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2005 Urban Water Management Plan

18 October 2005

Prepared for

Linda County Water District
1280 Scales Street
Marysville, CA 95901

K/J Project No. 0570012.00

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Linda County Water District
2005 Urban Water Management Plan
Contact Sheet

Date plan submitted to the Department of Water Resources: **11 October 2005**

Name of person preparing this plan: **Mr. Brian Davis**

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The Water supplier is a: **Municipal Water Purveyor**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Section 1: Introduction

1.1 Purpose

The Urban Water Management Planning Act (Act) requires urban water suppliers to describe and evaluate sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs.

1.2 Benefits

This UWMP will serve as a foundation document and source of information for Water Supply Assessment and Written Verification of Water Supply. This UWMP also serves as:

- A long-range planning document for water supply,
- Source data for development of a regional water plan, and
- A source document for cities and counties as they prepare their General Plans, including Linda, Olivehurst, and Marysville.
- A key component to Integrated Regional Water Management Plans.

1.3 Scope

The scope of the UWMP is to create a planning document for LCWD that will be used in future LCWD projects and to meet the requirements of the Urban Water Management Planning Act.

This UWMP compares past, current and projected District water supplies and demands; identifies a hypothetical three-year worst case drought scenario and its effect on District urban water supplies; discusses existing and anticipated demand management measures; evaluates a water shortage contingency plan; provides a response to an urban water shortage emergency; and reviews District use of recycled water.

1.4 Water Code

Water Code § 10620 (c)

The Urban Water Management Planning Act is part of the California Water Code. A complete UWMP is a requirement for water service providers to be eligible for grants and loans from the California Department of Water Resources (DWR) and for State drought assistance.

1.5 Appropriate Level of Planning for Size of Agency

> 10631 (a) "It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied"

LCWD is a small water supplier; they exceeded 3,000 customers in late 2004. Therefore, this is the first UWMP that LCWD has prepared.

LCWD believes that water management is important. Due to a concern for water supply, LCWD has developed demand management measures (DMMs). As the agency grows, with increasing staff and budget, LCWD will increase its efforts to reduce demand. Section 8 of this report more thoroughly describes DMMs for LCWD.

LCWD is completely dependent on groundwater supply and will include adequate planning activities to maintain an adequate supply as the agency grows.

Section 2: Public Participation

2.1 Public Participation

> 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.

The public was invited to review the plan in Draft form and make comments. The Draft UWMP was presented for public comment on 26 September 2005. A copy of the public notice can be found in Appendix A.

2.1.1 Plan Adoption

The LCWD Board adopted the plan on 10 October 2005. See Appendix B for formal adoption notice.

Section 3: Agency Coordination

> 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.

Linda County Water District lies within the unincorporated town of Linda. LCWD is both the water retailer and supplier. Communities affected by the UWMP are City of Marysville and Olivehurst Public Utility District (OPUD). Agencies concerned with providing potable water to these communities include Cal-Water for the City of Marysville. These agencies were contacted and provided with an opportunity to comment on the Draft UWMP. Comments are included in Appendix C.

Section 4: Supplier Service Area

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Regional Setting

Linda County Water District is located southeast of the confluence of the Feather River and Yuba River in Yuba County. The water management issues of the near these rivers are common to the area and to a large degree are different than the mountain issues facing the County. Most of the agricultural activities taking place in the County are located in the valley floor. The common water management issues of this area include frequent flooding, urban growth, conversion of agricultural lands to residential areas and wastewater discharge.

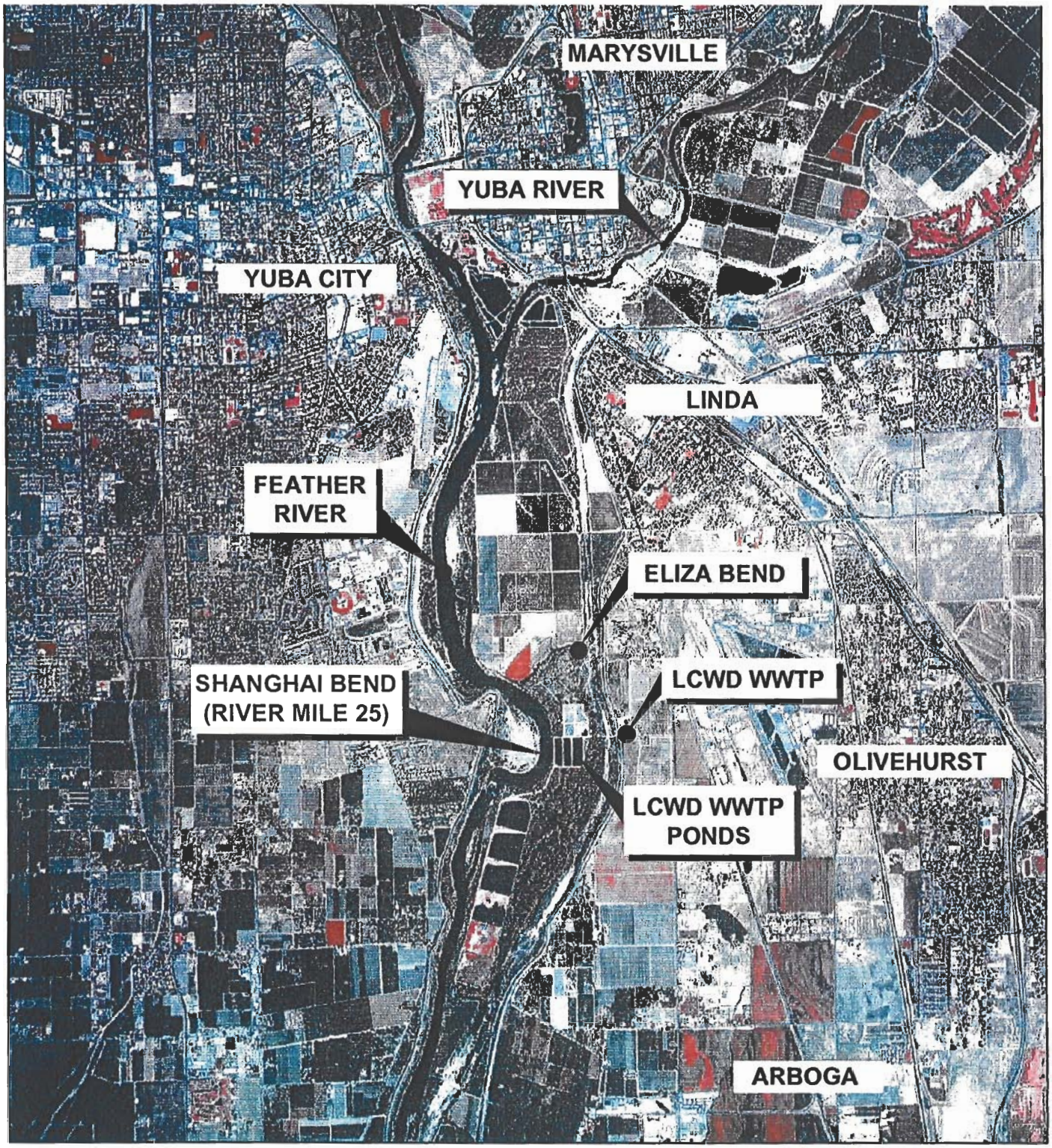
The valley floor portion of Yuba County is bordered on three sides by watercourses and bisected by the Yuba River. Within the County boundary water purveyors currently utilize both surface water and groundwater to meet demand.

The municipal water purveyors located in this area of the County rely exclusively on groundwater to meet their needs. The municipal purveyors are California Water Service for the City of Marysville, Linda County Water District, the City of Wheatland, Olivehurst Public Utility District (OPUD), and Beale Air Force Base (Beale AFB).

The economy of the region is largely driven by agricultural and agricultural related activities. Urban communities within the region are, generally, small and include cities of Marysville, Linda, Olivehurst, and Wheatland. Because of the region's proximity to Sacramento and Roseville, the region is facing significant growth challenges.

Linda County Water District

The service area shown in Figure 1 is bordered by the Simpson-Dantoni Road to the North, the Feather River to the west, Earle Road to the south, and Beale Air Force Base to the east.



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Kennedy/Jenks Consultants

LINDA COUNTY WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

LOCATION MAP

N

NO SCALE

SEPTEMBER 2005
K/J 0570012.00
Figure 1

4.1 Linda County Water District Background and Area History

Linda County Water District was formed in 1955 to provide treated potable water and distribution and fire protection for the health and safety of the unincorporated community of Linda. In 1960, the District expanded its services to include wastewater collection, treatment, and disposal. The District serves approximately 10,230 people through about 3,117 service connections. The District's general role in water planning is in the capacity of a water purveyor and waste treatment agency.

Looking East across North Beale Road

4.2 Climate

Water Code § 10631 (a)

Winters are usually mild with rain. Summers are usually hot and there is very little rain from May to October. Table 4-1 shows rainfall, ETo, and average maximum temperatures for the unincorporated community of Linda.

Table 4-1: Linda Climatic Data

Month	Standard Monthly Average ETo (inches)	Average Rainfall (inches)	Average Temperature (Fahrenheit-average daily max)
January	1.00	4.37	54.1
February	1.66	3.53	61.1
March	3.12	2.93	66.3
April	4.72	1.61	73.7
May	6.07	0.64	81.8
June	7.45	0.23	90.1
July	8.46	0.04	96.3
August	7.62	0.08	94.5
September	5.70	0.33	89.7
October	4.06	1.37	79.7
November	1.97	2.81	64.7
December	1.07	3.61	55
Annual	52.90	21.52	75.6

(a) Source?

4.3 Population Projections

LCWD's service area population is currently (2005) at 10,230 people. The population projections were created using the growth rates from Yuba County from 2000 to 2003 (www.yubacounty.org\demographics) combined with actual growth estimates. Sacramento Area Council of Governments (SACOG) growth projections were also evaluated. Projections did not reflect actual growth rates occurring in the area. Since new developments are known to add additional population to LCWD's service area, data from Yuba County representing these new developments are included to more accurately project growth. It is estimated that LCWD would experience an increase in population by 10% annually for the next 10 years, followed by a reduced growth rate of 5% per year. Several large residential developments are being constructed within LCWD, and these developments were not included in SACOG or Yuba County projections. Table 4-2 shows the updated population projections adjusted for known new developments that were not included in previous projections compared with projections developed by SACOG and Yuba County.

Table 4-2: Summary of Population Projections

	Year					
Source	2005	2010	2015	2020	2025	2030
Updated Projection	10,230	16,476	26,534	33,865	43,221	55,162
SACOG Projection	9,523	10,722	12,072	13,592	15,303	17,230
Yuba County Demographics	9,607	11,300	13,292	15,635	18,390	21,632

Table 4-3 shows the proposed developments within LCWD and how much additional population they may add to the District.

Table 4-3: Proposed Development within LCWD

Name of Development	Number of Units	Estimated Number of People
Woodbury Development	10,000	30,000
Edgewater	400	1,200
Orchards & Montrose	800	2,400
Sierra Vista	180	540
Miscellaneous	200	600

4.4 Other Demographic Factors

4.4.1 Housing Density

LCWD's housing density has historically been considered low with four or less houses per acre. New developments are constructed with approximately six houses per acre. This will increase the water for indoor usage, while decreasing the water demand for irrigation on a per acre basis.

