CITY COUNCIL
CITY OF LEMOORE

URBAN WATER MANAGEMENT PLAN 2005

Prepared by:

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5110 W. Cypress Avenue
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DECEMBER 2005

L050033

RESOLUTION NO. 2005-40

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LEMOORE ADOPTING AN URBAN WATER MANAGEMENT PLAN

At a regular meeting of the City Council of the City of Lemoore, duly called and held on December 20, 2005 at 7:30 p.m., it was moved by Councilmember Plourde, and seconded by Councilmember Murray, and duly carried that the following resolution be adopted:

WHEREAS, PURSUANT TO Assembly Bill 797, Water Code Section 10610 ett seq., the City of Lemoore has prepared an Urban Water Management Plan; and

WHEREAS, the City Council scheduled a public hearing for December 20, 2005 to accept testimony regarding the Urban Water Management Plan; and

WHEREAS, the public hearing has been held as scheduled and any and all testimony has been received and considered regarding the Plan, and said Plan has been submitted in draft format to the Department of Water Resources, and minimally modified in accord with comments therefrom.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Lemoore approves and adopts the Urban Water Management plan, incorporating therein the appointment of the Public Works Director as the City's Program Manager for water shortage activities and authorizing the City Manager to declare water shortage should one occur and to implement or recommend thereafter, if necessary, the water shortage measures described in Chapter Eight of said Plan.

Passed and adopted at a Regular Meeting of the City Council of the City of Lemoore held on December 20, 2005 by the following vote:

Ayes: Plourde, Murray, Buford
Noes: None
Absent: Grego, Martin
Abstaining: None

Approved:

Thomas E. Buford
Mayor

Attest:

Nanci C. O. Lima, City Clerk

CERTIFICATE

STATE OF CALIFORNIA)
COUNTY OF KINGS) ss.
CITY OF LEMOORE)

I, NANCI C. O. LIMA, City Clerk of the City of Lemoore do hereby certify the foregoing Resolution of the City Council of the City of Lemoore was duly passed and adopted at a Regular Meeting of the City Council held on December 20, 2005.

Dated: December 21, 2005

Nanci C. O. Lima

NANCI C. O. LIMA, City Clerk

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ACKNOWLEDGEMENTS

The base data, and much of the
analysis, for this report was
provided by:

David Wlaschin, Public Works Director
Richard Pereira, Water and Fleet Superintendent
J.P. Prichard, Administrative Analyst

CHAPTER ONE

INTRODUCTION

CHAPTER ONE – INTRODUCTION

LAW

Water Code Section 10610-10610.4

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2 The Legislature finds and declares....:

...This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4 The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

1.1 The Urban Water Management Planning Act

The California Water Code, Division 6, Section 10610 et seq requires all urban water suppliers within the state to prepare Urban Water Management Plans (UWMPs) and update them every five years. Such plans satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983, including amendments that have been made to the Act (see Appendix A). This report constitutes the City of Lemoore 2005 UWMP.

The Code requires that a UWMP must include historic, current and future supplies and demands for water; address conservation measures, and describe potential supply deficiencies during drought conditions and the ability to mitigate these conditions; compare total projected water use and water supply sources over 20 years in 5-year increments, for a single dry water year and for multiple dry water years; and provisions for recycled water use, demand management measures, and a water shortage contingency plan. A copy of the governing Code sections is included in Appendix A hereto; pertinent excerpts therefrom precede and are included in the Chapters in this Plan.

1.2 Previous City Urban Water Management Plans

The City adopted Urban Water Management Plans in 1998 and 2000, and an amended Plan in 2004.

The initial 2000 Plan included a general description of the City's current water system and a brief overview of the history of the system. An updated excerpt of that description and overview is included here to provide perspective for the detailed, Code-required, data and analysis in succeeding Chapters of this Plan.

The heart of the modern City of Lemoore domestic water system was constructed in 1972, when several shallow supply wells within the City were taken out of service in lieu of three new wells constructed in an 80-acre well field located six miles north of Lemoore, adjacent to the Kings River. Where the water produced by the older wells was characterized by taste, odor, and a prominent green-brown color, the water from the well field is absent many of these negative aesthetic qualities.

Along with the new wells, an 18-inch transmission main was constructed to a new water distribution plant located in the central city at G Street west of Lemoore Avenue. This distribution plant included a 1-million gallon storage tank, five distribution pumps, and an electronic control and telemetry system. Additional ground-level storage has since been added to the system in three additional tanks, for a total current storage capacity of 4.4 million gallons.

In 1977, federal Drought Relief funds allowed construction of a fourth well at the well field, and a second 1-million gallon storage tank. These improvements added greatly to the ability of the system to support a growing urban population, and provided a greater degree of protection against an operational problem at the well field or a problem with the transmission main.

In the late 1980's, the telemetry and control systems were completely replaced through a series of projects. In addition, the capacities of the individual wells at the well field were increased, and in-city distribution-pumping capacity was increased by replacement and addition of distribution pumps.

In 1995, the City constructed a deep well within the City limits (Well No.10).

In 1996, two of the original wells at the river were removed from service. One of them was replaced, with a well of similar construction to Well No.5, during Spring, 1997.

In 2000, two additional wells were constructed within the City limits, Wells No. 11 and 12, in the northeast and southwest quadrants of the community, respectively. An additional 1 million gallon storage tank was constructed near the westerly terminus of the water system (at the site of Well No. 7 which was added to the system in 2005). The water from both wells meets primary drinking water standards. The water from Well No. 12 meets secondary drinking water standards; that from Well No.11 exceeds color standards. Well No. 12 is connected directly to the distribution system. Well No. 11's discharge is blended with well field water to meet color standards prior to connection to the distribution system.

In addition to the main domestic water supply system, the City operates a separate water system which supplies water to the SK Foods tomato processing plant in South Lemoore (Wells No.8 and 9). This plant operates between July 1 and September 25 annually, consuming 2.0 to 2.5 million gallons of water per day. Each well pumps into a pressure vessel in order to increase delivery pressure to the plant. The pressure vessel outlets are plumbed together, providing a single service point for the plant. This water system normally operates completely apart from the main system, although connections exist which allow the City to interconnect the two systems in an emergency such as a major fire demand or other abnormally high system demand.

This water is treated on site after it is used in the tomato process, and is then discharged to a nearby farm where it is used as irrigation water and, in lesser part, to the City's wastewater reclamation facility.

All of the water used within the City is chlorinated via gaseous chlorine or hypochlorite systems. These injection systems are located near the junction point of the three individual well discharge lines at the well field, near the point of service for SK Foods, and on the discharge lines for Wells No.10, 11 and 12. This is done mostly for aesthetic reasons. The water that is pumped is of an acceptable quality to meet state drinking water standards, but does possess a slight sulfuric odor. Chlorine injection remedies this problem.

The City monitors water quality with testing by an independent testing laboratory and records groundwater levels with pump testing.

All of the City's wells were constructed by reverse rotary methods. Well No.2 has perforations both above and below the "E" Clay, but is sealed above the "A" Clay. Wells No.3 and 5 take water from beneath the "A" Clay but above the "E" Clay. Wells No.4, 8, 9, 10, 11 and 12 take water exclusively from beneath the "E" Clay.

The City has new added another in-town well, with an associated hypochlorite facility, to the system. A second major food-processing (cheese production) facility is now served by the system.

1.3 Public Participation, Plan Adoption

LAW

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published...After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

In accordance with the UWMPA, the City held a public hearing regarding the 2005 UWMP on December 20, 2005. A copy of the proposed adopting resolution is included in Appendix A. Fourteen days prior to Council consideration, a notice of the public hearing was published in the

local newspaper, notifying interested parties that the Amended 2000 UWMP was available at various City facilities for review; at the same time, copies of the Draft were forwarded to the Department of Water Resources for review. Upon the completion of that review, and corrections based thereon, the Council will adopt the Plan.

