoir	---	9	---	6
Agua Fria Enterprises	1999	---	Eagle Nest contract	71	---	Cieneguilla Creek	---	750	---	6
	---	---	Eagle Nest contract	71	Storage	Eagle Nest Reservoir	---	3,750	---	6
Swanson	1909	85	---	---	Irrigation	Hewitt Creek	1.5	127.5	18	6
Gorman	1883	40	---	---	Irrigation	Porbar Creek	1.5	60	16 (Witt)	7
	1902	155	---	---	Irrigation	Porbar Creek	1.5	232.5	16 (Witt)	7
Monte Verde Lake (Angel Fire Corp.)	First	68.9	---	---	Irrigation	Cieneguilla Creek	1.5	103.35	32	7
Gallagher	1890	60	---	---	Irrigation	Froelich Creek	1.5	90	14	8
	1890	41	---	---	Pasture	Froelich Creek	1	41	14	8
	1889	40	---	---	Irrigation	Froelich Creek	1.5	60	14	8
	1889	20	---	---	Irrigation	Froelich Creek	1.5	30	13	8

Note: Information on this table does not reflect changes in water rights since April 2001.

ac-ft/yr = Acre-feet per year
 --- = None

cfs = Cubic feet per second



Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
Monte Verde (Angel Fire Corp.)	First	19.3	---	---	Irrigation	School House Draw	1.5	28.95	34	8
Gant	1883	19.9	---	---	Irrigation	Willow Creek	1.5	29.85	19	9
Soden (Allen)	1878	20.3	---	---	Irrigation	Cimarron River	1.5	30.45	47	10
St. Louis Con. (Burk)	1880	---	---	---	Domestic	Draw	1	1	54	11
Jackson (Funk)	1878	107	---	---	Irrigation	Ute Creek	1.5	160.5	41	11
Soden (Allen)	1870	136	136 ac-ft	T205	Irrigation	Ute Creek	---	136	47	11
Atmore (Funk)	1878	45.8	---	---	Irrigation	Ute Creek	1.5	68.7	43	11
Soden (Allen)	1870	60	---	---	Irrigation	Ute Creek	1.5	90	47	11
	1878	135.8	---	---	Irrigation	Ute Creek	1.5	203.7	47	11
Raton	1907	---	Eagle Nest Contract	71	Storage	C S Canal via Eagle Nest Res.	---	15,000	---	21
	1907	---	Eagle Nest Contract	71	Municipal	C S Canal via Eagle Nest Res.	---	3,612	---	11
	---	---	Eagle Nest contract	71	Storage	Cimarron	---	50	---	11
Philmont	1907	---	1,000 ac-ft	---	Storage	Cimarron River	---	1,000	---	12
W.S. Ranch	1907	---	1,085 ac-ft	71	Storage	Cimarron River	---	1,085	---	12
Chandler (W.S.)	1875	171.7	---	---	Irrigation	Cimarron River	1.5	257.55	83	12
Village of Cimarron	1880	---	---	---	Irrigation	Cimarron River	42	63.3	---	13
Russell	1880	38.7	---	---	Irrigation	Cimarron River	1.5	58.05	70	13
Chandler (W.S.)	1864	32	---	---	Irrigation	Cimarron River	1.5	48	83	14
W.S. Ranch	1883	100	---	---	Irrigation	Cimarron River	1.5	150	92	15
	1899	100	---	---	Irrigation	Cimarron River	1.5	150	92	15
	1864	6.9	---	---	Irrigation	Cimarron River	1.5	10.35	75	16
Campinella (Cetrulo)	1864	6.9	---	---	Irrigation	Cimarron River	1.5	10.35	75	16
Lambert (Tucker)	1864	21.3	---	---	Irrigation	Cimarron River	1.5	31.95	99	16
W.S. Ranch	1900	---	French Reservoir	---	Storage	Cimarron River	---	163	96	16
	1946	---	French Reservoir	---	Storage	Cimarron River	---	300	---	16
Martinez (Godding)	1864	6.4	---	---	Irrigation	Cimarron River	1.5	9.6	74	16
J. Madrid (Dobyne/sold to Nazelrod)	1870	6.49	---	---	Irrigation	Cimarron River	1.5	9.735	73	16
W. Hickman (Gruenerwald)	1870	80.63	---	---	Irrigation	Cimarron River	1.5	120.945	77 and 97	17
Daniels (Gruenerwald)	1870	10.7	---	---	Irrigation	Cimarron River	1.5	16.05	76	17