4.4.2 Future commercial development

LCWD will need equivalent commercial development with the increase in residential housing. Coupled with the increase in residential construction, additional commercial areas will be developed as well.

4.4.3 Limited Industrial Uses

LCWD does not have any significant industrial water users. The district mainly supplies single and multi family residential customers.

4.4.4 Agricultural and Landscape Connections

LCWD has limited agricultural or landscape water use. There are agricultural areas surrounding LCWD, but they either have their own water supply source or purchase their water from an agricultural water purveyor. Some flow is provided for the parks and beautification projects in the area. The flow used for this purpose is less than 0.3% of the total for water within the District's distribution system.

Section 5: Water Supply Sources

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 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 [to 20 years or as far as data is available.]

LCWD is exclusively dependent on groundwater. Yuba County Water Agency (YCWA) prepared a groundwater management plan that includes the groundwater used by LCWD. The plan can be found in Appendix D. Areas of this report discussing groundwater reliability, storage and historical trends refer to information contained in the YCWA Groundwater Management Plan.

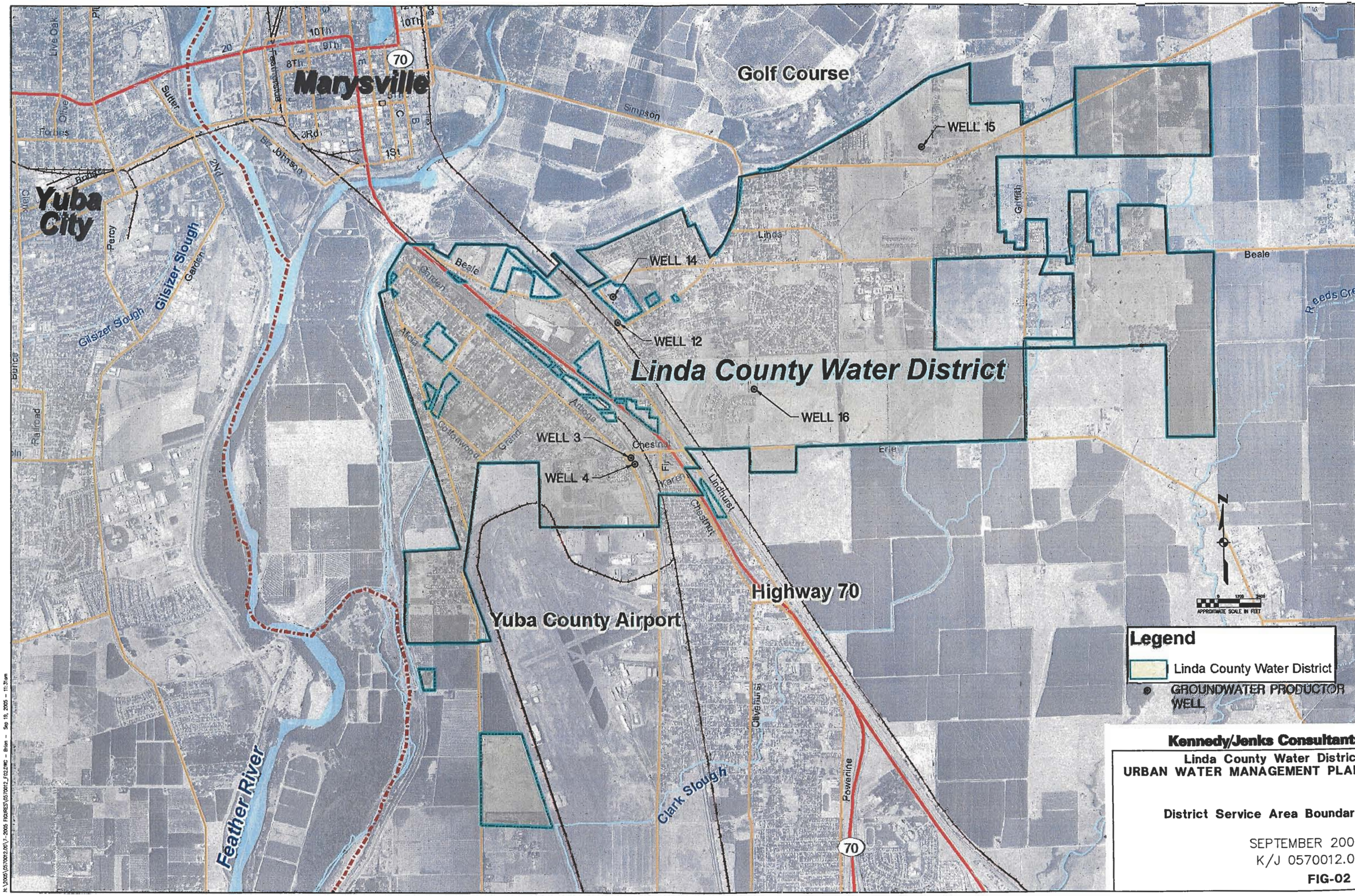
5.1 Past Drought, Water Demand, and Conservation Information

Since LCWD is exclusively on groundwater and uses relatively little groundwater, there has been little impact on supply resulting from drought. Historical information indicates demand has increased by 5% each year. The demand has increased concurrently with population increases. LCWD customers have not historically experienced shortages.

New developments must comply with Yuba County requirements for water conservation. All LCWD customer usage is metered and customers are charged according to the volume of water consumed. Therefore, customers are conscious of how much water they use and can identify overuse by monitoring their water bills.

5.2 Water Supply Sources

Linda County Water District is supplied by six groundwater wells. The wells pump from the South Yuba Groundwater Basin (SYGB). They are Well Numbers 3, 4, 12, 14, 15, and 16. The wells produce a maximum of 10,200 gpm (14.7 mgd). To see where the wells are located please refer to Figure 2.


Marysville
Yuba City
Golf Course
WELL 15
WELL 14
WELL 12
Linda County Water District
WELL 16
WELL 3
WELL 4
Yuba County Airport
Highway 70
Feather River
Gilsizer Slough
Clark Slough
Simpson
Beale
Linda
Erie
Chestnut
Lindhurst
Olivehurst
Powerline
Griffith
Garden
Atoga
Grand
Colleenwood
Karen
Fir
Sutter
Percy
Forbes
Live Oak
Olive
Bridge
Bunce
Railroad
Pine
Ellis
Biz Johnson
Freeway
10Th
9Th
8Th
5Th
3Rd
1St
2Nd
20
70
Reeds Cre
N
APPROXIMATE SCALE IN FEET
Legend
Linda County Water District
GROUNDWATER PRODUCTOR WELL
Kennedy/Jenks Consultants
Linda County Water District
URBAN WATER MANAGEMENT PLAN
District Service Area Boundary
SEPTEMBER 2005
K/J 0570012.00
FIG-02

5.2.1 South Yuba Groundwater Basin Description

The South Yuba subbasin lies in the southern portion of the Sacramento Basin Hydrologic Study Area. It is bounded on the north by the Yuba River, the west by the Feather River, on the south by the Bear River and on the east by the Sierra Nevada and encompasses nearly 107,000 acres. Elevations range from about 150 feet in the northwest region to about 30 feet in the southwest corner near the confluence of the Feather and Bear Rivers.

Average annual precipitation is 20 inches in the southwest and 20-24 inches in the rest of the basin.

Stream channel and floodplain deposits present along the Yuba River, Feather River, and Honcut Creek are highly permeable and provide for large amounts of groundwater recharge within the subbasin. The potential for artificial recharge of groundwater in the basin is limited since areas which have available storage space typically have overlying soils with very low infiltration rates that would restrict recharge potential (Bookman-Edmonston Engineering, Inc. 1992).

5.2.2 South Yuba Groundwater Basin Storage Evaluation

The South Yuba Groundwater Basin (SYGB) as described in the YCWA Groundwater Management Plan has about 1,090,000 acre-feet of storage from 20 to 200 feet below ground surface (bgs). The Management Plan does not give storage for any depth intervals below 200 feet. This is important because most of LCWD's groundwater wells are screened below 200 feet. One could extrapolate that there is 1,000,000 AF of storage per 200 feet of aquifer. It then could be theorized that from 200 feet to 600 feet there is an additional 2,000,000 AF of storage given uniform aquifer material.

Historical groundwater level graphs show a consistent decrease in groundwater levels in the early 1970's to 1976. Since then the groundwater levels have started to increase. According to the YCWA Groundwater Management Plan SYGB is recharging at a rate of 15,100 to 21,200 AF per year since the construction of the South Yuba Canal in 1983. The installation of the canal has decreased the need to use groundwater in the area.

The South Yuba Groundwater Basin that serves LCWD is not adjudicated, and there are no set legal pumping rights. The DWR has not identified the SYGB to be projected in or currently in overdraft. The SYGB Management Plan identifies steps to prevent the groundwater basin becoming over drafted. The overdraft steps consist of groundwater level measurements taken from a large network of groundwater monitoring wells. The wells are monitored by DWR, YCWA and local water suppliers. If overdraft is detected the YCWA will take action to reduce production from the groundwater basin. It should be noted that the SYGB Groundwater Management Plan did not present what constitutes overdraft within the basin.

5.2.3 Groundwater Supply Wells

Groundwater pumping wells are located through out LCWD; see Figure 2 for a map showing well locations. Table 5-1 shows the well names and their respective maximum pumping rates.

Table 5-1: Well Production

Well Name	Maximum Production in gallons per minute
3	800
4	800
12	1,400
14	1,700
15	2,000
16	3,500
Total	10,200 (14.7 mgd/ 16,464 AF/Y)

Table 5-2 shows the well size, depth and screened interval. It should be noted that the more recently installed wells (12, 14, 15, and 16) have a higher pumping capacity, much greater total depth, and the screened intervals are also much deeper.

Table 5-2: Well Information

Well Name	Diameter of Screen	Total Depth	Screened Interval
3	12”	211	139.5-169.5, 197.5-206.5
4	12”	166	128-158[(a)]
12	12”	552	131-542[(a)]
14	16-12”	610	181-608[(a)]
15	16”	590	320-580[(a)]
16	20”	635	260-620[(a)]

(a) These wells have multiple screened intervals between the depth ranges listed.

5.3 Past Groundwater Usage

LCWD has increased groundwater pumping by an average rate of 2.7% each year since 2000. Future groundwater demand is projected to increase at a higher rate as new developments and commercial buildings come under construction. The increased water demand from 2003 to 2004 was 11.6%. Table 5-3 shows quantities of groundwater pumped during the past five years. The water pumping figures were determined by totaling LCWD’s groundwater well pumping records.

Table 5-3: Amount of Groundwater Pumped

Amount of Groundwater Pumped AF/Y					
	2000	2001	2002	2003	2004
South Yuba Groundwater Basin	2,642	2,700	2,806	2,730	3,047
Increase From Previous Year	N/A	2.2%	3.9%	-2.7%	11.6%

5.4 Future Supply and Demand

Projected water use was calculated by increasing the number of connections at the same rate as the population projection. LCWD uses a standard peaking factor of 2.7 times the average daily flow to supply the customers with adequate water during peak hourly demands and still provide adequate water for fire hydrants. Table 5-4 shows the projected annual demand and required supply to meet peak hourly demands from 2005 to 2030. These projections reflect a 10% annual increase to 2015, then a 5% annual increase to 2030. LCWD assumes the projected groundwater supply will be pumped from the lower aquifer (200-600 feet bgs). The lower aquifer is less susceptible to groundwater contamination and has a more consistent yield than the upper aquifer.