1.4 Agency Coordination

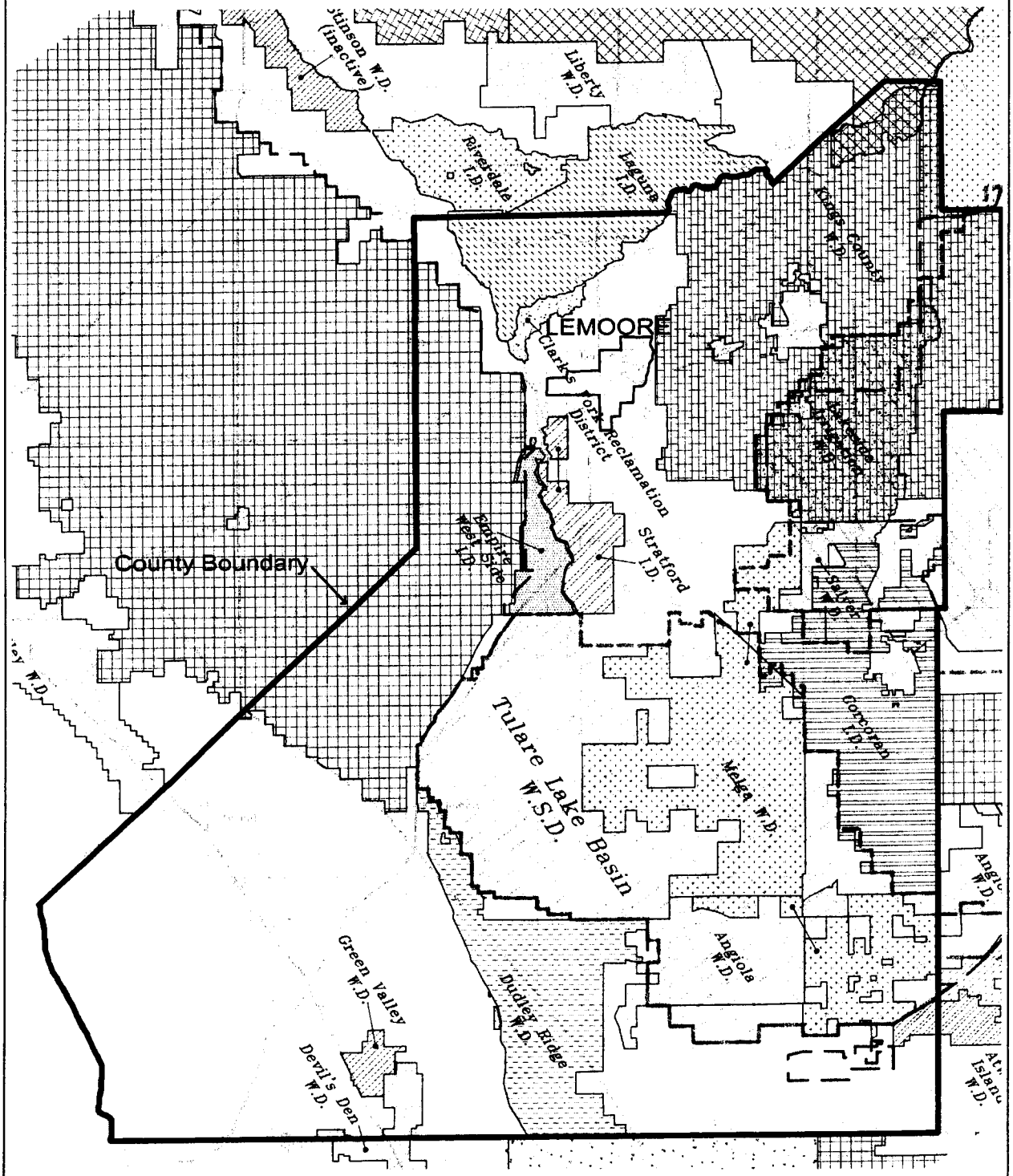
LAW

10620 (d) (2). Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

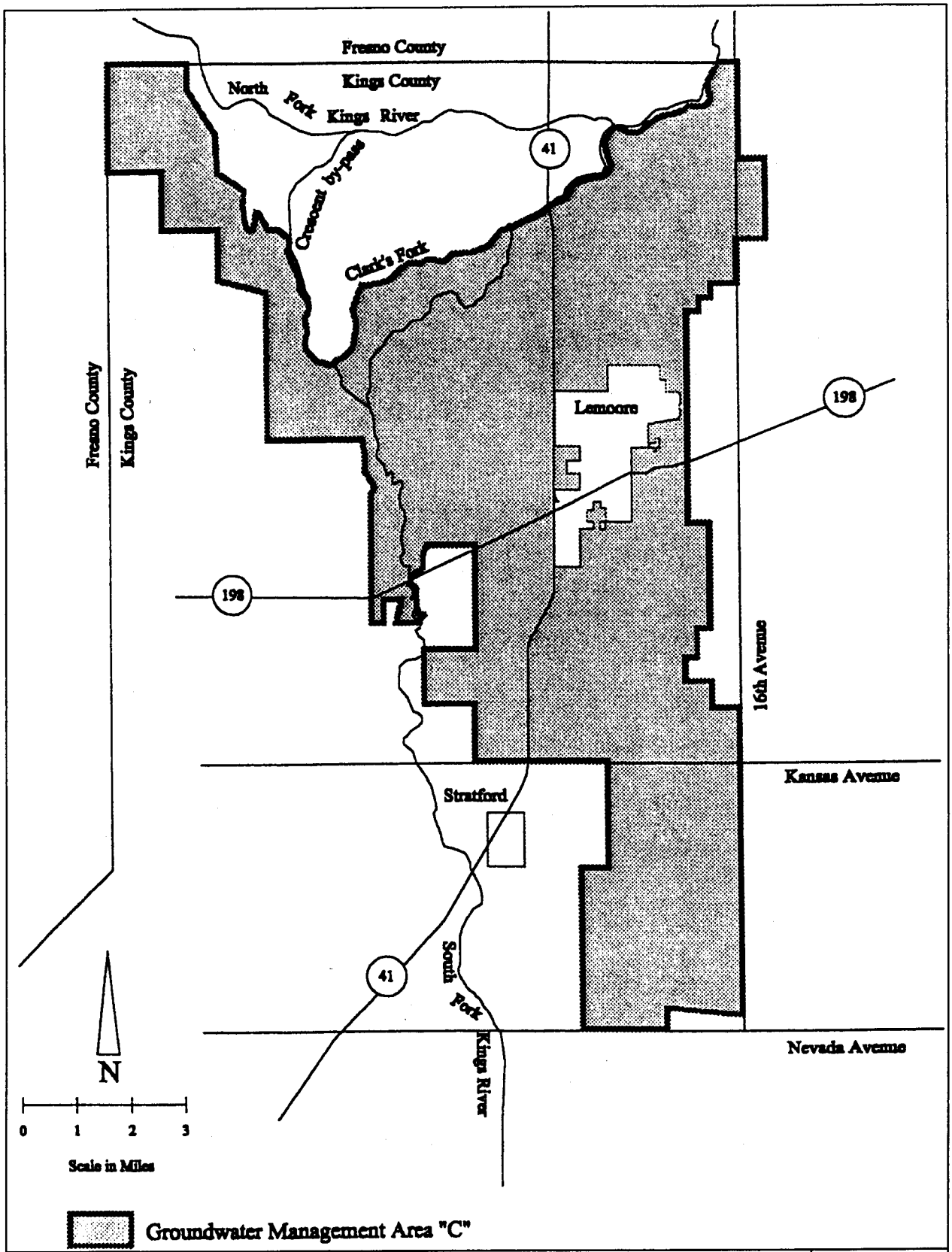
The City of Lemoore 2005 UWMP is intended to address those aspects of the Act, which are under the control of the City, specifically water supply and water use. While preparing the 2005 UWMP, the City coordinated its efforts with relevant local agencies to ensure that the data and issues are presented accurately.

The City's consultants contacted the Department of Water Resources (DWR) to discuss the requirements of the UWMPA and obtain a checklist and other guidelines.

The City has furnished copies of the draft Plan to and requested comments by Kings River Conservation District, Kings County Water District and Laguna Irrigation District, as entities providing water management in the northwest portion of Kings County. Although the City is not included within District boundaries (see Figures 1-1 and 1-2 on the following pages) they are adjacent to the City and their activities affect the groundwater basin from which the City draws its water supply. A copy of the draft Plan was also furnished to, and comments requested from, the Lemoore Canal and Irrigation Company which serves an area north of the City.



Quad Knopf	WATER DISTRICT BOUNDARIES Kings County	Figure 1 - 1



Quad Knopf	KINGS RIVER CONSERVATION DISTRICT Area "C"	Figure 1 - 2

CHAPTER TWO

SERVICE AREA

CHAPTER TWO – SERVICE AREA

The City's existing water facilities, and the recent history of their development, are described in Section 1.2 of Chapter One of this Plan.

2.1 Location

The City of Lemoore is located in Kings County approximately 200 miles north of Los Angeles and 210 miles south of San Francisco. The City is situated at the intersection of State Highway 198, which connects coastal Highway 101 with Sequoia National Park, and State Highway 41 connecting Pacific Coast Highway 1 with Yosemite National Park (see Figure 2-1).

2.2 Climate

The climate of the Lemoore area is characteristic of that of the Southern San Joaquin Valley. The summer climate is hot and dry, while winters are cool and periodically humid. Mean daily maximum temperatures range from a low of approximately 57 degrees F in December and January to a high of about 99 degrees F in July. Rainfall is concentrated during the six months from November to April. December and January typically experience heavy fog, mostly nocturnal, caused when moist cool air is trapped in the valley by high pressure systems. In extreme cases, this fog may last continuously for two or three weeks. Its depth is usually less than 3,000 feet.

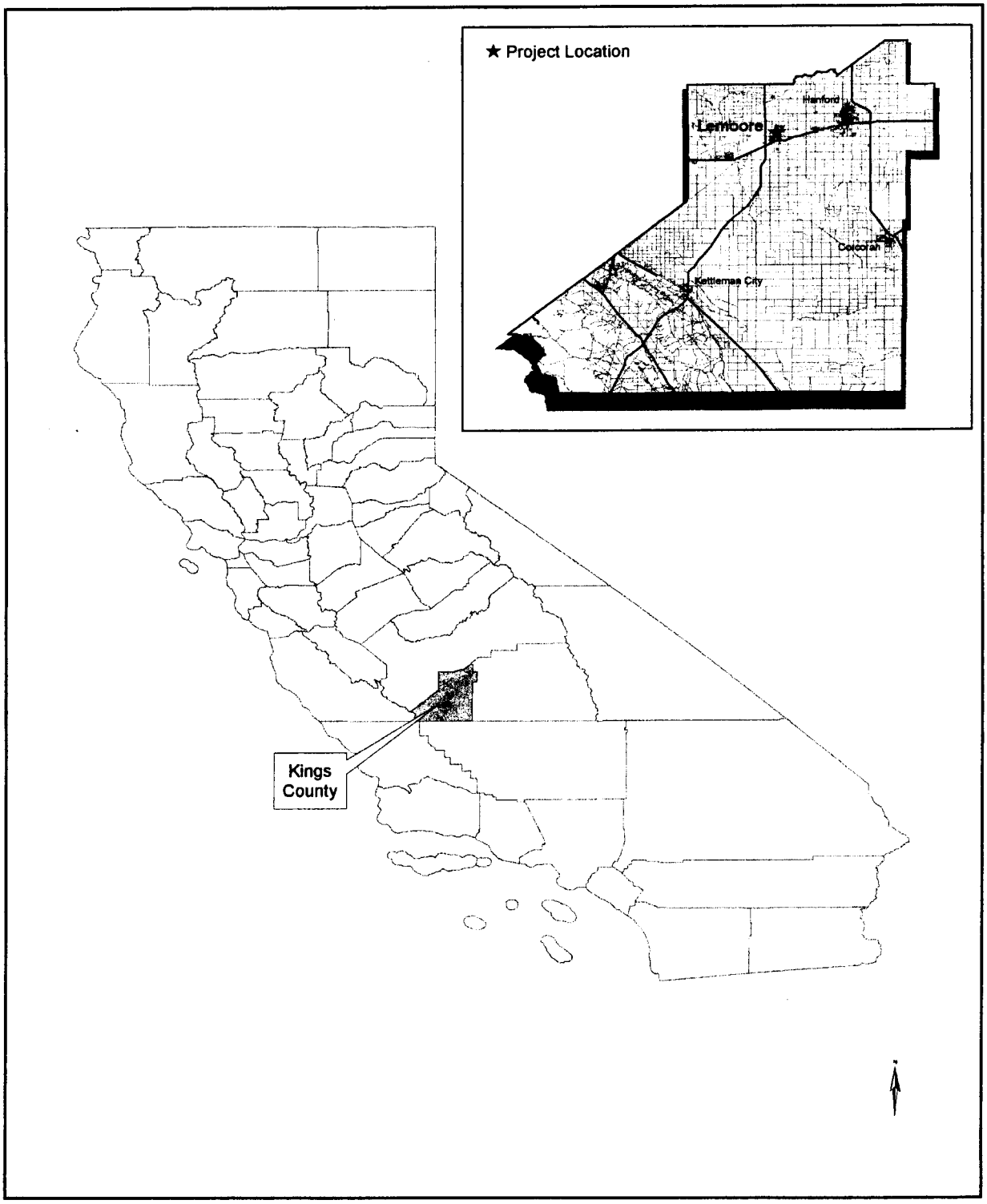
The Valley area is subject to characteristic seasonal air flows. During the summer, air currents from the Pacific Ocean enter the Valley through the San Francisco Bay and Delta region and are forced down the valley. These air movements are primarily to the southeast at velocities of six to ten miles per hour. During the winter, cold air flowing off the surrounding mountains results in currents toward the northwest and velocities ranging from zero to five miles per hour. These airflows result in extensive horizontal mixing of air masses in the Valley. However, vertical dispersion is constrained by temperature inversions, an increase in air temperature in a stable atmospheric layer, which may occur throughout the year.

Climatic data pertinent to system operation and design are summarized as follows:

Table 2.2-1
Climate

	Jan	Feb	Mar	Apr	May	June	
Standard Monthly Average ETo*	0.92	1.94	3.19	4.62	6.04	7.34	
Average Rainfall (inches)	1.66	1.60	1.76	0.63	0.26	0.08	
Average Temperature (Fahrenheit)	44.7	50.2	55.0	60.6	68.3	75.0	
	July	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Standard Monthly Average ETo*	8.23	7.18	4.94	3.24	1.67	1.08	50.39
Average Rainfall (inches)	0.01	0.01	0.25	0.44	0.82	1.06	8.58
Average Temperature (Fahrenheit)	79.6	78.4	73.3	64.5	52.4	44.1	62.2

*Evaporation/transpiration, inches



Quad Knopf	REGIONAL LOCATION	Figure 2 - 1

2.3 Land Use

The City of Lemoore is surrounded by agricultural development, with smaller parcels north and east of the community and large holdings west and south. A major economic factor in the community's economy is Lemoore Naval Air Station located west of the Kings River and of the City.