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Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
Jackson (Gruenerwald)	1870	43.23	---	---	Irrigation	Cimarron River	2.5	108.075	79	17
	1873	153	---	---	Irrigation	Cimarron River	2.5	382.5	79	17
McDaniel (UU)	1873	426.3	---	---	Irrigation	Cimarron River	1.5	639.45	100-105	18
Chandler (Gruenerwald)	1914	14	---	---	Irrigation	Cimarron River	1.5	21	81	18
Cimarron Water Co.	7/27/1907	---	1 cfs	60	Storage	Cimarroncito Creek	---	92.43	80	19
Phillips (Philmont)	7/27/1907	---	Webster Lake	60	Storage	Cimarroncito Creek	---	700	89	19
	1907	466.1	---	---	Irrigation	Cimarroncito Creek	1.5	699.15	89	19
	1907	100	---	---	Pasture	Cimarroncito Creek	1	100	89	19
	1877	190	---	---	Irrigation	Cimarroncito Creek	1.5	285	87	19
McDaniel (UU Adams)	1933	---	Lewis Lake	---	Storage	Cimarroncito Creek	---	156	---	19
	1933	751.9	---	---	Irrigation	Cimarroncito Creek	1.5	1127.85	---	19
Phillips (UU Adames)	1873	89.2	---	---	Irrigation	Cimarroncito Creek	1.5	133.8	102	19
Antelope Valley Irrigation Dist.	9/10/1907	5,000	---	---	Irrigation	Cimarron River	5060	5060	---	20
Swope	1907	---	Eagle Nest Contract	71	Irrigation	C S Canal via Eagle Nest Res.	---	318	---	11
Hanson Trujillo	1907	---	Eagle Nest Contract	71	Irrigation	C S Canal via Eagle Nest Res.	---	1,050	---	22
Urraca Farms (Hughes)	1907	---	Eagle Nest Contract	71	Irrigation	C S Canal via Eagle Nest Res.	---	1,000	---	22
UU Ranch	1907	---	Eagle Nest Contract	71	Irrigation	C S Canal via Eagle Nest Res.	---	266	---	22
C S Cattle Co.	1886	114.7	---	---	Irrigation	C S Canal via Eagle Nest Res.	1.5	172.05	---	23
	1880	18.7	---	---	Irrigation	C S Canal via Eagle Nest Res.	1.5	28.05	111	23
	1873	1179	---	---	Irrigation	C S Canal via Eagle Nest Res.	1.5	1768.5	108-111	23
	1907	---	---	71	Storage	C S Canal via Eagle Nest Res.	---	1,500	---	23
USFS (Shuree Ponds)	1881	10.52	---	3959-T	Irrigation	Ponil Creek	1.5	15.78	48	24
Stern (N.M. Game and Fish)	1881	59.47	---	---	Irrigation	Ponil Creek	1.5	89.205	48	24
Stern (Philmont)	1881	11.08	acres to wells	---	Irrigation	Ponil Creek	1.5	16.62	53-54	24
Maxwell Land (USFS)	1882	100	---	---	Irrigation	North Ponil Creek	1.5	150	57	25
	1904	100	---	---	Irrigation	North Ponil Creek	1.5	150	57	25
Maxwell Land (Philmont)	1902	20	---	---	Irrigation	North Ponil Creek	1.5	30	57	25
	1892	10	---	---	Irrigation	North Ponil Creek	1.5	15	57	25
Chase (Chase Ranch)	1873	288.7	---	---	Irrigation	Ponil Creek	1.5	433.05	59	26