Table 5-4: Future Demand and Supply Comparison

Year	2005	2010	2015	2020	2025	2030
Projected Annual Demand (AF/Y)	3,267	4,819	7,311	9,132	11,451	14,402
Current Maximum Supply (AF/Y)	16,464	16,464	16,464	16,464	16,464	16,464
Current Maximum Daily Supply (MGD)	14.7	14.7	14.7	14.7	14.7	14.7
Max Daily Demand and Required Max Daily Supply (MGD)	8.49	11.62	17.63	22.01	27.61	34.72
Required Additional Supply (MGD)	0	0	3	7.5	13	20

The results of this comparison reveal that LCWD has adequate supply to meet annual demand using average daily usage, but they will not have enough pumping capacity to meet peak demands. By 2015, LCWD will need to increase its installed capacity for water production by 3 MGD and continue increasing its installed capacity according to the above table. Because LCWD does not currently have storage capacity, the District must provide installed capacity to meet peak demands.

Section 6: Reliability Planning

6.1 Reliability

> 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 supplier:
>
> 10632 (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.

LCWD groundwater supply is very reliable. Historic data shows that the supply has not been vulnerable to seasonal or climatic changes. Seasonal and climatic changes that affect water supply are generally applicable to surface water supplies, or groundwater supplies that are severely overdrafted. These are not conditions that exist in the LCWD service area. Refer to Section 5.0 for a discussion of the South Yuba Groundwater Basin for a summary of the water supply source.

6.2 Basis of Reliability

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

The Yuba County Groundwater Management Plan shows historical trends of groundwater levels indicating a decrease in groundwater levels between March 1975 and March 1978. The groundwater elevation decreased from 40 feet MSL to 20 feet MSL. After 1978 the water levels have increased to between 40 and 50 feet MSL. It should be noted that the decrease in water level did not affect LCWD's ability to supply water to its customers.

The South Yuba Groundwater Management Plan (SYGWMP) concludes that there is an increase of about 15,100 to 21,200 acre-feet per year in storage in the SYGB. The projected 2030 demand of 14,402 acre-feet of water is not projected to overdraft the SYGB.

6.3 Water Quality Impacts on Reliability

> 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 water management strategies and supply reliability.

The groundwater used as drinking water in LCWD is treated for iron, manganese, and entrained gasses including hydrogen sulfide, methane, and carbon dioxide. A copy of LCWDs annual Consumer Confidence Report can be found in Appendix E. This report summarizes LCWD's drinking water quality. Currently the only well potentially impacted by contamination is Well Number 12. Well Number 12 is adjacent to a Leaky Underground Storage Tank (LUST) site. Well Number 12 is monitored for petroleum hydrocarbon contamination. Monitoring results from 2004 have not detected target analytes. It is assumed that Well Number 12 will continue to be operable into the future.

All wells in LCWD have wellhead treatment systems installed to provide treatment for taste, odor and color. The treatment systems consist of an aerator to remove entrained gasses, a chlorination system, a sump to provide contact time, and pressure filters. Water quality is not expected to reduce LCWD's ability to supply water.

6.4 Water Sources not Available on a Consistent Basis

All of LCWD's wells can be used at any time to provide a reliable water supply.

6.5 Describe Factors Resulting in Inconsistency of Supply

Other factors in addition to seasonal or climatic changes that can affect supply are:

- Mechanical failure or reduced capacity
- Change in water quality,
- Water treatment plant malfunction,
- Distribution system leak,
- Power outage, and
- Natural disaster.

These scenarios are more thoroughly described in Section 9.0.

6.6 Transfer and Exchange Opportunities

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

LCWD does not currently participate in transfers and exchanges of water. LCWD will consider the potential for transfers or exchanges as customer demand increases.

6.7 Average Water Year

> 10631 (c) Provide data for each of the following:
> (1) An average water year …

During an average water year LCWD can expect to meet their entire demand. This demand is currently 3267 ac-ft and projected to be 14,042 ac-ft per year by 2030. Assuming that LCWD constructs new groundwater supply wells concurrently with demand increases, LCWD will be able to supply its customers with enough water during the average water supply year.

6.8 Single Dry Year

> 10631 (c) Provide data for each of the following:
> … (2) A single dry water year…

LCWD has historically had adequate groundwater supply during single dry years.

6.9 Multiple Dry Years

> 10631 (c) Provide data for each of the following:
> ... (3) Multiple dry water years.

LCWD has historically had adequate groundwater supply during multiple dry years.

Section 7: Water Use Provisions

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

This section quantifies past and current water use in five year increments and projected water use by sector. The sectors for which LCWD keeps records are single family residential, multi-family residential, commercial/institutional, landscape irrigation, and agricultural.

7.1 Past, Current and Projected Water Use by Sector

Water code §10631 (e)(1-2)

Table 7-1 shows the past, current and projected future water use in LCWD by sector. The customer sector labeled “other” includes meters rented for construction and activities such as water main flushing and fire hydrant testing. The data was provided from LCWD’s DWR Public Water System Statistics summary sheet.

Table 7-1: Past, Current, and Future Water Use

Year	Water Use Sectors	Single family residential	Multi Family	Commercial/ Institutional	Landscape Irrigation	Agricultural	Other (rented meters)	Total
2000	# Accounts	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Deliveries (AF/Y)	N/A	N/A	N/A	N/A	N/A	N/A	2642
2005	# Accounts	2814	371	162	11	3	0	3360
	Deliveries (AF/Y)	1670	1101	388	63	274	25	3267
2010	# Accounts	4532	597	166	13	3	0	5311
	Deliveries (AF/Y)	2444	1612	396	68	274	25	4819
2015	# Accounts	7298	962	170	14	3	0	8447
	Deliveries (AF/Y)	3937	2596	406	73	274	25	7311
2020	# Accounts	9315	1227	174	15	3	0	10734
	Deliveries (AF/Y)	5024	3314	416	78	274	25	9132
2025	# Accounts	11888	1566	179	16	3	0	13652
	Deliveries (AF/Y)	6413	4229	427	83	274	25	11451
2030	# Accounts	15173	1999	183	16	3	0	17374
	Deliveries (AF/Y)	8184	5397	438	83	274	25	14402

LCWD has increased groundwater pumping on a 2.7% average rate each year since 2000. Future groundwater demand is projected to increase at a much higher rate due to new developments and commercial buildings that are being constructed. This can be seen from the increase from 2003 to 2004, where demand increased by 9%. Table 7-2 shows the past five years of groundwater pumped in AF per Year.

Table 7-2: Amount of Groundwater Pumped

Amount of Groundwater Pumped AF/Y

	2000	2001	2002	2003	2004
South Yuba Groundwater Basin	2,642	2,700	2,806	2,730	3,047

7.2 Sales to Other Agencies

LCWD does not currently sell water to other agencies.

7.3 Additional Water Uses and Losses

Additional water uses and losses within the system primarily result from water main flushing and unaccounted-for system losses. LCWD uses water for water main flushing which has accounted for an average of 6.26 AF/Y of water consumption over the last five years. Unaccounted-for system losses averaged 258 AF/Y, or 8.25% of total consumption between 2003 and 2004 Water main flushing and unaccounted-for system losses are included in the demand projection calculations.

7.4 Total Water Use

This section tabulates total water use, both current and projected. It also presents the maximum daily demand required to maintain system pressure for fire flow. LCWD uses a standard peaking factor of 2.7 times the average daily flow to be able to supply its customers with adequate water during peak hourly demands. Table 7-3 shows the annual demand in AF/Year and maximum daily demand in million-gallons per day. The demand estimates are projected to 2030.

Table 7-3: Future Demand

Year	2005	2010	2015	2020	2025	2030
Annual Demand (AF/Y)	3,267	4,819	7,311	11,315	11,451	14,402
Max Daily Demand and Required Max Daily Supply (MGD)	7.88	11.62	17.63	22.01	27.61	34.72

Table 7-3 also shows the projected groundwater pumping from the South Yuba Groundwater Basin. These calculations represent a concurrent increase in water use with population growth. It assumes that population grows at 10 % until 2015, and then slows to 5 % to 2030.

7.5 Opportunities for Development Of Desalinated Water

Water code § 10631 (i)

LCWD does not currently have opportunities for development of ocean water, brackish water, or saline groundwater as a long term supply.

7.6 CUWCC Signatory Status

LCWD is not a CUWCC signatory.

7.7 Water Received From Wholesale Supplier

Water code §10631(k)

LCWD does not currently receive water from a wholesale supplier.

7.8 Planned Water Supply Projects and Programs

Water Code § 10631 (g)

Planning future water supply projects and programs to provide adequate supply is important to the District. Currently LCWD plans on installing water supply wells when required by increased demand. LCWD requires developers to follow the East Linda Specific Plan when planning new developments and evaluating resource requirements for the applicable development.

LCWD typically requires developers to install new wells and water treatment plants to accommodate the demand from the new developments. LCWD assists the developers in determining the size of the wells and water treatment standards. The last well installed was Well Number 16. It was put into service in the summer of 2005.

Section 8: Water Demand Management Measures

8.1 Demand Management Measures Currently Being Implemented

> 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:

LCWD became an agency subject to the Urban Water Management Planning Act in the fall of 2004 by providing water service to over 3000 connections. LCWD is committed to implementing water conservation programs for all customer sectors and water recycling programs. The District is currently involved in regional efforts with Yuba County Water Agency, Yuba City, and the City of Marysville to address regional water supply and wastewater disposal issues. The agencies have submitted a grant application to DWR to receive assistance in the development of an Integrated Regional Water Management Plan. As LCWD grows, and program staff and budget increases, future efforts will address regional management programs to supplement the current programs in which the District participates. Additional potential partners in a regional conservation program may include Olivehurst Public Utility District and California Water Service (water supplier for the City of Marysville).

Linda County Water District is not a signatory to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and is therefore not a member of the California Urban Water Conservation Council (CUWCC). The District will consider the benefits of membership in CUWCC as their role in the region increases in the near term.

The DMMs that are directly applicable to LCWD are currently being implemented by the district or will be implemented in the near term future. The following section describes each DMM, its implementation schedule, method to evaluate effectiveness, water conservation savings, and budget required to implement the DMM.

8.1.1 DMM 1 Interior and Exterior Water Surveys for Single-Family Residential, Multi-Family Residential, Governmental, and Institutional Customers

LCWD does not currently provide water surveys for their customers. The District will consider the cost-effectiveness of providing water surveys to the highest water consumers in each customer category as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 1 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: When this DMM is implemented, the District will monitor water use of specific accounts to determine the effectiveness of water surveys.

CONSERVATION SAVINGS: When implemented, water surveys will target highest use customers resulting in potential savings of 5% to 15%.