The 2000 Land Use Element of the Lemoore General Plan shows an area of approximately 7.08 square miles or 4,533 acres inside the City limits; there have been no annexations since that date (see Figure 2-2). Because of the significant areas of the City within its corporate boundary which remain undeveloped the urban growth boundary is currently designated as coterminous with the corporate limits of the City. Over 500 acres were added to the City limits after 1990, when the incorporated area totaled just over 4,000 acres.

Fifty percent, or 2,297 acres of the City is designated for residential use, with industrial as the next largest category at 896 acres and representing 20 percent of the land area (see Table 2.3-1).

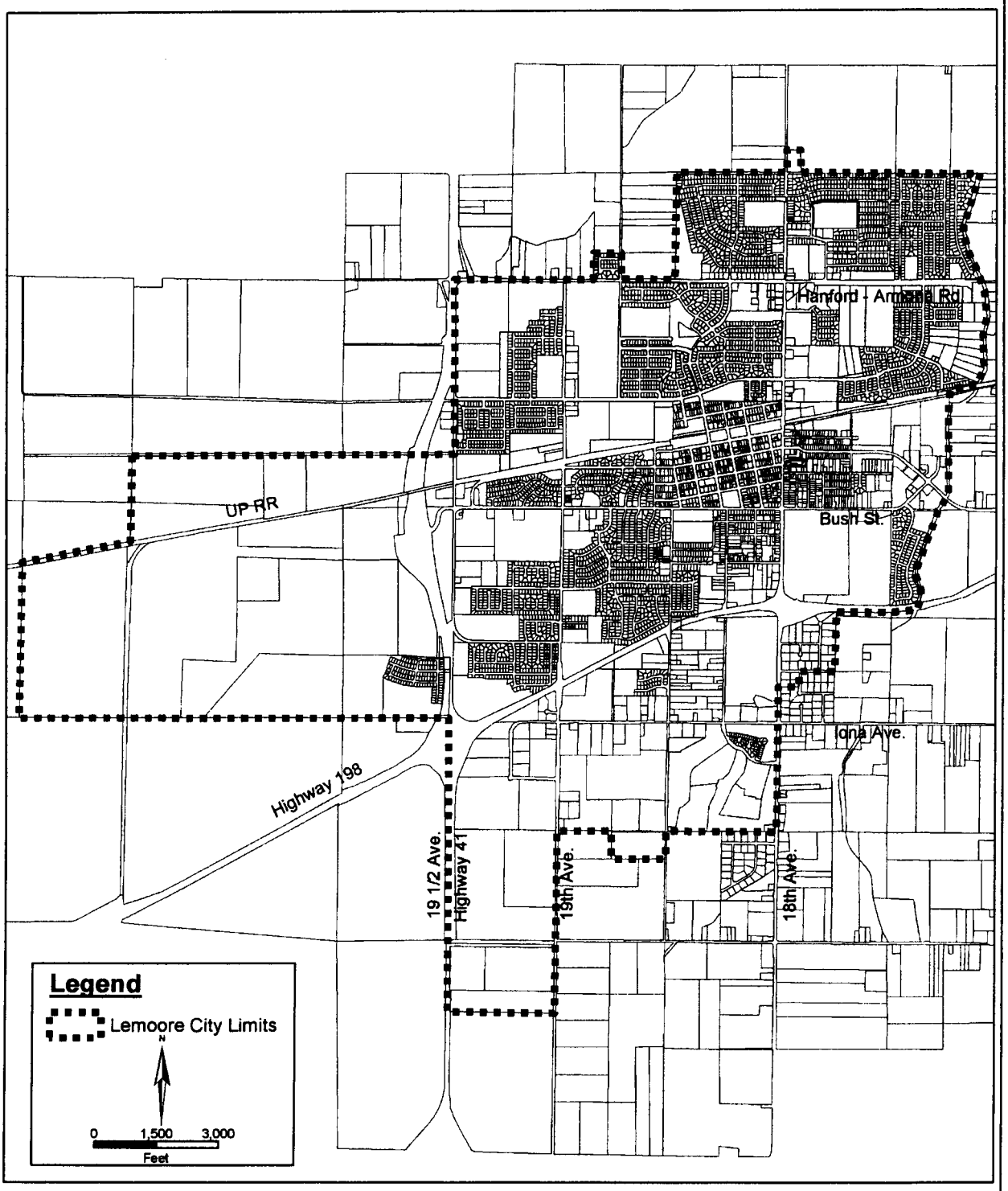
Table 2.3-1
General Plan Land Use Designations
City of Lemoore

Land Use Designations	Area (Acres)	% of Total
Residential		
Low Density:	1,765	39
Medium Density:	241	5
High Density:	148	3
Residential Acreage:	143	3
Commercial	435	10
Industrial	896	20
Recreation/School Conservation	749	16
Urban Reserve	176	4
Total	4,533	100

Source: 2000 Land Use Element, City of Lemoore

2.4 Projected Population

Recognized as a community in 1873 the town was initially called Latache. In 1893 the small settlement was renamed Lemoore, and by the turn of the century, Lemoore reached a population of just less than 1,000 residents. Incorporated in July of 1900, the City prospered as a small agricultural service center.



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LEMOORE CITY LIMITS

Figure 2 - 2

Lemoore has experienced significant increases in population in every decade since 1970. Between 1970 and 1980 the population increased 109 percent reflecting the expansion of the Lemoore Naval Air Station and industrial development in northern Kings County.

General Plan population projections are shown in Table 2.4-1. The population projections shown on Figure 2-3 were used to forecast water requirements. The Lemoore General Plan projected a population increase from 1990 to 2010 that ranged from a minimum of three percent to a maximum of five percent average annual growth.

Table 2.4-1
Population Projections 1995-2010
City of Lemoore

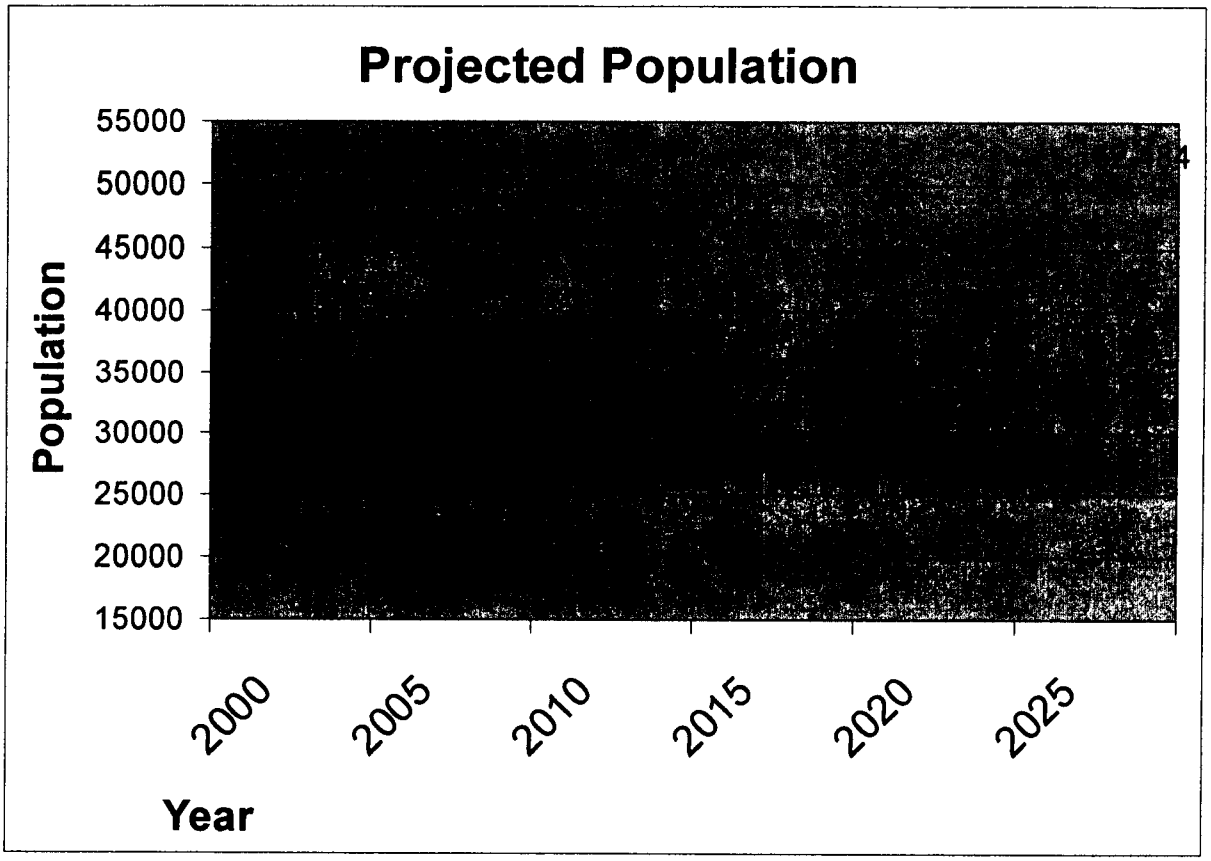
Years	Population		
	With 3% Annual Growth Rate	With 5% Annual Growth Rate	Mean
1995		17,025	17,235
2000	19,825	21,544	20,684
2005	23,786	25,855	24,820
2010	27,354	31,025	29,190

Source: Lemoore General Plan 1990-2010

The three percent annual average growth rate projection prepared in 1988, and shown in Table 2.4-1 predicted a population of 19,825 in 2000, very close to the actual population of Lemoore in 2000, which was 19,712. Table 2.4-2 and Figure 2-3 show a population projection based on a four percent annual increase from 2000 to 2025. This rate of increase has been selected as most likely to be typical, and conservative as a basis of water needs estimate. (Continued expansion of Lemoore Naval Air Station, as a principal employer in the community, is assumed.)

Table 2.4-2
Population Projections, 2005-2025

Years	
2005	23,983
2010	29.179
2015	35,500
2020	43,191
2025	52,484



Note: Assumes 4%/year population growth.

Quad Knopf	POPULATION PROJECTIONS, 2000-2025	Figure 2 - 3

CHAPTER THREE

WATER SUPPLY

CHAPTER THREE – WATER SUPPLY

LAW

10631(b). Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a)... Provide:

(1) A copy of any groundwater management plan adopted by the urban water supplier.