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Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
C. Springer (Chase)	1873	84.1	---	---	Irrigation	Ponil Creek	1.5	126.15	65	27
	1880	33.4	---	---	Irrigation	Ponil Creek	1.5	50.1	67	27
Chase Ranch	1890	7.8	---	---	Irrigation	Ponil Creek	1.5	11.7	59	28
	1880	12.2	---	---	Irrigation	Ponil Creek	1.5	18.3	59	28
C. Springer (Chase)	1902	50.9	---	---	Irrigation	Ponil Creek	1.5	76.35	65	29
	1892	24.4	---	---	Irrigation	Ponil Creek	1.5	36.6	65	29
W.S. Ranch	1873	118	---	---	Irrigation	Ponil Creek	1.5	177	91	30
	1873	350	---	---	Irrigation	Ponil Creek	1.5	525	91	30
C S Cattle Co.	1873	107.43	---	---	Irrigation	Springer Ditch Canal	1.5	161.145	112	31
PNM (C S Cattle Co.)	1880	148.2	---	---	Irrigation	Springer Ditch Canal	1.5	222.3	---	31
Springer Ditch Co.	1887	4,000	Springer Dam	---	Storage	Springer Ditch Canal	---	3,595	128	32
P&M Coal	1873	240.4	---	---	Irrigation	Springer Ditch Canal	1.5	360.6	112-113	32
	1907	50	---	71	Irrigation	Springer Ditch Canal	1.5	75	---	32
Springer Village	1887	---	---	---	Storage	Springer Ditch Canal	---	450	---	33
	1907	---	---	71/AA	Municipal	Springer Ditch Canal	---	300	---	33
	1907	---	Storage contract	71	Storage	Springer Ditch Canal	---	1,000	---	33
Harkness (Davis)	1952	17.95	---	2659	Irrigation	Cimarron River	1.5	26.925	---	34
	1934	25.02	---	1901	Irrigation	Cimarron River	1.5	37.53	---	34
Philmont	1860	26	---	---	Irrigation	Rayado River	1.5	39	---	35
McDaniel	1860	439.4	---	---	Irrigation	Rayado River	1.5	659.1	---	35
Farmers Dev. Co. (Miami water users)	1906	6,500	---	---	Irrigation	Rayado River	1.5	9750	7	35
Farmers Dev. Co. (Hemmings)	1867	193	---	---	Irrigation	Rayado River	1.5	289.5	5	35
C S Cattle Co.	1894	---	Clouthier	---	Storage	Rayado River	---	150	---	---
	1894	135	Clouthier	---	Irrigation	Rayado River	1.5	202.5	---	35
Philmont	First	---	Urraca Reservoir	---	Storage	Urraca Creek	---	50	---	36
	First	---	Stock and domestic	---	Storage	Urraca Creek	---	75.6	---	36
	1925	---	Stock and domestic	---	Storage	Urraca Creek	---	114	---	36

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Table D2-1. Water Rights
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Owner	Priority Date	Irrigated Acres	Permit Modifications	Permit Number	Designated Use	Tributary	Duty (ac-ft/yr)	Total (ac-ft/yr)	Decree Page Number	Reference Number
Philmont	1870	132.9	---	---	Irrigation	Urraca Creek	1.5	199.35	---	36
	1925	157.3	---	---	Irrigation	Urraca Creek	1.5	235.95	---	36
Clayton Ranch (C S Cattle Co.)	1890	105	---	---	Irrigation	Rayado River	1.5	157.5	---	37
	1890	115	---	---	Irrigation	Rayado River	1.5	172.5	---	37
J.T. Smith (C S Cattle Co.)	1890	85	---	---	Irrigation	Rayado River	1.5	127.5	---	37
Clayton Ranch (C S Cattle Co.)	1890	150	---	---	Irrigation	Rayado River	1.5	225	---	37
Bowen (P&M)	1940	100	Pump	2394	Irrigation	Cimarron River	1.5	150	---	38
Clayton Place	1939	653.1	---	2084	---	Salado Creek	1.5	979.6	---	39
	1939	---	Clayton Reservoir	2084	---	Salado Creek	---	511	---	39
Clayton Ranch (C S Cattle Co.)	1936	---	Pump	2127	Irrigation	Cimarron River	---	6	---	39
R. Lane (Fred Reno)	1920	21.7	Pump	1355	Irrigation	Cimarron River	1.5	32.55	---	40
Federal Land (Knowles)	1878	70	Pump	02522	Irrigation	Cimarron River	1.5	105	100	41
Total							---	76,664.8	---	---

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 --- = None

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