BUDGET: A budget for a water survey program that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.2 DMM 2 Residential Plumbing Retrofit

LCWD will consider plumbing retrofit programs such as faucet aerators, low flow toilets and low flow showerheads as conservation program staff and budget at the District continue to expand. All new construction in LCWD is subject to Yuba County ordinances and must meet the most recent California Building Code and Uniform Plumbing Codes. This DMM may be implemented in the future with additional funding and a regional water conservation coordinator.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 2 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: The effectiveness of plumbing retrofits would be evaluated by the number of retrofits performed, the comparison of water use from per and post surveys, and customer feedback on the effectiveness of a retrofits performed at their residence or facility.

CONSERVATION SAVINGS: Conservation savings from plumbing retrofits within LCWD is unknown. Plumbing retrofits would target existing single family and multifamily residences living in older homes. Further retrofits targeting items such as faucet aerators and low flow showerheads could be applied to newer construction therefore affecting more customers.

BUDGET: A budget for a plumbing retrofit program that would provide cost-effective results will be developed as part of the program implementation analysis. The supply of plumbing retrofit materials could be provided during water surveys as performed in DMM 1, saving an extra step in the process to reducing water use.

8.1.3 DMM 3 System Water Audits, Leak Detection, and Repair

LCWD will consider a formal system water audit, leak detection, and repair program as staff and budget at the District continue to expand. LCWD's current method of leak detection is through visual inspection. LCWD water distribution system is constructed of cast iron pipe. According to the district when a pipe fails, it is usually a catastrophic failure and leaks are visually detectable. The leaks are immediately repaired by the district. During the past two years, overall losses for LCWD distribution system averaged about 8.25% of total production. It is LCWDs goal to reduce system losses to less than 5% within the next 5 years.

IMPLEMENTATION SCHEDULE: This DMM is currently being partially implemented. The District may consider full implementation of DMM 3 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: The DMMs effectiveness is evaluated by tracking the number of leaks and repairs and monitoring the total system losses.

CONSERVATION SAVINGS: Conservation saving by repairing leaks is very large. An un-repaired leak could drain a significant amount of the districts supply capabilities.

BUDGET: Costs associated with this program are incorporated into the District's annual budget and are not separately accounted for.

8.1.4 DMM 4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All water sales by LCWD are metered. Commodity rates are included in LCWDs charges to its customers. All existing customers were converted to water meters starting in 1992. The meter conversion program is now complete and all customers are on water meters. All new customers are required to have water meters for their water service.

IMPLEMENTATION SCHEDULE: This conversion of existing customers to water meters is complete. All new customers are required to have water meters as well.

METHODS TO EVALUATE EFFECTIVENESS: This DMM has been implemented to its full extent and has been deemed effective through its ability to track the amount of water each customer uses, and has created awareness by the districts customers of their water usage.

CONSERVATION SAVINGS: Conservation savings due to the installation of water meters has not been determined as records of pre and post meter water usage are currently unavailable for comparison.

BUDGET: Costs associated with this program are incorporated into the District's annual budget and are not separately accounted for.

8.1.5 DMM 5 Large Landscape Conservation Programs and Incentives

LCWD does not currently participate in large landscape conservation programs and incentives to reduce water use. LCWD believes that this would be a valuable program for reducing water usage in the future. LCWD currently has 11 landscape accounts for a total of 63 AF/Year of water usage. This accounts for a total of 2.1% of the districts total water use. The District will consider the cost-effectiveness of providing large landscape conservation programs and incentives as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 5 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: When this DMM is implemented, the District will monitor water use of specific accounts to determine the effectiveness of DMM 5.

CONSERVATION SAVINGS: Conservation savings by conducting large landscape conservation programs incentives could be small considering only 63 AF/Y of water is currently used for large landscape irrigation.

BUDGET: Costs associated with this program would be the cost of incentives for the conservation programs and staff time associated with administering the program.

8.1.6 DMM 6 High-Efficiency Washing Machine Rebate Programs

LCWD does not currently participate in high efficiency washing machine rebate programs. The local gas and electricity provider is typically the supplier of such programs. PG&E offers rebates for high efficiency appliances that include washing machines. PG&E's customers can apply for the rebates through their web site.

IMPLEMENTATION SCHEDULE: There is no plan to implement this DMM as it is performed by the local gas and electric utility (PG&E).

METHODS TO EVALUATE EFFECTIVENESS: The water conservation savings form the implementation of DMM 6 is unknown. The effectiveness is totally dependant on the number of customers who take advantage of the program. If the district could get statistics from PG&E the program could be evaluated.

CONSERVATION SAVINGS: The conservation savings are difficult to determine, it is dependant on the number of customers who take advantage of the program.

BUDGET: Since this is implemented by the local gas and electric utility, the District has no budget responsibility.

8.1.7 DMM 7 Public Information Programs

These programs educate and inform the general public about the roles water plays, either directly or indirectly, within the community. These include: working with social groups, political, and business leaders to increase the level of water awareness; establishing a favorable relationship with the media by responding promptly to requests for information and being forthright in any dealings with them; speakers' presentations to community organizations; and presence (through booths, displays) at community events such as Earth Day celebrations and weekly farmers' markets.

The District will consider the cost-effectiveness of providing public information programs as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 7 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through public feedback from the public information programs.

CONSERVATION SAVINGS: Conservation savings by public information programs could be significant. It could create an environment of conservation within the district, reducing water demand during peak months.

BUDGET: A budget for public information programs that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.8 DMM 8 School Education Programs

The district currently does not provide school education programs. The District will consider the cost-effectiveness of providing school education programs as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 8 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through feedback from the schools that receive the education programs.

CONSERVATION SAVINGS: Conservation savings by school education programs would be difficult to determine until the programs are implemented. It could create an environment of conservation within the district, reducing water demand during peak months.

BUDGET: A budget for school education programs that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.9 DMM 9 Conservation Programs for Commercial, Industrial, and Institutional Accounts

The District will consider the cost-effectiveness of providing conservation programs for commercial, industrial, and institutional accounts as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: This DMM could be implemented with the addition of a regional water conservation coordinator. The District may consider implementation of DMM 9 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through feedback from the customers participating in the programs and through water usage comparisons from pre and post program implementation.

CONSERVATION SAVINGS: Conservation savings implementing conservation programs for large accounts could be significant. Current usage by these types of accounts is 388 AF/Y, or about 12% of the water the district produces. It would be difficult to determine the ultimate savings until the programs are implemented.

BUDGET: A budget for Conservation programs for commercial, industrial, and institutional accounts that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.10 DMM 10

DMM 10 - Wholesale agency programs

Since LCWD does not wholesale water, DMM 10 is not applicable.

8.1.11 DMM 11 Conservation Pricing for Water Service and Conservation Pricing for Sewer Service, Where the Urban Water Supplier Also Provides Sewer Service

LCWD bills its customers on a commodity basis for metered water use. LCWD does not currently have a conservation pricing rate structure that is tied to sewer service. The District will consider the cost-effectiveness of conservation pricing as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: The DMM could be implemented through an administrative change in wastewater service billing. The District may consider implementation of DMM 11 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through feedback from the customers and through water usage comparisons from pre and post program implementation.

CONSERVATION SAVINGS: Conservation savings through implementing the new billing structure is unknown. It would be difficult to determine the ultimate savings until the programs are implemented.

BUDGET: A budget for conservation pricing rates that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.12 DMM 12 Water Conservation Coordinator

LCWD staff performs the function of water conservation coordinator as required. LCWD is evaluating teaming with other water suppliers to hire a water conservation coordinator for the Marysville, Linda, and Olivehurst areas.

The District will consider the cost-effectiveness of a water conservation coordinator as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: The District may consider implementation of DMM 12 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through feedback from the community and through water usage comparisons from pre and post program implementation.

CONSERVATION SAVINGS: Conservation savings through implementing a water conservation coordinator is unknown. Conservation savings could be significant since the water conservation coordinator would be in charge of implementing many of the DMMs in this section.

BUDGET: Costs associated with this program would be the districts contribution to the hiring of water conservation coordinator, or about 30-50% the cost of current district staff, if the cost was shared between the communities.

8.1.13 DMM 13 Water Waste Prohibitions

Since the entire district is metered water waste is limited. In cases of gross water waste LCWD contacts customers to resolve potential problems.

The District will consider the cost-effectiveness of a water waste prohibitions as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: The District will consider implementation of DMM 13 within the next five years. Water waste prohibitions are included in the draft water probation ordinance.

METHODS TO EVALUATE EFFECTIVENESS: This DMM's effectiveness would be evaluated through feedback from the community and through water usage comparisons from pre and post program implementation.

CONSERVATION SAVINGS: Conservation savings through implementing water prohibitions could be significant if large water wasting is occurring during supply deficiencies.

BUDGET: A budget for water waste prohibitions that would provide cost-effective results will be developed as part of the program implementation analysis.

8.1.14 DMM 14 Residential Ultra Low Flush Toilet Replacement Programs

The District will consider the cost-effectiveness of a toilet replacement program as the District staff and budget continue to grow.

IMPLEMENTATION SCHEDULE: The District may consider implementation of DMM 14 within the next five years.

METHODS TO EVALUATE EFFECTIVENESS: The program would be evaluated by the number of toilets replaced and the calculated water savings through the toilet savings.

CONSERVATION SAVINGS: The conservation from retrofitting toilets would most likely be fairly low given the small customer base and the mandatory use of low flush toilets since 1992.

BUDGET: Costs associated with this program would be the amount the district would contribute to the purchase of a low flush toilets, it is usually about $50 to $75 per toilet. A more detailed budget for toilet replacement that would provide cost-effective results will be developed as part of the program implementation analysis.

Section 9: Water Shortage Contingency Plan

> "10632. The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:
> (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage."

9.1 Water Shortage Contingency Plan

This section discusses the District plans for a water supply shortage resulting from a variety of conditions including drought, flooding, mechanical failure of pumps and well contamination.

9.2 Step One-Stages of Action

The plan includes for four stages of action, and the situations that might cause a supply shortage. Stage 5 is normal, 4 is a 10% reduction, 3 is a 25% reduction, 2 is a 50% reduction, and 1 is a greater than 50% reduction.

Specific water supply conditions that must exist for the stages to occur are:

Stage 5: Normal operations, 100% of supply is available for use.

Stage 4: 10% reduction, single well or treatment system down.

Stage 3: 25% reduction, single well or multiple wells inoperable, large system leak.

Stage 2: 50% reduction, multiple wells inoperable, large system leak, or a natural disaster.

Stage 1: Greater than 50% reduction, multiple wells inoperable, large system leak, or a severe natural disaster.

9.2.1 50% Supply Reduction Plan

The District will make every effort to restore supply in the event of a 50% reduction. Actions taken would be dependent on the cause of the shortage and may include:

- Prohibitions
- Penalties, and
- Consumption Reduction Methods

These emergency demand management measures are described in Section 9.5.

9.2.1.1 Mechanical Failure

A series of severe mechanical failures could potentially lead to a 50% supply reduction; at this point LCWD would have to react quickly to fix the broken mechanical devices that are causing the water supply reduction. With a 50% reduction LCWD would not be able to meet peak hourly demands.

Possible Mechanical Failure:

- Well pump failure,
- Mainline Break, and
- Well head treatment system failure.

These failures can be caused by a number of situations which include, but are not necessarily limited to, the following: Natural Disaster (flood, fire, and earthquake), and power failure greater than 24 hours.