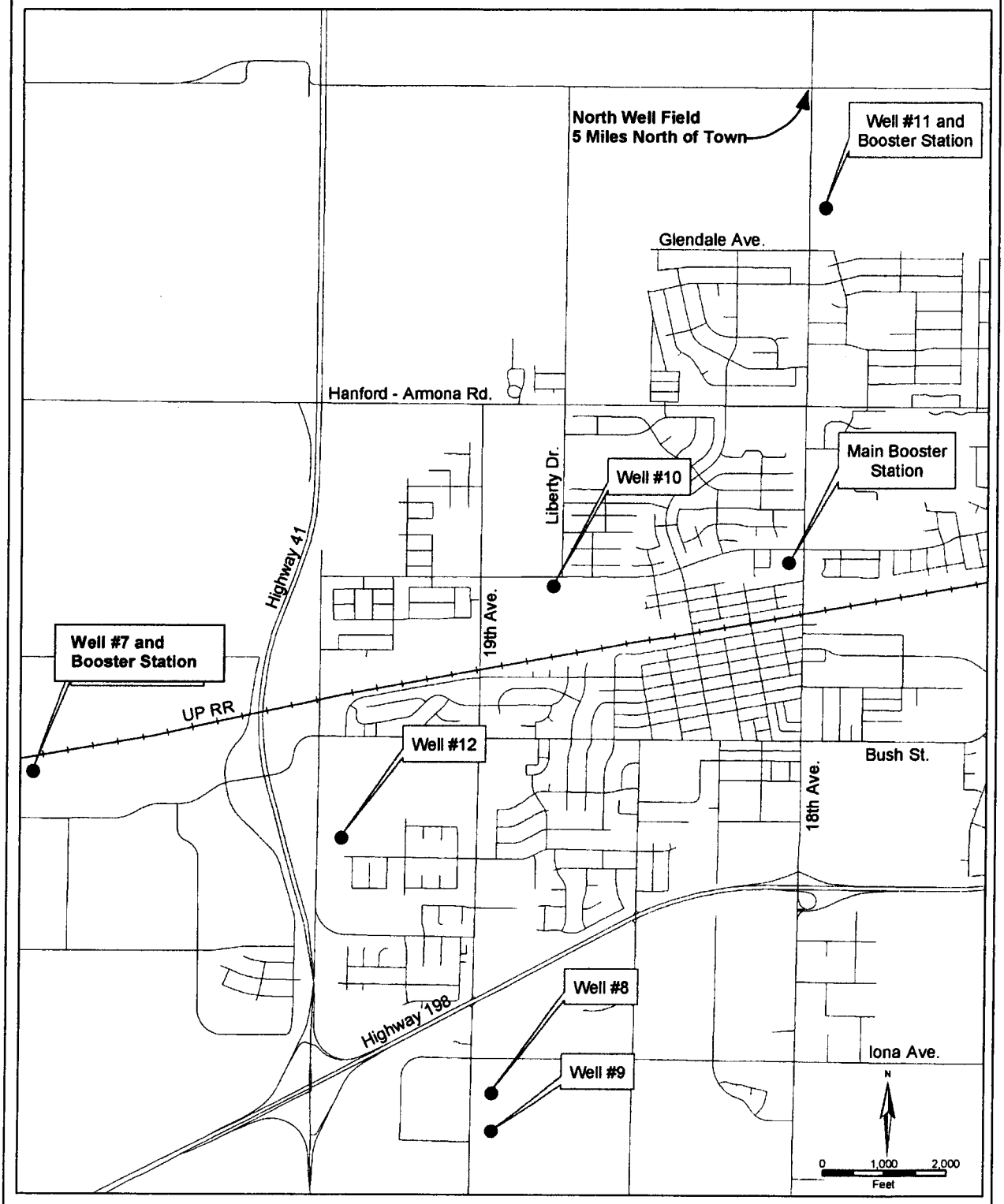
(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater..... information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted .....and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.

(4) A detailed description and analysis of the amount and location of groundwater that is protected to be pumped by the urban water supplier.

3.1 Water Supply Facilities

The City currently utilizes local groundwater as its sole source of supply. The City's municipal water system extracts its water supply from underground aquifers via nine active groundwater wells within, and in a wellfield five miles north of, the City (Figure 3-1). The pumping capacities of the City wells are shown on Table 3.1-1. Water is conveyed from the wells to the consumers via a distribution system with pipe sizes between 4 and 12 inches in diameter. The City maintains four ground-level storage reservoirs within the distribution system, with a total capacity of 4,400,000 gallons.



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WELL LOCATIONS

Figure
3 - 1

Table 3.1-1
Water Supply Wells

Well No.	Status	H.P.	Well Capacity (gpm)	Well Capacity (MGD)	Current Emergency Capacity Emergency Generator or Diesel	Current Emergency Capacity (gpm)	Current Emergency Capacity (MGD)
2	Active	200	2100	3.02	N	---	---
3	Inactive	---	---	---	N	---	---
4	Active	300 (Diesel)	2200	3.17	Y Diesel	2200	3.17
5	Active	250	2200	3.17	N	---	---
7	Active	200	1200	1.73	Y	1200	1.73
10	Active	300	2000	2.88	N	---	---
11	Active	200	1000	1.44	Y	1000	1.44
12	Active	200	1000	1.44	N	---	---
8	Active	150	800	1.15	Y	800	1.15
9	Active	150	800	1.15	Y	800	1.15
Total			13,300	19.15		6,000	8.64

Source: City Staff, 11/22/05

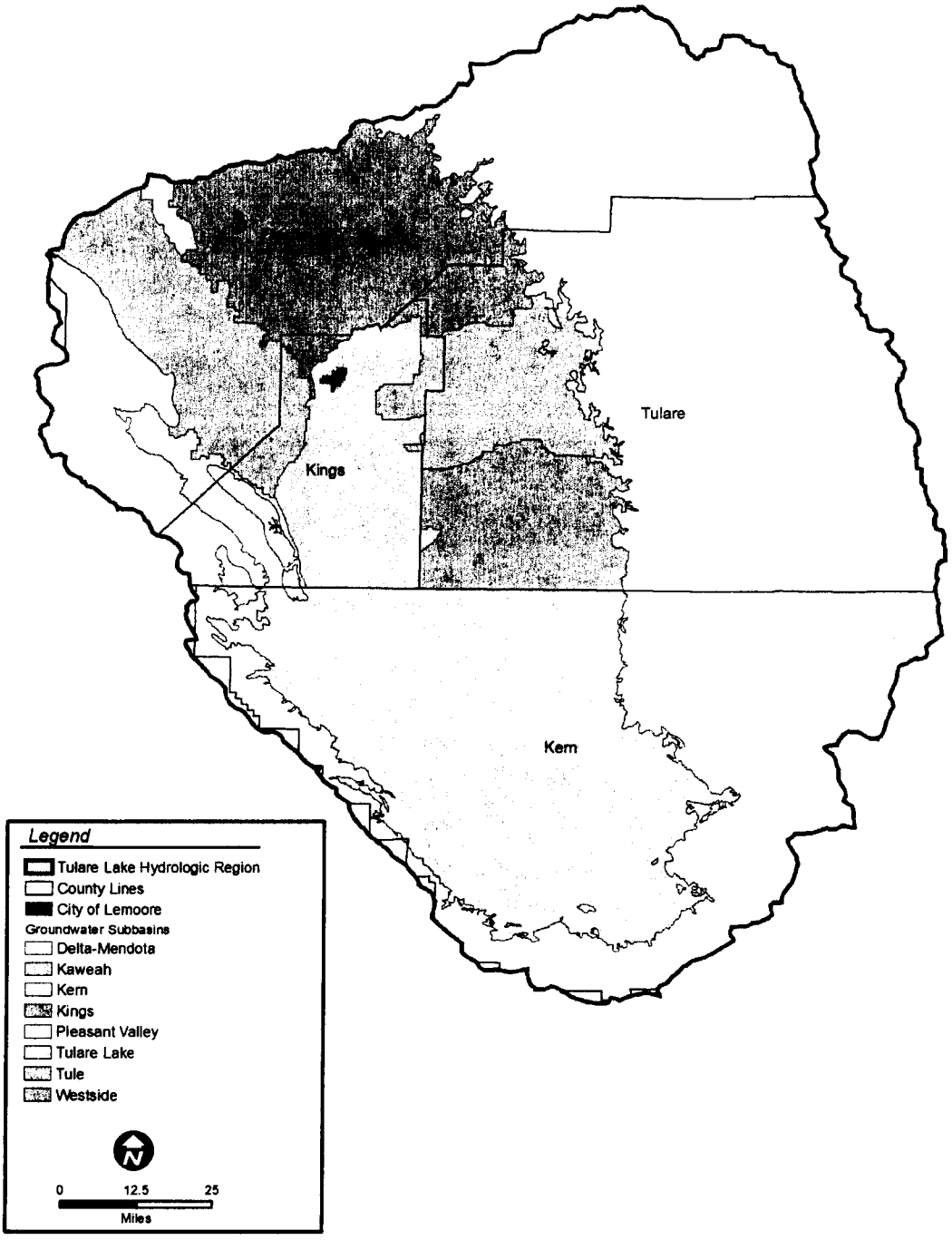
3.2 Groundwater Basin

The groundwater subbasin underlying the City is the Tulare Lake Basin, which is part of the Tulare Lake Hydrologic Region (Figure 3-2). This region contains multiple interconnected subbasins that transmit, filter, and store water: the Kings, Kern, Kaweah, Tulare Lake, Tule, Westside, and Pleasant Valley subbasins. The City of Lemoore is immediately adjacent to the south boundary of the Kings subbasin.

The Tulare Lake Basin is not an adjudicated groundwater basin, as defined by the California Water Plan Update, Bulletin 160-98, Figure 3-28 on page 3-54 and Table 3-16 page 3-55.

The California Water Plan Update, Bulletin 160-98 page 3-50, Table 3-15, lists the 1995 overdraft for the Tulare Lake Hydrologic Region at 820 thousand acre feet (taf). As shown in Table 3-15, groundwater overdraft is expected to decline to 670 taf during 2020.

During drought periods, water levels in the subbasins may decline. However, during wet periods, most of them recover, thus making application of Lemoore area overdraft or perennial yield models less reliable than desired, particularly in subbasin boundary areas.



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SUBBASINS, TULARE LAKE HYDROLOGIC REGION

Figure 3 - 2

3.2.1 BASIN BOUNDARIES AND CHARACTERISTICS

The Tulare Lake Subbasin is bounded on the south by the Kings-Kern county line, on the west by the California Aqueduct, the easterly boundary of Westside Groundwater Subbasin, and by the Tertiary marine sediments of the Kettleman Hills. It is bounded on the north by the southern boundary of the Kings Groundwater Subbasin, and on the east by the westerly boundaries of the Kaweah and Tule Groundwater Subbasins. The southern half of the Tulare Lake Subbasin consists of lands in the former Tulare Lakebed in Kings County.

According to DWR, estimations of the total storage capacity of the Tulare Lake Subbasin and the amount of water storage as of 1995 were calculated using an estimated specific yield of 8.5 percent and water levels collected by DWR and cooperators. According to these calculations, the total storage capacity of the Tulare Lake Subbasin is estimated to be 17,100,000 acre feet to a depth of 300 feet and 82,500,000 acre feet to the base of fresh groundwater. These same calculations give an estimate of 12,100,000 acre feet of groundwater to a depth of 300 feet stored in this subbasin as of 1995.

While several strata of groundwater can be found beneath both the City's wellfield and the City itself, only certain of the strata have proven to be useful for domestic water supply. These strata are below the "A" Clay and below the "E" Clay. The "A" Clay is at a depth below the ground surface of approximately 70 feet at the wellfield and approximately 400 feet within the City. The "E" Clay is at a depth below the ground surface of approximately 500 feet at the City's wellfield and approximately 800 feet within the City. The aquifers below the "A" Clay have been described in hydrogeological reports as "semi-confined," and the aquifer below the "E" Clay has been described as "confined". These aquifers are fed by percolating surface water along the east side of the San Joaquin Valley, west of the Sierra Nevada watershed. That water then migrates south and west under much of the San Joaquin Valley, forming a groundwater pool over 2 million acres in area.

Lemoore is geographically located within the Kings River service area in which groundwater management activities are conducted and coordinated by a number of agencies. A recent publication of the Kings River Water Association describing these activities is included in Appendix E of this report.