9.2.1.2 Priority by Use

If water demand needs to be reduced to respond to a water supply shortage, the District will give priority to maintaining fire flows. LCWD will reduce landscape and agricultural irrigation. They will also impose a moratorium on water use on impermeable surfaces, and implement alternate day watering for residents. The following list begins with the highest priority demand:

Highest Priority:

- Health and Safety
- Commercial and Industrial
- Permanent agriculture (requires 5 years to return to production)
- Existing Landscaping
- Annual agriculture

Lowest Priority:

- The addition of new customers

9.2.1.3 Health and Safety Requirements

To ensure a minimum amount of water for health and safety the District must be able to supply a minimum of 20 psi and 2000 gpm at fire hydrants. Other local institutions such as hospitals and schools would also need a minimum supply to provide services

9.3 Step Two-Minimum Supply for Next Three Years

> 10632. "(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."

Historically, groundwater supply to LCWD has not been affected during drought periods. Table 9.1 shows the next three years demand compared to supply, assuming no new supply is established within LCWD.

Table 9-1: Next Three-Year Minimum Supply

Year	2005	2006	2007
Total Demand (AF/Y)	3267	3521	3800
Average Day Demand (mgd)	2.92	3.14	3.39
Peak Hour Demand (mgd)	7.88	8.49	9.16
Total Current Supply (AF/Y)	16451	16451	16451
Total Current Supply (mgd)	14.69	14.69	14.69

9.4 Step Three-Catastrophic Supply Interruption Plan

Water Code § 10632 (c)

> "(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."

The three most likely scenarios for catastrophic water supply interruption for LCWD is earthquake, flooding, and power outages.

LCWD is in seismic zone 3 and therefore, it may experience a severe earthquake. Pipelines can rupture and treatment plants can fail as a result of an earthquake. LCWD will prepare for an earthquake providing redundant systems, backup generators, and to design and build the water distribution infrastructure to withstand the maximum possible earthquake, following UBC guidelines.

Flooding is a possibility in Linda. One danger from flooding is contamination of drinking water. The district employs disinfection procedures and stores disinfection supplies in case the drinking water system becomes contaminated. Another impact of severe flooding is that groundwater pumping and treatment equipment could become damaged. Evaluation, repair and replacement of groundwater pumping and treatment equipment are a part of LCWD's protocol.

Historic Flood Near Marysville, CA

Power outages are possible causes of water supply interruptions. All of the District's water distribution facilities are supplied with back-up power generation. In the event of a power outage, the back-up generators automatically start and supply electricity to the well and treatment system until the power is restored. The back-up generators are designed to run for 24 hours at the wells maximum pumping capacity.

The steps that LCWD has taken to prepare for a catastrophic supply interruption plan there are summarized bellow:

1. Design all water supply infrastructure and water treatment facilities to latest UBC code.
2. Have emergency disinfection products and procedures available, incase of contamination from flooding.
3. Continue to periodically test and maintain emergency backup generators.

9.5 Step Four-Prohibitions, Penalties and consumption Reduction Methods

> "10632. The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(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.

9.5.1 Prohibitions

When water supply is reduced, mandatory prohibitions may be imposed to reduce water wasting. A list of Draft Prohibitions is presented below.

Table 9-2 shows the water rationing stage, and what steps are to be taken when that stage is reached.

Table 9-2: Mandatory Prohibitions

Mandatory Prohibitions	Stage when prohibition becomes mandatory
Using potable water for street washing	4
Landscape Irrigation to odd/even days	3
No car washing	2
No landscape irrigation	1

9.5.2 Excessive Use Penalties

Water Code § 10632 (f)

Excessive use penalties are intended to reduce demand by imposing higher rates for water users who use water excessively. LCWD does not currently have an excessive use policy to control water usage. LCWD may implement excessive use penalties as the District continues to grow and demand increases.

9.5.3 Consumption Reduction Methods

Water Code §10632 (e)

Table 9-3 shows the consumption reduction methods and how much reduction is expected at each stage.

Table 9-3: Consumption Reduction Methods

Consumption Reduction Method	Stage when method takes effect	Projected Reduction (%)
Issue Water Shortage alert	4	10
Implement all Mandatory Prohibitions	3	20
Rate increase	2	25
Water Policing	1	30

9.6 Step 5-Analysis of Revenue Impacts of Reduced Sales During Shortages

> 10632(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.

If a mandatory reduction in water usage was implemented it would have a direct impact on revenue to the District. LCWD currently uses a flat rate depending on service size plus a $0.65 per 100 cubic foot charge for potable water. Table 9-4 shows the monthly rates and the reduced revenue from reduced sales.

Table 9-4: Water Shortage Revenue Impacts

	MG Produced (Average of 2000-2005)	Revenue with no reduction	Revenue 10% Reduction	Revenue 20% Reduction	Revenue 30% Reduction	Revenue 40% Reduction	Revenue 50% Reduction
June	113.45	$94,032	$84,629	$76,166	$68,550	$61,695	$55,525
July	127.05	$105,305	$94,775	$85,297	$76,767	$69,091	$62,182
August	116.64	$96,682	$87,014	$78,313	$70,481	$63,433	$57,090
September	98.61	$81,737	$73,564	$66,207	$59,587	$53,628	$48,265

The following table shows the flat rates charged for each connection size. Most single-family residences would use a 5/8 to 1-inch service. With an average usage of 481 gallons per day per single-family household, the average water bill is about $20.00. $12.75 of the $20.00 is for metered usage, and the flat rate varies between $6.00 and $10.80. Table 9-5 shows the base monthly service charge for different sized connections.

Table 9-5: Monthly Base Rate Service Charges

Meter Size	Monthly Base Rate
5/8-inch	$6.00
¾-inch	$8.40
1-inch	$10.80
1 ½-inch	$13.20
2-inch	$20.35
3-inch	$39.50
4-inch	$52.70
6-inch	$93.40
8-inch	$140.05

Source: Linda County Water District Code Book.

9.7 Step 6-Draft Ordinance and Use Monitoring Procedure

Water Code § 10632 (h)

As part of this UWMP a Draft Water Shortage Contingency Resolution was developed to assist the LCWD Board of Directors to implement water conservation during supply shortages. A copy of the draft water shortage contingency resolution can be found in Appendix F.

Water Code § 10632 (i)

LCWD believes that the most effective way to evaluate water conservation is through monitoring metered water usage. LCWD will use water meter readings and visual observation to determine the actual reduction of water usage and compliance of a declared water shortage emergency.

Section 10: Water Recycling

10.1 Water Recycling Opportunities

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area…
>
> 10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.
>
> 10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
>
> 10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

LCWD has successfully applied for a water recycling planning grant to assess the regional potential for wastewater recycling as a new water source. The water recycling planning project is scheduled to begin in September 2005 and take approximately 15 months to complete. It is a cooperative effort on behalf of LCWD, the City of Marysville, and the City of Yuba City. If recycled water were used in the future it would reduce demand from the groundwater wells. Recycled water would most likely be used for agricultural irrigation, landscape irrigation, industrial reuse, wildlife habitat enhancement, and wetlands.

Since the recycled water project is in the planning stage, it is not known what amount of tertiary treated wastewater would be used for recycled water. Currently LCWD is also working on designing a new tertiary treatment WWTP. To the extent practical LCWD intends on providing recycled water for the above-mentioned uses.

Section 11: Wastewater System

> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
> (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.
> (c) A description of the recycled water currently being used in the supplier's service area, including, but limited to the type, place, and quantity of use.

11.1 Service District

The District was formed in 1955 to provide the community of Linda with water for domestic uses and fire services. In 1960, the District expanded its services to include wastewater collection and treatment. The District's existing service area, which is depicted in Figure 2, encompasses approximately 3,900 acres. The current connection base is primarily residential with limited light commercial and no significant industrial use.

The District is currently undergoing substantial developer-driven growth. As a result, there are a number of recent, on-going, and near-term construction projects relating to improved water and wastewater service.

11.2 Wastewater Collection and Treatment System

The District's sanitary sewer collection system is comprised of a series of 6-inch through 30-inch diameter vitrified clay pipes. Several new sewer trunk lines were installed throughout the service area as part of the 1996 system expansion and improvements project. In response to rapid growth, the District has recently completed construction of a new 30-inch vitrified clay trunk line that will parallel the existing 27-inch trunk line conveying wastewater to the plant. The collection system also includes eight wastewater lift stations. Due to the relatively flat terrain, these lift stations were needed to eliminate deep sewer main excavations.

The District owns and operates an equivalent-secondary WWTP situated on a 15-acre parcel of District property, located just outside of the flood protection levee of the Feather River. The WWTP is located at 909 Myrna Avenue, in Section 1, T14N, R3E, MDB&M. The assessors parcel number is 13-010-002.

The original WWTP was constructed in 1960, with major plant upgrades completed in 1996 and 2002. The current treatment plant employs coarse and medium screening, grit removal, primary clarification, biotrickling filtration, secondary clarification, disinfection, dechlorination, and solids processing.

Aerial Photograph of Linda WWTP

11.3 Disposal System

11.3.1 Outfall Pipeline

The District maintains a 30-inch concrete outfall pipeline with a short section of 18-inch diameter pipe from the effluent pump station to the eastern bank of the Feather River. There is a coarse protective screen along the riverbank where the pipeline daylights. The District has not used the outfall and bank discharge in many years because of the potential for nuisance conditions due to poor wastewater mixing.

11.3.2 Pond System

Treated wastewater is typically disposed on land using a series of seven percolation/evaporation (p/e) ponds located west of the WWTP, inside of the flood protection levee. Individual ponds are separated by levee roads but connected through a network of underground pipes. The p/e ponds have a collective surface area of 28 acres and a capacity of 163 acre-feet, assuming two feet of freeboard. There is ample capacity to allow at least one pond to be out of service at any time under present flow conditions. During typical operation, the shallower southern ponds (ponds #1, 2, 3) are kept out of service. These ponds may be used during high flow periods or when the northern ponds require maintenance or cleaning.

The various pond levees are constructed at two different elevations, with the northernmost ponds (ponds #4A, 4B, 5A, 5B) being approximately two feet higher than the southern ponds (ponds #1, 2, 3).

11.4 Past, Current, and Future Wastewater Flows

As a rural residential community with no industrial facilities and limited light commercial business, the wastewater is derived primarily from domestic sewage. The planned development within the District's service area is also residential.

11.4.1 Past and Current Wastewater Flows

LCWD conducts continuous wastewater flow monitoring using a weir structure and ultrasonic level sensor at the effluent of the secondary clarifier. The District reports this information as part of its Discharger Self-Monitoring Reports. Table 11.1 provides a summary of the plant flow rates by month and year for the period January 2001 through July 2004. The table also summarizes average and peak day dry and wet weather flow rates. For the purposes of this table, the dry season was assumed to be June through September and the wet season October through May.