The Lemoore Canal and Irrigation Company, although not a "District" or public agency, owns, maintains and operates surface water canals near and within the City of Lemoore. The activities of this Company affect groundwater levels and usage in the Lemoore area; the City of Lemoore discharges stormwater to the Company's canals for transport to a City-owned wetlands facility and to other agricultural areas. The City enjoys a close and cooperative relationship with the Company.

3.2.2 GROUNDWATER MANAGEMENT PLANS

As a water district immediately up-gradient from the City of Lemoore, the groundwater management program of the Kings County Water District (KCWD) is of importance to the City of Lemoore.

KCWD was formed in 1954 under the County Water District Act to provide a legal entity for water management in the Northeast portion of Kings County. KCWD has prepared a Groundwater Management Program (GMP), which provides an understanding of KCWD groundwater management role within the County. It also documents the existing activities of KCWD and formalizes other proposed programs in a plan that will be used in implementing a monitoring and management program for conjunctive use, replenishment and preservation of groundwater of the basin (see Appendix C). The following are excerpts from the GMP.

Since its creation, KCWD has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. KCWD"s objectives related to groundwater management are to recharge the groundwater basins, conserve water, increase water supply, and to prevent waste or diminution of KCWD's water supply.

KCWD has effectively managed the groundwater basins to fulfill the objectives of the District Act and its mission. The goals of these groundwater management efforts have been, and continues to be, to ensure that groundwater resources are sustained and protected.

The Groundwater Management Program formally documents KCWD's groundwater management goals and describes programs in place that are designed to meet those goals. The following programs are documented in the plan:

- *Conjunctive use of surface water and groundwater has been practiced within the KCWD since its formation in 1954. Through the purchase of slough channels and other appropriate sites for the as recharge basins, and by the purchase and importation of available surplus water and flood release water, the KCWD has reduced the decline of groundwater levels within the District.*

- *Since 1963, the KCWD has engaged in a cooperative program with the State Department of Water Resources for the monitoring and sampling of groundwater in the District. Water level measurements are annually obtained from approximately 200 wells in both the spring and the fall. The data obtained in the spring (normally the last of January) reflects the "seasonal high" water table, as the measurements are made prior to pumping for pre-irrigation. The fall measurements (normally obtained in the first part of October) are taken after the season of crop irrigation pumping.*

- *The cooperative program between DWR and the KCWD has been expanded to include monitoring of groundwater quality. Water samples from selected wells were collected in those years and delivered to the DWR and private laboratories for analysis.*

The City is also located adjacent to and down-gradient from the Laguna Irrigation District (LID).

3.2.3 AGREEMENT WITH LAGUNA IRRIGATION DISTRICT

As a result of extensive negotiation between the City and the Laguna Irrigation District in 1994 and 1995, the parties entered a Stipulation and Judgement in Kings County Superior Court in June, 1995. (Appendix D) This agreement, as slightly amended in November, 2003, sets forth a

mutual program to preserve groundwater which contains several elements. Among them are the following:

- The agreement limits the City's pumping from the wellfield after October, 1998 to an average 3,380 acre-feet per year (the 1994 base year amount). Pumping may increase in any one year to 3700 acre-feet.

- Constrains the City from increasing the pipeline capacity between the City and the well field by building a second transmission line.

- Prohibits construction of additional wells in or near the well field, while protecting the City's right to repair or replace existing wells in kind.

- Sets up a jointly held fund, to be used to purchase recharge water, which each party agreed to fund at the rate of $62,500 annually, to a maximum fund amount of $500,000.

The agreement is broadly drawn with regard to how recharge is to be accomplished, allowing land application in the Laguna Irrigation District, in the Kings River channel itself, in the District canal system, or at other mutually acceptable locations. In addition, the City may apply up to 250 acre-feet per year of surface water used to irrigate the Lemoore Municipal Golf Course against its obligations under this agreement.

3.2.4 CITY SUPPLY WELLS

The City currently has 9 active groundwater wells. The wells are located within the City and in a wellfield five miles north of the City and have a total supply capacity of 19,150,000 million gallons per day (MGD) or 13,200 gallons per minute (gpm). The firm capacity, which is defined as the total capacity less one of the largest wells out of service, is approximately 15,990,000 MGD. The City's water system has no current interconnections to any other water system.

3.2.5 GROUNDWATER LEVELS

Information obtained from DWR indicates that on average, the Tulare Lake Subbasin water levels have declined nearly 17 feet from 1970 to 2000. The period from 1970 through 1978, showed moderate declines with many fluctuations, totaling about 12 feet. The ten-year period from 1978 to 1988 saw more fluctuations and a general increase of about 24 feet, bringing water levels up to 12 feet above the 1970 water levels. 1988 through 1993 showed steep declines, bottoming out in 1993 at 23 feet below the 1970 level. From 1999 to 2000, water levels dropped another 7 feet, bringing the water levels to about 17 feet below the 1970 water levels. Fluctuations in water levels have been most exaggerated in the lakebed area of the subbasin. This area has the steepest decrease in water levels as well as some of the strongest increases in water levels.

Groundwater generally flows southwest, toward the Tulare Lakebed. Based on current and historical groundwater elevation maps, Appendix E, horizontal groundwater barriers do not appear to exist in the subbasin. Water-level maps obtained from DWR for spring 1989 and

spring 2001 (Figures 3-3 and 3-4) indicate a very minor decline in groundwater elevations under the City.

The litigation brought by the Laguna Irrigation District (L.I.D.) regarding the possibility of the City increasing the capacity of the well field by construction of a parallel water main in 1992 prompted several studies to be undertaken related to existing and future groundwater conditions. A study completed by Provost & Pritchard on behalf of the irrigation district concluded that the groundwater basin within the L.I.D. boundaries was being overdrafted by 500 acre feet per year, approximately one percent of the total groundwater inflow of 50,000 acre feet per year. This was with the then configuration of four wells at the well field.

Both the Provost & Pritchard study and a study conducted by Geometric Consultants, Inc. (on behalf of the City, related to the litigation) concluded that groundwater elevations closely correspond to weather conditions. When there are years of drought, the groundwater levels lower due to lack of percolation of rainfall and increased groundwater pumping to meet agricultural water demands. Correspondingly, when there is rainfall, groundwater levels rise as more surface water is available, lessening the reliance on groundwater, and the rainfall is able to percolate into the basin.

The overall health of the local groundwater subbasin, from which the City pumps its water, has shown some consistent trends since the late 1950's. Data from the City wells at the well field used to evaluate the effect of the City's wells on the basin show that there has been a consistent decline of 0.5 feet per year in groundwater levels in the semi-confined aquifer (below the "A" Clay) and no decline in levels in the confined aquifer below the ("E" Clay). The City removes approximately 0.14 percent from the groundwater basin, and this percentage is anticipated to increase to 0.19 percent by the year 2010 if current trends continue. There was no change in the historic trends of the local subbasin after the construction of the City's wells; the City's continued use of their wells will not lead to a decline of the portion of the groundwater basin below the "E" Clay.

3.2.5 SOURCES OF RECHARGE AND DISCHARGE

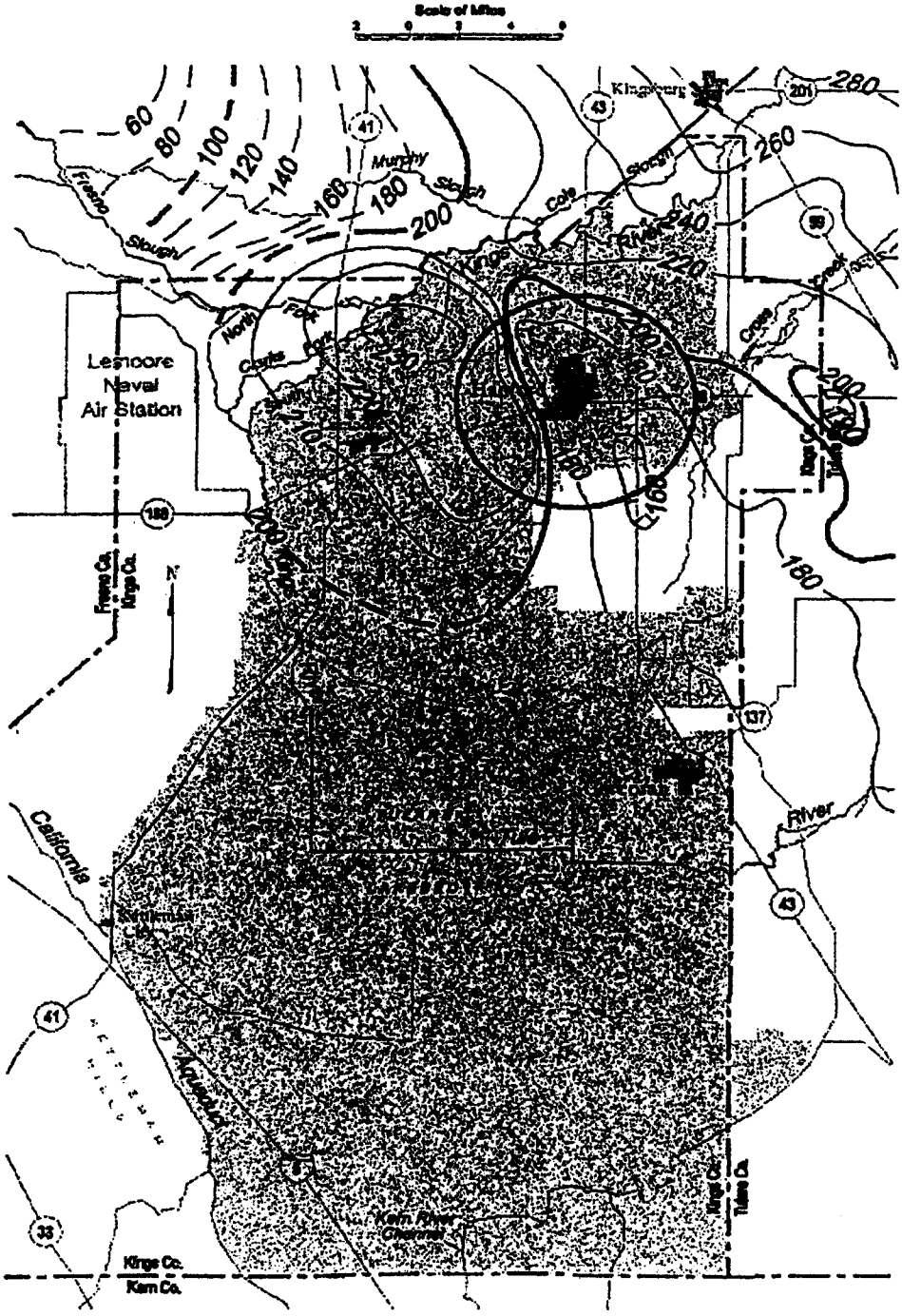
Groundwater recharge is primarily from stream recharge and from deep percolation of applied irrigation water.

The Lemoore Canal and Irrigation Company owns, maintains and operates surface water transport facilities adjacent to and within the City of Lemoore.

The KCWD manages surface water supply in the area east of the City. The water utilized by the KCWD comes from a variety of sources. A major portion is obtained from the Kings River through ownership of shares of stock in the Peoples Ditch Company and the Last Chance Water Ditch Company. Water is also obtained from the Kaweah River through shares of Lakeside Ditch Company Stock.