Table 11-1: Treatment Plant Flows (MGD)

Month	Year 2001	2002	2003	2004	Daily Average by Month	Daily Peak by Month
January	1.20	1.37	1.49	1.23	1.32	2.49
February	1.27	1.14	1.42	1.55	1.35	3.06
March	1.22	1.26	1.34	1.25	1.27	2.75
April	1.17	1.13	1.39	1.12	1.20	2.23
May	1.29	1.10	1.31	1.12	1.21	1.88
June	1.19	1.11	1.29	1.16	1.19	1.39
July	1.21	1.19	1.35	1.22	1.24	1.52
August	1.22	1.15	1.29	NA[a]	1.22	1.57
September	1.23	1.04	1.27	NA	1.18	1.78
October	1.23	1.07	1.20	NA	1.17	1.61
November	1.27	1.04	1.18	NA	1.16	1.62
December	1.45	1.30	1.21	NA	1.32	2.22
Daily Average by Year	1.25	1.16	1.31	1.24		
Daily Dry [b] Average	1.21	1.12	1.30	1.19		
Daily Wet [c] Average	1.26	1.18	1.32	1.25		
Peak Dry Day	1.35	1.78	1.57	1.33		
Peak Wet Day	2.23	2.49	2.12	3.06		

(a) NA = Data not available
(b) Dry season in June through September
(c) Wet season is October through May

Over the past four years the annual average daily flow through the WWTP has varied between 1.16 and 1.3 mgd. The ADWF over this period was measured to be 1.2 mgd, which translates to approximately 120 gallons per capita per day. The average wet weather flow (AWWF) was only slightly higher at 1.25 mgd as the result of inflow/infiltration (I/I) associated with periodic storm events. At 4% of ADWF, the average I/I contribution of 50,000 gpd is quite low. It should be noted that the plant flow meter was found to be out of calibration for part of 2004, and it is suspected that flow measurements during this time may be artificially high.

The permitted capacity of the existing WWTP is 1.8 mgd ADWF. The minimum dry weather daily flow was 1.04 mgd, observed in September 2002. The wet weather peak day flow was 3.1 mgd, observed in February 2004 (see note above). The maximum four-day average flow, which is of use for evaluating the dilution factor for chronic protection of aquatic life, was 2.3 mgd, observed in February 2004. Based on historical observations by District staff, the peak hourly flow factors (expressed relative to ADWF) for dry weather and wet weather are 1.75 and 3.0, respectively.

11.4.2 Future Wastewater Flows

Based on the Yuba County General Plan and several specific plans, the District has estimated the need for ADWF plant capacities of 2.5 mgd and 5.0 mgd by the year 2010 and 2020, respectively. The existing WWTP is expected to reach its design flow capacity by mid-2008. As part of the facility master plan, the District is proceeding with the preliminary evaluation of a wastewater treatment plant expansion to accommodate an ADWF of 5 mgd. The District requests that the new discharge permit grant capacity for the 5 mgd ADWF plant expansion. Based on historical peaking factors, the District plans to design the new plant assuming a maximum day flow of 12 mgd and peak wet weather hourly flow of 15 mgd. These are preliminary projections and may be revised during the facility master plan.

Table 11-2: Future Wastewater Flows

Year	2005	2010	2015	2020	2025	2030
Average Dry Weather Flow (mgd)	1.19	2.5	3.2	5.0	5.8	6.6

Section 12: Water Service Reliability

> 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 area of the urban water supplier.

Supply totals are based on the annual estimate of increase in storage of the SYGWB. This is 3,267 AF/Y plus 15,100 AF/Y (18,367 AF/Y) from the YCWA Groundwater Management Plan. 18,367 AF/Y is projected to be the ultimate normal yearly supply. The additional groundwater supply would require development before the additional water would be available. Demand is based on the projected demand presented in Section 5.

The single dry year supply is estimated to be 10% less or 16,530 AF/Y. 16,530 AF/Y is much less than the ultimate demand of 14,402 AF/Y in 2030, therefore a single dry year should not have any effect on water supply.

The multiple dry year scenarios are based on 10% reduction of groundwater recharge on year one, 20% reduction on year two, and 30% reduction on year three. The tables do not present any demand reduction as a result of limited DMM implementation at this time. Not using demand reduction is done to reflect a more conservative approach to the projections.

12.1 Normal Year Scenarios

This section presents the normal supply and demand comparison. The analysis reveals that there will not be any supply deficiencies during normal water years projected to 2030.

12.1.1 2010-2030

Projected supply during multiple dry year period ending in 2030-AF/Y

	2010	2015	2020	2025	2030
Supply	18367	18367	18367	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during normal years ending in 2030-AF/Y

	2010	2015	2020	2025	2030
Demand	4819	7311	9132	11451	14402
% of projected normal	100	100	100	100	100

Projected supply during normal years ending in 2030-AF/Y

	2010	2015	2020	2025	2030
Supply Totals	18367	18367	18367	18367	18367
Demand Totals	4819	7311	9132	11451	14402
Difference (supply minus Demand)	13548	11056	9235	6916	3965
Difference as % of Supply	26	40	50	62	78
Difference as % of Demand	74	60	50	38	22

12.2 Single Dry Year Scenarios

This section presents the single dry year supply and demand comparison. The analysis reveals that there will not be any supply deficiencies during single dry water years projected to 2030.

12.2.1 2006-2010

Projected supply during multiple dry year period ending in 2010-AF/Y

	2010	2015	2020	2025	2030
Supply	16530	16530	16530	16530	16530
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2010-AF/Y

	2010	2015	2020	2025	2030
Demand	4819	7311	9132	11451	14402
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2010-AF/Y

	2010	2015	2020	2025	2030
Supply Totals	16530	16530	16530	16530	16530
Demand Totals	4819	7311	9132	11451	14402
Difference (supply minus Demand)	11711	9219	7399	5079	2128
Difference as % of Supply	29	44	55	69	87
Difference as % of Demand	71	56	45	31	13

12.3 Multiple Dry Year Scenarios

This section presents the multiple dry year supply and demand comparison. The analysis reveals that there will be a supply deficiency of 2% in 2028, the third year in the multiple dry year scenario. It is anticipated that through demand management measures that the deficiency will be made up if this particular situation should arise.

12.3.1 2006-2010

Projected supply during multiple dry year period ending in 2010-AF/Y

	2006	**2007**	**2008**	**2009**	**2010**
Supply	16530	14694	12857	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2010-AF/Y

	2006	**2007**	**2008**	**2009**	**2010**
Demand	3521	3800	4106	4443	4819
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2010-AF/Y

	2006	**2007**	**2008**	**2009**	**2010**
Supply Totals	16530	14694	12857	18367	18367
Demand Totals	3521	3800	4106	4443	4819
Difference (supply minus Demand)	13010	10894	8751	13924	13548
Difference as % of Supply	21	26	32	24	26
Difference as % of Demand	79	74	68	76	74

12.3.2 2011-2015

Projected supply during multiple dry year period ending in 2015-AF/Y

	2011	**2012**	**2013**	**2014**	**2015**
Supply	16530	14694	12857	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2015-AF/Y

	2011	2012	2013	2014	2015
Demand	5227	5675	6168	6710	7311
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2015-AF/Y

	2011	2012	2013	2014	2015
Supply Totals	16530	14694	12857	18367	18367
Demand Totals	5227	5675	6168	6710	7311
Difference (supply minus Demand)	11303	9018	6689	11657	11056
Difference as % of Supply	32	39	48	37	40
Difference as % of Demand	68	61	52	63	60

12.3.3 2016-2020

Projected supply during multiple dry year period ending in 2020-AF/Y

	2016	2017	2018	2019	2020
Supply	16530	14694	12857	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2020-AF/Y

	2016	2017	2018	2019	2020
Demand	7640	7985	8347	8727	9132
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2020-AF/Y

	2016	2017	2018	2019	2020
Supply Totals	16530	14694	12857	18367	18367
Demand Totals	7640	7985	8347	8727	9132
Difference (supply minus Demand)	8890	6709	5410	9640	9235
Difference as % of Supply	46	54	65	48	50
Difference as % of Demand	54	46	35	52	50

12.3.4 2021-2025

Projected supply during multiple dry year period ending in 2025-AF/Y

	2021	2022	2023	2024	2025
Supply	16530	14694	12857	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2025-AF/Y

	2021	2022	2023	2024	2025
Demand	9551	9990	10452	10937	11451
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2025-AF/Y

	2021	2022	2023	2024	2025
Supply Totals	16530	14694	12857	18367	18367
Demand Totals	9551	9990	10452	10937	11451
Difference (supply minus Demand)	6980	4703	2405	7430	6916
Difference as % of Supply	58	68	81	60	62
Difference as % of Demand	42	32	19	40	38

12.3.5 2026-2030

Projected supply during multiple dry year period ending in 2030-AF/Y

	2026	2027	2028	2029	2030
Supply	16530	14694	12857	18367	18367
% of projected normal	100	100	100	100	100

Projected demand during multiple dry year period ending in 2030-AF/Y

	2026	2027	2028	2029	2030
Demand	11985	12546	13135	13733	14402
% of projected normal	100	100	100	100	100

Projected supply during multiple dry year period ending in 2030-AF/Y

	2026	2027	2028	2029	2030
Supply Totals	16530	14694	12857	18367	18367

Demand Totals	11985	12546	13135	13733	14402
Difference (supply minus Demand)	4545	2148	-278	4614	3965
Difference as % of Supply	73	85	102	75	78
Difference as % of Demand	27	15	-2	25	22

References

Yuba County Groundwater Agency – Groundwater Management Plan March 2005

Linda County Water Agency – Report of Waste Discharge, May 2005

Yuba County.org- Demographics

Appendix A

Public Notice to Review Draft UWMP

APPEAL-DEMOCRAT

1530 Ellis Lake Drive, P.O. Box 431, Marysville, CA 95901
(530) 741-2345

This space is for the County Clerk's filing stamp.

RECEIVED
OCT 6 2005
L.C.W.D.

Affidavit of Publication

(2015.5 C.C.P)

STATE OF CALIFORNIA,

Counties of Yuba and Sutter

Linda County Water District

Notice of Public Hearing on October 10, 2005 (Urban Water Management Plan)

I am not a party to, nor interested in the above entitled matter. I am the principal clerk of the printer and publisher of THE APPEAL-DEMOCRAT, a newspaper of general circulation, printed & published in the City of Marysville, County of Yuba, to which Newspaper has been adjudged a newspaper of general circulation by The Superior Court of the County of Yuba, State of California under the date of November 9, 1951, No. 11481, and County of Sutter to which Newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sutter, State of California under the date of May 17, 1999, Case No. CV PT99-0819 that the notice of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

September 26, October 3, 2005

I declare under penalty of perjury
that the foregoing is true and correct.
Executed at Marysville, California

Date: October 3, 2005

Spring Wall
(Signature)

PROOF OF PUBLICATION

NOTICE OF PUBLIC HEARING
LINDA COUNTY WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that on October 10, 2005 at 7:00 p.m. at the Linda County Water District office, 1280 Scales Street, Linda, California, 95901, the District Board of Directors will hold a public hearing on the following:

To discuss and adopt a 2005 Urban Water Management Plan. Linda County Water District is required under Assembly Bill 797 and 2661 to prepare an Urban Water Management Plan and submit it to the Department of Water Resources after adoption by the Board of Directors.

The purpose of the Urban Water Management Plan is to achieve efficient use of water supplies and protect Linda ratepayers and their water sources. This report has been prepared in accordance with guidelines established by the California Department of Water Resources.

The public is encouraged to attend and provide comments. Copies of the Urban Water Management Plan will be available for public review at the District's office, 1280 Scales Street, Marysville, California after September 19, 2005. Interested members of the public may contact Doug Lofton, Manager at (530) 743-2043 for more information.