Tulare Lake Groundwater Basin

Spring 1989, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer



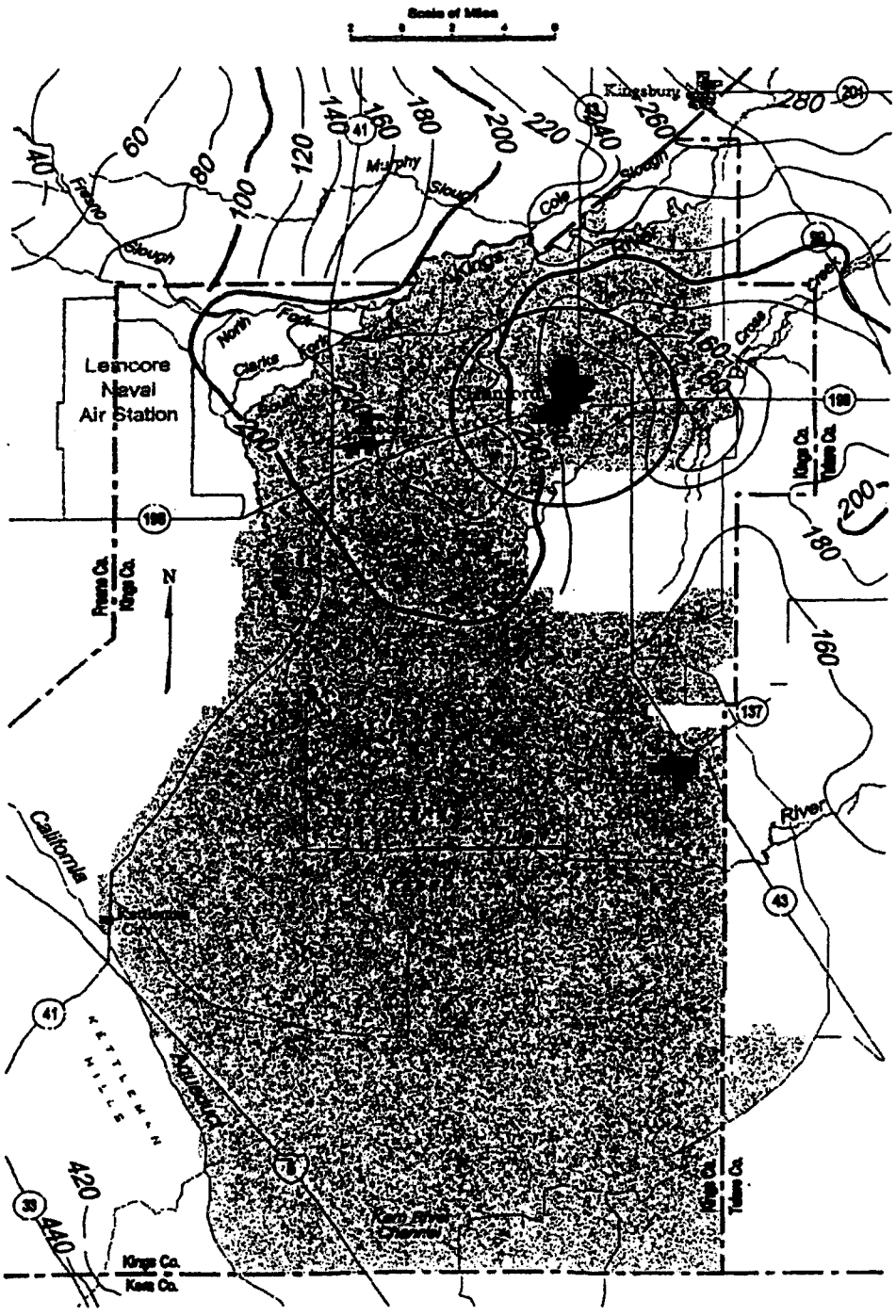
Contours are dashed where inferred. Contour interval is 10 and 20 feet.

Source: Department of Water Resources

Quad Knopf	GROUNDWATER ELEVATION CONTOURS IN SPRING 1989	Figure 3 - 3

Tulare Lake Groundwater Basin

Spring 2001, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer



Contours are dashed where inferred. Contour interval is 20 feet.

Source: Department of Water Resources

Quad Knopf	GROUNDWATER ELEVATION CONTOURS IN SPRING 2001	Figure 3 - 4

Conjunctive use of surface water and groundwater has been practiced within the KCWD since its formation in 1954 through the purchase of slough channels and other sites for use as surface water recharge basins and by the importance of available surface water and flood release water.

The City of Lemoore has 14 storm drain basins within the City, totaling approximately 100 acres, providing surface water runoff percolation. The City has, additionally, purchased approximately 700 acres west of the City which provides a wetlands percolation area accommodating about 70% of the City's storm drainage runoff. These facilities recharge groundwater in the Lemoore area and to the southeast.

3.3 Water Supply Projections

In determining the adequacy of water supply facilities, the source must be large enough to meet varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural disasters.

3.3.1 NORMAL PRODUCTION CAPACITY

In accordance with industry standard practices and the California Department of Health Services (DHS) criteria for "Adequate Source Capacity" regarding water supply, the source should be sized to serve the Maximum Day Demand (MDD). On the day of maximum demand, it is desirable to maintain a water supply rate equal to the MDD rate. Water required for peak hour demands or for fireflows would come from storage.

3.3.2 STANDBY PRODUCTION CAPACITY

Standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be out of service during MDD conditions due to equipment malfunction, for servicing, or for water quality concerns. The DHS criteria recommends calculating the system capacity with the largest well being out of service. To mitigate the potential impact of lost production capabilities, the City should thus have wells with a capacity of 3.17 mgd in surplus of MDD demand.

The City's current MDD is approximately 12.05 mgd and City staff indicates the current supply availability is 19.15 mgd. Supply availability with one of the two largest wells out of service is 15.98 mgd. The City has recently (2005) increased water supply and storage facilities to include redundancy provisions for standby production and source reliability.

3.3.3 FUTURE GROUNDWATER SUPPLY CAPACITY

An adequate source of supply for the City will consist of groundwater wells with a combined production capacity that continues to meet the MDD, in addition to a standby well production capacity of 3.17 mgd (2,200 gpm). The projected water supply, in 5-year increments, through the planning horizon of 2025 are shown in Table 3.3-1. In calculation of future maximum day demand (MDD) it is assumed that SK Foods and Leprino Foods current demand components of MDD will remain constant, and that the current non-major industry component will increase at the same rate as the projected population increase of four percent per year.

The City will place additional in-City wells, with capacities equal to or exceeding 1,000 gallons per minute, in service as required to meet maximum day demands.

Utilizing the same estimating criteria - continued existing water supply usage by SK Foods and by Leprino Foods, and increased other-user usage based on a 4 percent increase in population, current and projected annual water usage is estimated as shown in Table 3.3-2.

Table 3.3-1
Current and Projected Maximum Day Water Demands and Water Supply Capacity Needs, Million Gallons per Day

	Years				
	2005	2010	2015	2020	2025
Demand	12,046,000	14,660,000	17,841,000[1]	21,710,000[1]	26,420,000[1]
Supply	15,980,000[2]	15,980,000[2]	17,840,000[3]	21,710,000[3]	26,420,000[3]

(1) Existing major-industry demand + 4% increase per year in all other existing demand
(2) Total existing well capacity minus largest well out of service
(3) Required capacity including largest well out of service

Table 3.3-2
Current and Projected Annual Water Usage, Acre Feet

Years				
2004	2010	2015	2020	2025
6,702[1]	7,960[2]	9,095[2]	10,550[2]	12,320[2]

(1) 1,014 acre feet, SK Foods; 1,376 acre feet, Leprino Foods; 4,312 acre feet, all other users.
(2) Constant usage, SK Foods and Leprino Foods; 4 percent increase per year all other usage.

3.3.4 FUTURE SURFACE WATER SUPPLY CAPACITY

The City has entered into an agreement with the City of Hanford, Kings County Water District and Kings County, with the informal support of Lemoore Naval Air Station, to conduct a study of the possibility of supplementing municipal groundwater supply in the north Kings County area with surface water supplies. The group has made application for 303 funding to initiate such a study. Supplementation of existing groundwater supplies would not only potentially increase supply capacity, but would also mitigate current groundwater quality concerns such as arsenic.

The City also owns 46 shares of Lemoore Canal and Irrigation Company stock. This ownership gives the City water rights for irrigation of the municipal golf course. The City's allocation during 2004, including 'flood release' water, in 2004 was 339 acre feet. This water requires no treatment and is directly applied.

CHAPTER FOUR

RELIABILITY PLANNING

CHAPTER FOUR – RELIABILITY PLANNING

LAW

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.

10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplied:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

4.1 Water Supply Reliability

Two aspects of supply reliability are considered for both near-term needs (present to 2010) and long term needs (beyond 2010). The first relates to emergency reliability needs and is primarily a function of the availability and adequacy of supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods.

4.1.1 STANDBY PRODUCTION

As described in the previous chapter, standby production capacity is required for system reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be out of service during maximum day demand conditions due to equipment malfunction, for servicing, or for water quality concerns.

The California Department of Health Services (DHS) criteria recommends counting the capacity of the largest well as out of service. To mitigate the potential impact of lost production capabilities, the City should thus have wells with a capacity of 3.17 million gallons per day (MGD) in surplus of the maximum day demand requirements.

The City's current MDD is approximately 12.05 mgd and City staff indicates the current supply availability is 19.15 MGD. The City has recently (2004 and 2005) increased water supply and storage facilities to include redundancy provisions for standby production and source reliability.

4.1.2 CLIMATE-RELATED RELIABILITY CONCERNS

Not all hydrologic dry years lead to water supply shortages and groundwater overdraft. The annual quantity of groundwater available to the City will not vary significantly in relation to wet or dry years. During extended drought periods, groundwater levels generally decline, and will require more aggressive demand management practices. The reliability of the City's water supply, however, remains constant despite seasonal or climatic changes.

In terms, therefore, of water supply reliability, the City's system reliability is such that alternative source consideration and water shortage contingency planning have not thus far been required (but see Chapter Eight of this Plan). Water conservation demand regulations are, however, incorporated in a City ordinance (Appendix H) and discussed in Chapter Seven of this report.

The City of Lemoore has never suffered a severe water shortage. The nature of the groundwater supply is such that a sudden shortage is extremely unlikely. Any shortage that may be experienced will be due to failure to plan for increased demand due to population and industrial growth, or from catastrophic well or equipment failure. The effects of droughts in the past have

forced the City to modify their wells due to falling groundwater levels, but the overall effect has not been detrimental to the City's water supply.

4.2 Groundwater Quality Reliability Concerns

LAW

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.

4.2.1 LOCAL GROUNDWATER QUALITY

The United States Environmental Protection Agency (EPA) has implemented and is currently considering implementing several new or revised drinking water standards. The Ground Water Rule (GWR) contains measures to establish multiple barriers to further protect against bacteria and viruses in drinking water from the groundwater sources. The GWR will specify when corrective action (including disinfection) is required to further protect consumers serviced by groundwater systems from bacteria and viruses. The City currently disinfects its supply water, although its groundwater has long been considered free of sanitary contamination. Such disinfection (with gaseous chlorine or hypochlorite) has the corollary effect of mitigation of sulfur-related color and odor. The City is faced with two water quality conditions that are the result of the natural deposition that formed the valley fill, arsenic and hydrogen sulfide. Each successive layer of material deposited on the valley floor carried with it a portion of the minerals that are present in the surrounding mountains and these became a part of the geology of the Valley.

Many of these minerals contribute to the quality of the soils and to the quality of the groundwater. Most of the minerals are in concentrations that do not affect the suitability of the water for domestic use. Arsenic however, is concentrated in water-bearing strata in the Lemoore area in sufficient quantity that water for domestic consumption must be treated, blended or otherwise modified in the immediate future in order to meet new and more restrictive water quality standards.