Dated: September 22, 2005

Wendi Jellsey, District Secretary

Sept. 26, Oct. 3 Ad #02532241

Appendix B

Formal LCWD Board Adoption Resolution

RESOLUTION NO. 601

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE LINDA COUNTY WATER DISTRICT ADOPTING 2005 URBAN WATER MANAGEMENT PLAN

WHEREAS, the Urban Water Management Planning Act (Water Code section 10610 et seq.) requires the District to prepare, adopt and implement an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water;

WHEREAS, the District, through its District engineer Kennedy/Jenks Consultants, has prepared an Urban Water Management Plan; and

WHEREAS, the District has circulated for public review a draft Urban Water Management Plan, and properly noticed and conducted a public hearing before the Board of Directors regarding the proposed plan;

NOW THEREFORE, BE IT RESOLVED by the Board of Directors of Linda County Water District as follows:

1. The 2005 Urban Water Management Plan, in the form presented at this meeting, is hereby adopted and ordered filed with the District Secretary. The District Secretary is hereby authorized and directed to file the 2005 Urban Water Management Plan with the California Department of Water Resources, California State Library and County of Yuba within 30 days after this date.

2. The General Manager is hereby authorized and directed to implement the 2005 Urban Water Management Plan in accordance with the schedule in the plan.

PASSED AND ADOPTED by the Board of Directors of the Linda County Water District this 10th day of October 2005 by the following vote.

AYES: DIRECTORS BEAN, CARVER, SAUNDERS, SWEENEY AND WHITAKER
NOES: NONE
ABSENT: NONE
ABSTAIN: NONE

Jackie Bean
President

ATTEST:

Wendi Jursey
District Secretary

LINDA COUNTY WATER DISTRICT YUBA COUNTY CALIFORNIA

6347\R092205rps

Appendix C

Comments on Draft UWMP

No Comments Were Received

Appendix D

Yuba County Water Agency Groundwater Management Plan March 2005

YUBA COUNTY WATER AGENCY
GROUNDWATER
MANAGEMENT PLAN

March 2005

ORDINANCE NO. 9

OF THE BOARD OF DIRECTORS OF THE YUBA COUNTY WATER AGENCY TO ADOPT A GROUNDWATER MANAGEMENT PLAN UNDER WATER CODE §10750 *et seq.* (AB 3030, STATS 1992)

The Board of Directors of the Yuba County Water Agency ordains as follows:

Section 1. This ordinance is adopted with reference to the following background recitals:

WHEREAS, the California Legislature has declared that groundwater is a valuable natural resource in California and should be managed to ensure both its safe production and its quality; and

WHEREAS, it is the intent of the Legislature through the passage of AB3030 (Stats 1992) codified as Water Code §10750 *et seq.* to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions; and

WHEREAS, the Legislature also has declared that the additional study of groundwater resources is necessary to better understand how to manage groundwater effectively to ensure the safe production, quality, and proper storage on groundwater in this state; and

WHEREAS, the adoption of a Groundwater Management Plan is encouraged, but not required by law; and

WHEREAS, any local agency, whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not subject to groundwater management pursuant to other provisions of law or a court order, judgment, or decree, may, by ordinanceadopt and implement a groundwater management plan within its service area; and

WHEREAS, the Yuba County Water Agency (Agency) is an independent, government organization created in 1959 by the Yuba County Water Agency Act, hereafter referred to as the Act; and

WHEREAS, the Agency was created to develop and promote the beneficial use and regulation of the water resources of Yuba County; and

WHEREAS, the Act and Water Code section 10750 et seq. authorize the Agency to adopt and implement a Groundwater Management Plan; and

WHEREAS, the Agency is interested in the development of a Groundwater Management Plan as defined under Water Code Section 10750, *et seq.*; and

WHEREAS, the Agency began proceedings on a groundwater management plan in 1996 (See Resolution No. 1996-8) and in 1998 (See Resolution No. 1998-11) and 2002 (See Resolution No. 2002-14); however, each time the plan was not completed within the statutory two year period; and

WHEREAS, in 2003 the Agency facilitated a Water Advisory Committee (WAC) comprising of local water purveyors, reclamation districts, Yuba County agencies, Yuba County Resource Conservation District, and Beale Air Force Base, to assist in the development of the Groundwater Management Plan and this committee met on approximately a monthly basis during development of the Plan; and

WHEREAS, the purpose of the Agency Groundwater Management Plan is to build and formalize the historically successful management of Yuba County's groundwater resource and develop a framework for implementation of future activities; and

WHEREAS, prior to adopting a resolution of intention to draft a groundwater management plan, Water Code §10753.2 requires a local agency to hold a second hearing, after publication of notice pursuant to Government Code §6066, on whether or not to adopt a resolution of intention to draft a Groundwater Management Plan, and take protests, pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program; and

WHEREAS, a resolution of intent (Resolution No. 2004-14) to draft a groundwater management plan was passed on October 12, 2004, and such hearing was noticed pursuant to Government Code Section 6066; and

WHEREAS, upon adoption of the Groundwater Management Plan the Agency will discuss the continuation and composition of the WAC to guide implementation of the Plan and the Agency will ensure effective outreach to other self-supplied pumpers in the area; and

WHEREAS, the Agency prepared a draft Groundwater Management Plan that was released for public review on February 3, 2005 and made available for inspection in local libraries and at the Agency's office located in Marysville, California, and on the Agency's website; and

WHEREAS, the Agency published a Public Notice of the availability of the Public Review Draft – Yuba County Water Agency Groundwater Management Plan in the Appeal Democrat newspaper on February 7, 2005 and February 14, 2005, as required under Government Code Section 6066 pursuant to Water Code Section 10753.5; and

WHEREAS, the Board of Directors received an update on the formation of the Groundwater Management Plan at its regular workshop meeting held February 1, 2005

and recommended to schedule a public hearing to adopt the groundwater management plan pursuant to Water Code Section 10750 *et.seq*. for the purposes of hearing protests and adopting the plan and establishing a groundwater management program, at 8:30 A.M. on February 22, 2005; and

WHEREAS, the Agency has documented suggested changes to the groundwater management plan, based on comments received on the public review draft, under Water Code Section 10750 *et seq*.; and

WHEREAS, the Agency has not received a majority written protest against the plan under Water Code section 10753.6.

Section 2. The Agency hereby adopts the Yuba County Water Agency Groundwater Management Plan under Water Code Section 10750 et seq. (AB 3030, Stats 1992) in the form as presented at this Board meeting.

Section 3. This ordinance shall take effect 30 days after its final passage.

Section 4. Within 15 days from the date of passage of this ordinance, the Agency Secretary shall (a) publish it at least once in a newspaper of general circulation published and circulated in the Agency, and (b) submit a copy of the plan in electronic format to the State Department of Water Resources.

The foregoing ordinance was introduced by the Board of Directors at its meeting on February 22, 2005, and duly passed and adopted by the Board of Directors of the Agency at its meeting on March 1, 2005 by the following roll call vote:

AYES: BELZA, CARPENTER, GRIEGO, NICOLETTI, SCHRADER, STOCKER

NOES: NONE

ABSENT: LOGUE

NOT VOTING: NONE

Don Schrader, Chairman, Board of Directors

ATTEST:

JEANENE UPTON
ASSISTANT SECRETARY

Jeanene Upton/MGT

CERTIFICATION

I hereby certify that I am the duly appointed Assistant Secretary of the Yuba County Water Agency and that the foregoing is the true and correct Agency Ordinance No. 9, which was duly introduced, regularly adopted and published pursuant to law.

By: _____
Assistant Secretary

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ABBREVIATIONS AND ACRONYMS

AB	Assembly Bill
AF	Acre-feet
AF/year	Acre-feet per year
Beale AFB	Beale Air Force Base
BMO	Basin Management Objective
BVID	Browns Valley Irrigation District
BWD	Brophy Water District
Cal Water	California Water Service
CALFED	CALFED Bay-Delta Program
CAS	California Aquifer Susceptibility
CID	Cordua Irrigation District
W.S.A	Water Service Area
cfs	Cubic feet per second
COC	Contaminants of concern
RWQCB	Regional Water Quality Control Board
CWC	California Water Code
CWD	Carmichael Water District
Camp Far West I.D.	Camp Far West Irrigation District
DCA	1,2-dichloroethane
DCE	cis-1,2-dichloroethene
Delta	Sacramento/San Joaquin River Delta
DHS	California Department of Health Services
DMS	Data Management System
Dry Creek M.W.C.	Dry Creek Mutual Water Company
DWR	California Department of Water Resources
DWSAP Program	Drinking Water Source Assessment and Protection Program
EWA	Environmental Water Account
GMP	Groundwater Management Plan
gpm	Gallons per minute
Hallwood I.C.	Hallwood Irrigation Company
InSAR	Interferometric Synthetic Aperture Radar
Linda County W.D.	Linda County Water District
LUST	Leaking Underground Storage Tank
M&I	Municipal and industrial
McClellan AFB	McClellan Air Force Base
MCL	Maximum Contaminant Level

MWH	Montgomery Watson Harza
μg/L	micrograms per liter
μmhos/cm	micromhos per centimeter
mg/L	Millgrams per liter
mgd	Million gallons per day
msl	Mean sea level
NAWQA	National Water Quality Assessment
NGS	National Geodetic Survey
OPUD	Olivehurst Public Utility District
PBE	Physical Barrier Effectiveness
PCAs	Potential Contaminating Activities
PCE	Tetrachloroethene
PL	Public Law
Plumas M.W.C.	Plumas Mutual Water Company
POU	Place of Use
Rameriz W.D.	Rameriz Water District
Reclamation	U.S. Bureau of Reclamation
RD 10	Reclamation District No. 10
RD 784	Reclamation District No. 10
SMWA	Sacramento Metropolitan Water Authority
SOP	Standard Operating Procedure
South Yuba W.D.	South Yuba Water District
SWRCB	State Water Resources Control Board
TCE	Trichloroethene
TDS	Total dissolved solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WWD	Wheatland Water District
YCWA	Yuba County Water Agency

1.0 INTRODUCTION

The Yuba County Water Agency (YCWA) is an independent, stand-alone government organization created in 1959 by the Yuba County Water Agency Act, hereafter referred to as the Act (see **Appendix A** for the complete Act). The YCWA was created to develop and promote the beneficial use and regulation of the water resources of Yuba County (See **Figure 1** for the location of the Yuba County and the YCWA boundary). Two sections of the Act are of particular importance to the implementation of groundwater management in Yuba County (County). The first section relates to water supply:

§84-4. AVAILABILITY OF WATER SUPPLY; NECESSARY ACTS

> *Sec. 4. The agency shall have the power as limited in this act to do any and every lawful act necessary in order that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the agency, including, but not limited to irrigation, domestic, fire protection, municipal, commercial, industrial, recreational, and all other beneficial uses and purposes. (Stats.1959, c. 788, p. 2783, § 4.)*

The second section relates to the storage of water:

> ***§84-4.3 Storage of water; conservation and reclamation; actions involving use of waters or water rights***
>
> *Sec. 4.3. The agency shall have the power to store water in surface or underground reservoirs within or outside the agency for the common benefit of the agency; to conserve and reclaim water for present and future use within the agency; to appropriate and acquire water and water rights, and to import water into the agency and to conserve and utilize, within or outside the agency, water for any purpose useful to the agency; …(Stats.1959, c. 788, p. 2783, § 4.3)*

The YCWA has a long history of actively managing the County's water resources for beneficial use in cooperation with its member units; stakeholders; and local, state, and federal agencies[1]. An example is the YCWA's contribution to reversing a potentially serious overdraft situation that existed in the south Yuba basin (See **Figure 1** for the basin location). Between 1948 and 1981, groundwater elevations in the south Yuba basin had declined an estimated 130 feet[2]. In 1984 the YCWA began delivering surface water, from its new Bullards Bar Reservoir to this basin which offset the use of groundwater extraction, resulting in increasing groundwater elevations to near historical levels.