Plants in deltaic and lacustrine environments in the ancient San Joaquin Valley utilized the mineral-rich water and bioaccumulated arsenic in plant tissue. Over time, the accumulation of dead vegetative material in which the arsenic had bioaccumulated formed interbedded layers within the finer grained deposits.

These fine-grained deposits (usually silts and clays) became enriched in arsenic and were eventually buried. Chemical analyses of well samples report soluble arsenic concentrations of 16 to 25 µg (in wells located in the well field north of the community) and lesser amounts, 3 to 11 µg/l in wells drilled within the community.

The majority of the City's municipal wells are completed in aquifers that have a moderately reducing chemical environment which enables the presence of arsenic, iron oxides and sulfate-

reducing bacteria. The bacteria utilize subsurface organic matter, and cause the release of hydrogen sulfide gas, H_2S, creating a mild "rotten egg" odor. In addition, it is possible that the mixing of H_2S and soluble iron form ferrous monosulfide, which can create an "iced tea" colored water.

Water from the three active wells in the well field north of the community, although higher in arsenic, does not have color or excessive sulfide problems. Wells drilled in the community have lower arsenic levels but must be carefully developed (in terms of which aquifer levels are utilized) to avoid color and sulfide taste or odor problems.

4.2.1 ARSENIC TREATMENT

The United States Environmental Protection Agency (EPA) has established a Maximum Contaminate Level of 10 µg/L for arsenic. This MCL was effective February 22, 2002 and the State Department of Health Services (DHS) set a compliance date of January 23, 2006. For the new arsenic standard, the City may implement wellhead treatment, or centralized treatment for the three wellfield wells, as necessary. Proprietary adsorption processes or greensand filtration processes are among those which will be considered. Alternatively, well modification to reduce arsenic content is being evaluated. An extension of the deadline, as provided by law, has been requested by the City to permit completion of evaluation of mitigation processes.

No treatment in addition to chlorine gas or hypochlorite is anticipated at this time to be necessary for existing or future in-community wells. It may, however, be necessary to modify the existing wellfield chlorination point to reduce detention of disinfected water to avoid potential trihalomethane criteria violations.

4.3 Catastrophic Interruption Concerns

Such concerns have been identified by the Water Code (Section 1063(c) as involving regional power outages, earthquakes or other disasters.

The availability of Diesel power on one of the system's largest wells, of portable emergency generation availability for four of the in-town wells, and of backup power for 3.5 million gallons of the system's 4.4 million gallon storage capacity mitigates the potential impact of such catastrophic emergencies. The City is planning the addition of emergency generator hookup capabilities to additional in-town wells and storage reservoir pumps.

CHAPTER FIVE

WATER USE

5.1.1 HISTORICAL WATER USE

The City provides potable water service to its residential, commercial, industrial, and institutional customers within the City limits. In 2004, the City produced approximately 2,185 billion gallons or 6,700 acre-feet (af) which is equivalent to 5,983,000 million gallons per day (mgd) of water servicing a population of approximately 22,500. Table 5.1-2 lists historical monthly and annual water production from 1994 to 2004.

5.1.2 MAXIMUM DAY DEMAND One of the water demand conditions that is of particular significance is the MDD. This is the highest water demand during a 24-hour period of the year. Water system sources are typically sized to meet the anticipated MDD of a water system.

Calculation of an appropriate maximum day demand for City of Lemoore water use projection purposes is complicated by several facts:

SK Foods water demand is almost totally supplied by Wells No. 8 and 9 which are not normally connected to the balance of the City's water system except for emergency (high fire demand or other-well outage) purposes because of potential taste and odor problems. It's maximum water usage is principally from July through October, 1/3 of the year. Leprino Foods water demand is constant on a year-round basis. It increased to present levels in 2003 because of usage by a second, new, facility. No further SK Foods or Leprino expansion or water use increase is projected.

Utilizing, therefore, 2003 data as a baseline a maximum day demand (MDD) factor may be expressed as:

MDD Factor = 2003 MDD – Leprino – SK Foods = [12,046,000 – 874,162 – 1,403,871] / 12,046,000 = (9,767,967 / 12,046,000) = .81. (Add: Leprino plus SK Foods to factored demands each year). This factor may be utilized to estimate future maximum day demands based on projected population, growth, adding thereto in each projection Leprino's and SK Foods demands.

5.1.3 PAST, CURRENT, AND PROJECTED PER-CAPITA CONSUMPTION

The per capita consumption rate may be used for estimating the City's future water requirements, evaluating the adequacy of the supply source, and determining storage needs. The consumption rate, expressed in gallons per capita per day (gpcd), is applied to the projected population to yield future water requirements, adjusted for constant SK Foods and Leprino usage. Since 1993, the adjusted consumption rate in the City has ranged between a calculated low of 147 gpcd in 1993 and 1995 and a high 187 of gpcd in 2002 (Table 5.1-3). (Historic lows, however, in the 145 to 165 range may not be accurate; industrial usage in those years may have been less than at present.) For planning purposes, a consumption rate of 175 gpcd plus constant annual water usages by SK Foods and Leprino Foods was used to estimate future water requirements of the City.

CHAPTER FIVE – WATER USE

LAW

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and government; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.

(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

5.1 Past, Current, and Projected Water Use

The City of Lemoore requires metering of all public, domestic, commercial and industrial water connections. The following Table 5.1-1 summarizes the City's water service connections as of December 2005.

Table 5.1-1
Water Service Connections

	Type of Connection		
	Metered	Flat Rate	Total
Public & Residential	5,340	4	5,344
Commercial	240	67*	307
Industrial	11	0	11
Total Active Connections	5,591	71	5,662

* Small "downtown" users

The City has no collated data regarding the distribution of water use among domestic, commercial and small industrial water connections. There are only two major industrial facilities with significant water use: SK Foods and Leprino Foods, utilizing approximately 1,014 acre feet (15 percent) and 1,376 acre feet (20 percent) of the City's current total acre feet usage (6,702 acre feet).

Table 5.1-2
Water Production

Month	Monthly Gallonage										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
January	73,850,000	67,600,000	71,810,000	58,780,000	67,830,000	65,870,000	73,090,000	71,000,000	84,097,000	90,109,000	101,334,000
February	65,320,000	60,080,000	65,340,000	61,063,000	58,650,000	59,260,000	66,950,000	62,230,000	81,800,000	85,369,000	96,072,000
March	84,320,000	67,230,000	80,890,000	106,920,000	75,510,000	81,980,000	91,210,000	88,200,000	110,310,000	135,919,200	129,639,000
April	105,980,000	91,630,000	112,980,000	134,650,000	91,530,000	104,600,000	127,460,000	104,810,000	147,485,000	153,480,000	179,779,000
May	120,990,000	111,820,000	159,310,000	177,050,000	118,790,000	166,813,000	168,250,000	178,630,000	182,606,000	210,121,200	230,058,000
June	146,870,000	141,970,000	183,310,000	181,610,000	154,380,000	196,130,000	199,730,000	215,581,000	227,544,000	290,745,600	254,391,000
July	164,960,000	158,050,000	195,630,000	194,930,000	193,610,000	219,320,000	217,240,000	229,403,000	253,296,600	317,364,000	294,204,000
August	162,160,000	162,780,000	193,030,000	180,630,000	198,930,000	197,370,000	231,300,000	217,623,000	237,580,200	313,241,000	281,124,000
September	138,050,000	143,850,000	156,980,000	153,650,000	161,690,000	168,320,000	172,730,000	177,968,000	201,476,400	266,911,000	237,770,000
October	103,060,000	125,250,000	154,900,000	128,270,000	120,330,000	140,830,000	123,100,000	144,445,000	168,600,000	187,470,000	166,610,000
November	82,190,000	94,170,000	92,330,000	90,860,000	79,350,000	91,570,000	85,120,000	96,069,000	121,829,400	133,051,000	108,970,000
December	73,600,000	77,730,000	64,950,000	67,410,000	68,860,000	79,700,000	74,460,000	82,521,000	101,346,000	110,965,000	105,691,000
Total	1,321,350,000	1,302,260,000	1,528,460,000	1,535,823,000	1,389,460,000	1,571,763,000	1,612,640,000	1,668,480,000	1,917,970,600	2,294,746,000	2,185,642,000

Gallons: 7.48 = cubic feet

Note: Expanded Leprino Foods usage began in July 2002, reduced operating levels in April 2003.

5.1.4 PROJECTED WATER USE

Based on future trends in population provided by the City's General Plan, an estimated per capita water consumption rate of 174 pgcd, and continuing current water demands by the City's two major industries, the City's future water requirements are estimated and summarized in Table 5.1-4. Figure 5-1 illustrates projected maximum day demand relationships to existing and required well production capacities. In addition to the projected average demands, Table 5.1-4 includes annual estimates for maximum day demand, through the planning horizon year os 2025. Based on these projections, it is anticipated that the City's average day and maximum day requirements for 2025 will be over 11 mgd or 7,800 gallons per minute (gpm) and 25 mgd (17,500 gpm), respectively.

5.1.5 EXPANSION PROJECTS

Law

10910.(a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act X shall comply with this part.

10912. For the purpose of this part, the following terms have the following meanings:

10912 (a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.
(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
(4) A proposed hotel or motel, or both, having more than 500 rooms.
(5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,00 square feet of floor area.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Table 5.1-3
Historic and Projected Per-Capita Water Consumption Rates
(Gallons per capita per day)

Years															
Historic[1]							Projected[2]								
1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2005	2010	2015	2020	2025
147[3]	154[3]	147[3]	185	172	144[3]	164	164	165	187	177	175	175	175	175	175

Table 5.1-4
Projected Average Day Demands (ADD)
and Maximum Day Demand (MDD)
Through 2025 (Gallons per Day)[1]

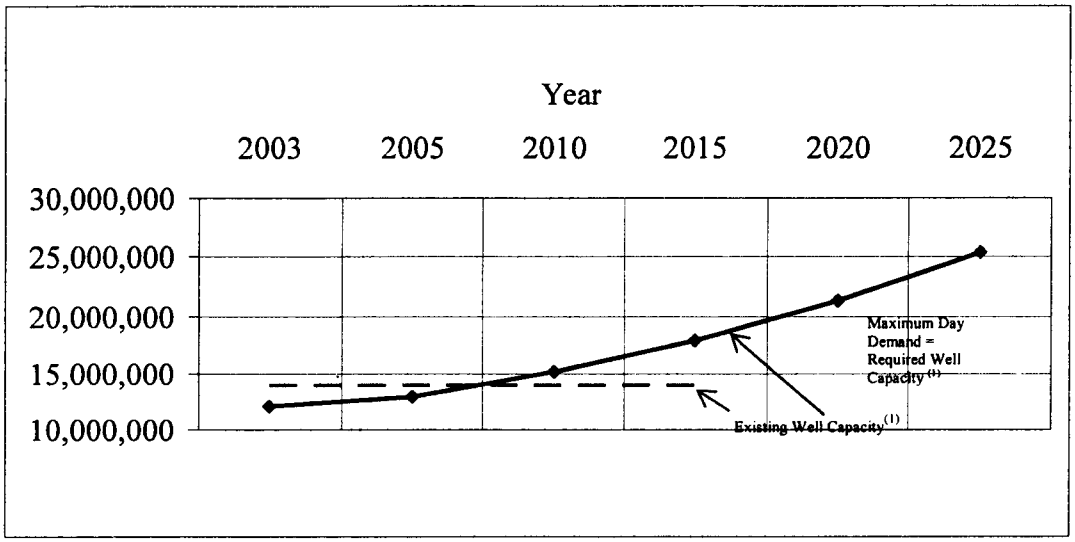
	2003	2005	Year 2010	2015	2020	2025
ADD	**5,982,960**	**6,230,000**	**7,139,325**	**8,245,500**	**9,591,425**	**11,217,700**
MDD[2]	**12,046,000**	**12,830,500**	**15,116,800**	**17,898,000**	**21,282,100**	**25,370,000**

(1) Using projected population (Figure 2-3), 175 gallons per day per capita consumption plus average day and maximum day demands of SK Foods and Leprino Foods (2,033,000 and 2,278,033).

(2) 440 gallons per capita per day of non-major industry demands, based on 2003 maximum day demand.

(3) Probably higher than these figures; industrial flows may have been less than assumed.

Figure 5-1
Maximum Day Demands vs. Existing and Required Well Production Capacities [1], Gallons Per Day



(1) Capacity with largest well out of service

The City has no knowledge regarding any proposed projects of the sizes or water demands defined in the law given the City's size. It is unlikely that such projects will be proposed or built within the 2025 planning horizon. If so proposed, project compliance with Sections 10910 through 10914 will be required.

5.2 Water Shortage Expectations

In general, demands during droughts increase to compensate for the lack of rainfall that was benefiting landscape irrigation. The water use projections in Table 5.1-4 assume any potential increase will be offset by the increased and more stringent water conservation measures that will be activated by the City during such droughts.

CHAPTER SIX

SUPPLY AND DEMAND COMPARISON

CHAPTER SIX – SUPPLY AND DEMAND COMPARISON

LAW

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service are a of the urban water supplier.

6.1 Supply and Demand Comparison

Comparisons of projected supplies and demands are shown in Tables 3.3-1 and 5.1-4 and on Figure 5-1. The City currently has the water supply capabilities to meet MDD and to provide standby production capabilities. Existing wells will be modified, and new wells drilled, as required to increase water supply capabilities to meet demand and standby requirements.

Figure 5-1 indicates a total demand of approximately 25,370,000 million gallons per maximum demand day in year 2025, compared with a required supply capability for that same year of the same amount. The total demand in 2025 will be 12,320 acre feet per year. The projected demands for 2025, as well as the projected demands for five-year increments until 2025, are the same for normal water years, single dry water years, and multiple dry water years except that domestic use demand control measures could, although not required in dry years to protect the supply resource, reduce demand by some arbitrary amount, (see Chapters Seven and Eight).

CHAPTER SEVEN

WATER DEMAND MANAGEMENT MEASURES

CHAPTER SEVEN – WATER DEMAND MANAGEMENT MEASURES

LAW

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following...

(a) Water survey programs for single-family residential and multi-family residential customers.

(b) Residential plumbing retrofit.

(c) System water audits, leak detection, and repair.

(d) Metering with commodity rates for all new connections and retrofit of existing connections.

(e) Large landscape conservation programs and incentives.

(f) High-efficiency washing machine rebate programs.

(g) Public information programs.

(h) School education programs.

(i) Conservation programs for commercial, industrial, and institutional accounts.

(j) Wholesale agency programs.

(k) Conservation pricing.

(l) Water conservation coordinator.

(m) Water waste prohibitions.

(n) Residential ultra-low-flush toilet replacement programs.

In 1991, a Memorandum of Understanding (MOU) regarding Urban Water Conservation in California formed the California Urban Water Conservation Council (CUWCC). The City is not currently a signatory of the MOU and is therefore not a member of CUWCC.

However, the City realizes the importance of Best Management Practices (BMPs) to ensure a reliable future water supply. The City is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

The California Department of Water Resources (DWR) has termed such Best Management Practices (BMPs) as Demand Management Measures (DMMs). Accordingly; this chapter will refer to them as Demand Management Measures (DMMs).

7.1 DMM 1 – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

This program consists of offering water audits to residential customers. Audit components include reviewing water usage history with the customer, identifying leaks inside and outside, and recommending improvements.

It is recommended that the City initiate a program offering such audits and residential landscape audits. The City should target the top one to five percent of single-family residential users in the first two years. A similar program for multi-family residential users should be developed in future years.

7.2 DMM 2 – Residential Plumbing Retrofit

This program consists of installing physical devices to reduce the amount of water used or to limit the amount of water, which can be served to the customer. In accordance with State Law, low flow fixtures have been required on all new construction since 1978. In addition, State legislation enacted in 1990 requires all new buildings after January 1, 1992 to install Ultra-Low Flush Toilets (ULFT).

Several studies suggest that savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gpd per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tends to produce more savings, while newer multi-family homes tend to produce fewer savings per housing unit. The City's Water Waste Ordinance (see subsection 7.13 of this Chapter) provides that residential remodeling must be accompanied by low-water use fixture retrofitting.

Since 1986, the City has participated in an informational booth at the Kings District Fair. Water saver kits have been distributed that contain low-flow plumbing fixtures, toilet dam, dye tablets, and water-saving tips. The City is a member of the Kings County Water Education Committee (KCWEC). Representatives of the KCWEC go to public schools and make presentations on water safety and water conservation. Information is published in the local newspaper reminding people to conserve water. Book covers that provide water conservation and water safety information are purchased and distributed to local schools.

7.3 DMM 3 – System Water Audits, Leak Detection and Repair

As a result of leak detection, and of engineering analyses, the City spends $50,000 per year replacing outdated, undersized, and leaking water mains in the distribution system. The City's capital improvement program provides funding for major water main replacement. The City has not yet conducted a formal water audit and leak detection program at this time. (A water audit is a process of accounting for water use throughout a water system in order to quantify unaccounted-for water. Unaccounted-for water is the difference between metered production and metered usage on a system-wide basis.) Water losses due to pipe leakage are considered, however to be minimal; the majority of the City's water system is less than thirty years old.

7.4 DMM 4 – Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

This DMM requires water meters for all new construction and billing by volume of use, as well as establishing a program for retrofitting any existing unmetered connections.

Ninety-nine percent of all City connections are metered, with unmetered facilities principally consisting of downtown, low-usage, commercial service connections. As a result, there is no need for a retrofit program.

There are no seasonal rates; the present rate structure is an increasing rate structure. For single-family residences, the first 700 cubic feet of water costs $9.75, the next 2,100 cubic feet is $0.65 per 100 cubic feet, the next 2,800, $0.70 per 100 cubic feet, and all usage thereafter $0.75 per 100 cubic feet. Comparable charges are made for other users (see Appendix I). Water meters are read every month, and consumers are billed monthly.

7.5 DMM 5 – Large Landscape Conservation Programs and Incentives

This DMM calls for agencies to commence assigning reference evapotranspiration-based (Eto) water budgets to accounts with dedicated irrigation meters and provide water-use audits to accounts with mixed-use meters.

The City will consider the adoption of a Water Efficient Landscape Ordinance in accordance with Assembly Bill 325: The Water Conservation in Landscaping Act. This ordinance would limit the amount of turf in landscaping, require plant groupings according to water needs, and provide some flexibility to the landscape designer while promoting landscape efficiency. The Parks Superintendent would review all commercial landscaping plans for compliance prior to permits being issued. The City would assist with setting irrigation controller clocks for water efficiency landscape watering.

To ensure that the intent of such regulations is carried out, the applicant for a building permit would be required to submit landscape plans for review to the City.

After the approved landscape is installed, it would be the responsibility of the Public Works Department to inspect the project to confirm that the landscaping for the project was installed in

accordance with the approved plans. The landscape designer should certify that the project is in compliance with these regulations by signing and submitting a completed certificate of compliance. The Director of Public Works, or his designated representative, could authorize the deferral of landscape completion for good and valid reasons, subject to the posting of appropriate security with the City.

7.6 DMM 6 – High – Efficiency Washing Machine Rebate Program

A $75 rebate, sponsored by the private utilities which serve the City is available to City residents who purchase a high-efficiency washing machine. An efficient washing machine can save the user up to $650 in energy and water costs over the life of the machine. To qualify, the unit must be installed with a water-heating source using natural gas distributed by Southern California Gas Company or electricity distributed by Pacific Gas and Electric Company.

7.7 DMM 7 – Public Information Programs

This program consists of distributing information to the public through a variety of methods including brochures, radio and television, school presentations and videos, and web sites.

The City participates in the KCWEC. Members of the committee make public presentations at local schools throughout the County and participate in the water awareness week campaign. Water-saving reminders are published in local newspapers.

The City also, through KCWEC, has an informational booth at the Kings District Fair. The City's relatively low per capita water use is evidence of the success of these programs coupled with the near-total metering of City water services.

7.8 DMM 8 – School Education Program

This DMM requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance.

The KCWEC sponsors a poster contest for all schools in Kings County, provides book covers with water safety and conservation tips, and makes presentations pertaining to water safety and conservation.

7.9 DMM 9 – Conservation Programs for Commercial, Industrial, and Institutional Accounts

The City does not currently have a conservation program for commercial, industrial and institutional accounts. These accounts are currently metered and charged in accordance with the quantity of used water on an increasing rate basis for increased water usage.

7.10 DMM 10 – Wholesale Agency Programs

This DMM applies to wholesale agencies and defines a wholesaler's role in terms of financial, technical, and programmatic assistance to its retail agencies in implementing DMMs. The City is not a water wholesaler.

7.11 DMM 11 – Conservation Pricing

There are no seasonal rates; the present rate structure is an increasing rate structure. For single family residences, the first 700 cubic feet of water costs $9.75, the next 2,100 cubic feet is $0.65 per 100 cubic feet, the next 2,800 cubic feet is $0.70 per 100 cubic feet, and all usage thereafter is charged at $0.75 per 100 cubic feet. Other uses are charged similar rates (see Appendix F). Water meters are read every month, and consumers are billed monthly.

7.12 DMM 12 – Water Conservation Coordinator

The City, concurrently with the approval of this Plan, will appoint a conservation coordinator. The conservation coordinator will be responsible for coordinating and expanding the City's water conservation program and providing residents with useful water conservation information.

7.13 DMM 14 – Residential Ultra-Low-Flush Toilet Replacement Programs

State legislation requires the installation of efficient plumbing in new construction, and effective in 1994 required that only ULFT be sold in California. Homes constructed since 1994 in the City have ULFT. The City's Water Conservation Ordinance (adopted in April 2003; see Appendix G) requires that residential remodeling be accompanied by retrofitting with low-flow fixtures.

The Ordinance provides the following requirements:

1. "No person shall keep, maintain, operate, or use any water connection, hose, faucet, hydrant, pipe, outlet or plumbing fixture which is not tight and free from leakage, dripping or waste of water."

2. "No person shall allow excessive water to run or waste from his property onto streets or highways."

3. "No person shall willfully or negligently waste water in any manner."

4. Outdoor watering for those with even numbered addresses is permitted on Tuesday, Thursday and Saturday, while odd numbered addresses may water on Wednesday, Friday and Sunday. Monday is a day on which no outdoor watering is allowed.

5. Regulates and constrains the drainage of swimming pools.

6. Prohibits washdown of exterior asphalt or concrete areas.

7. Restricts water usage for washing cars, boats or other vehicles.

8. Requires remodeling replacement of fixtures with low-flow units.

It provides for increasing fines, and ultimately for service flow restrictions, for repeated violations of the Ordinance.