[1] As defined in the Act, Member Units refer to any district, which enters into a contract with the YCWA for the delivery of water or repayment of infrastructure to deliver water. Currently, there are eight districts that are Member Units. They are: Browns Valley Irrigation District, Brophy Water District, Cordua Irrigation District, Dry Creek Mutual Water Company, Hallwood Irrigation Company, Rameriz Water District, South Yuba Water District and Wheatland Water District.

[2] Based on the hydrograph for state well ID: 14N05E06B01M, located within Brophy Water District.

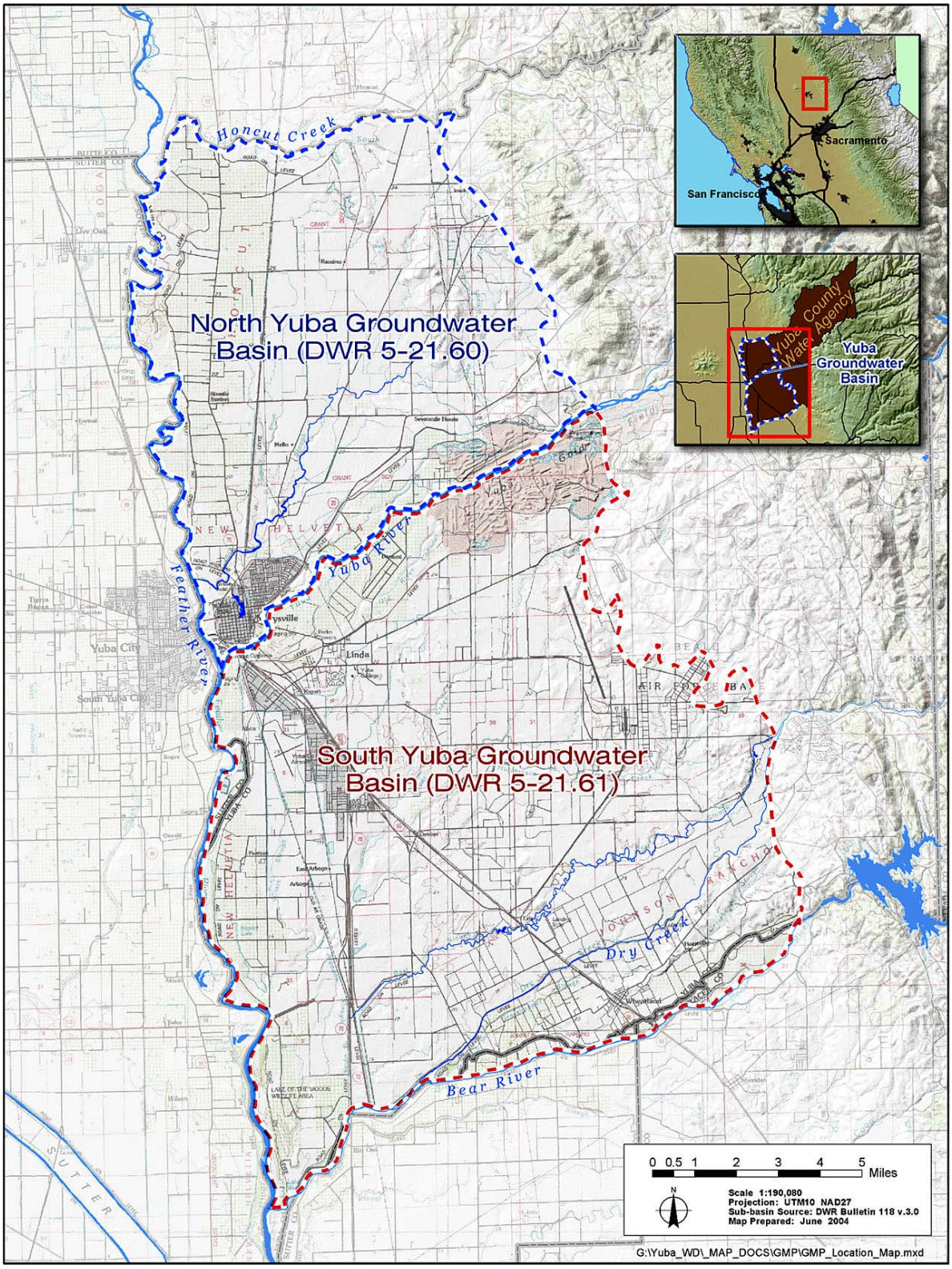

Figure 1. Location of Yuba County, Yuba County Water Agency and the Yuba Groundwater Basin

Such active surface water and groundwater conjunctive management is at the core of the YCWA's commitment to resource management. A commitment that has led to the following activities:

- Monitoring of North and South Yuba groundwater basin levels in cooperation with the Department of Water Resources (DWR).
- Measurement of water quality.
- Conducting groundwater studies.
- Exercise of this resource for the benefit of the County and State.

In recognition of the importance of groundwater management the YCWA has undertaken efforts to formalize its historical groundwater management program by developing a Groundwater Management Plan (GMP) consistent with the provisions of California Water Code (CWC) § 10750 *et seq*. The area covered by this GMP is shown in **Figure 1**.

1.1 Other Activities Affecting Resource Management

Over the past several decades, the YCWA has met water resource management challenges brought on by:

- Floods of 1955, 1986, and 1997.
- Droughts of 1976, 1977 and 1987 through 1992.
- The Bay-Delta Accord of 1994 (and State Water Resources Control Board (SWRCB) Decision 1641) and the subsequent Sacramento Valley Water Management Program Short-Term Agreement of 2001 (Phase 8).
- The 1999 listing of steelhead and spring run chinook salmon under protection of the Endangered Species Act.
- The SWRCB hearing and Decision 1644 regarding minimum in-stream flows in the Lower Yuba River.
- Yuba County's participation in meeting increasing statewide water demands through the YCWA's transfer program.

The YCWA and its member units have invested substantial time and resources in planning efforts to address many of the aforementioned items. Some of these activities, listed above, are discussed in more detail below.

1.1.1 Sacramento Valley Water Management Program Short-Term Agreement (Phase 8)

The Sacramento Valley Water Management Program (SVWMP) is an integrated effort by the Sacramento Valley water users to provide water as a mechanism to avoid a SWRCB hearing to determine which water users would be responsible to meet water quality standards set forth by the 1994 Bay-Delta Accord.[3] Rather than face a hearing, the Sacramento Valley Water Management Agreement (Agreement) establishes a framework to meet supply, water quality, and environmental needs in the Sacramento Valley. The YCWA is a signatory to the Agreement and is thereby committed to providing water for Bay-Delta quality needs while it continues to manage the resource for local supply reliability and beneficial use within the County.

[3] For a list of the signatories of the SVWMA see *The Sacramento Valley Water Management Agreement*, September 2001.

1.1.2 State Water Resources Control Board RD1644

In 1988, a complaint was filed with the SWRCB against the YCWA by a coalition of fisheries groups. The coalition's main contention was that the instream flow requirements did not provide an adequate level of protection for fishery resource in the lower Yuba River. On March 1, 2001 the SWRCB issued Decision 1644 and on July 16, 2003 the SWRCB issued Revised Decision 1644 (RD 1644)[4]. RD 1644 curtails the ability of the YCWA to provide a reliable surface water supply for local needs and eliminates the YCWA's ability to transfer water to fund County flood protection, water supply efforts and fund other YCWA needs. Since the original complaint was filed, several hearings and lawsuits have ensued. Currently, the YCWA is pursuing litigation as well as participating with the DFG and other parties in an ongoing settlement process.

1.1.3 Yuba County Water Agency Transfer Program

In addition to supplying water to its local member units, the YCWA has transferred water to other parts of the State when there was both a need for additional supply in other areas and when available water from the Yuba River was greater than the local need. As detailed in **Table 1**, the YCWA has significant experience in water transfers, both surface water and groundwater substitution transfers.

These transfers were often developed through cooperation between the YCWA's and its member units in the form of groundwater substitution transfers. In the case of a groundwater substitution transfer the YCWA participates in close monitoring of the groundwater basin.

The historical success of the YCWA's transfer program; the requisite monitoring program; and the cooperation with member units, local stakeholders and local, state and federal agencies exemplify the YCWA's commitment to resource management and form the foundation for the GMP.

1.2 Purpose of the Yuba County Groundwater Management Plan

The purpose of the YCWA's GMP is to build on and formalize the historically successful management of the County's groundwater resource and develop a framework for implementation of future activities.

1.3 Authority to Prepare and Implement a Groundwater Management Plan

The authority to manage the County's groundwater resource is provided through the Act and Water Code Division 6, part 2.75 (§ 10750 et seq.). The YCWA prepared this GMP consistent with the provisions of CWC § 10750 *et seq.* as amended January 1, 2003.

The state groundwater management law (Water Code Division 6, part 2.75, commencing with section 10750) prohibits the Agency from managing groundwater within the service area of another local water district, public utility or mutual water company, without the agreement of that other entity. (Section 10750.9(b).) This plan and the Agency's implementation of the plan shall comply with these and other applicable limitations of state law.

[4] A copy of RD 1644 is available from the State Water Resources Control board web site; http://www.waterrights.ca.gov/hearings/decisions/RevisedWRD1644.pdf

State law encourages local water agencies to coordinate on groundwater management plans. (See Water Code §§ 10755.2-10755.4.) The draft plan should indicate whether or not any of the local districts has adopted its own groundwater management plan. If one or more local districts have adopted a plan, then the Agency plan should address coordination among the plans and involved districts. Both South Yuba Water District and Cordua Irrigation District have adopted GMPs.

TABLE 1.
Recent YCWA Water Transfers

Year	Transferred to	Amount (acre-feet)		
		Surface Water	Groundwater Substitution	Total
1987	Department of Water Resources	83,100	0	83,100
1988	Department of Water Resources	135,000	0	135,000
1989	Department of Water Resources for DFG	200,000	0	200,000
1989	East Bay Municipal Utility District*	60,000	0	60,000
1989	City of Napa	7,000	0	7,000
1990	Department of Water Resources	109,000	0	109,000
1990	City of Napa	6,700	0	6,700
1990	Tudor/Feather	2,951	0	2,951
1991	State Water Bank	99,200	84,840	184,040
1991	State water Bank for DFG	28,000	0	28,000
1991	City of Napa	7,500	0	7,500
1992	State Water Bank	30,000	0	30,000
1994	Department of Water Resources	0	26,033	26,033
1997	Bureau of Reclamation (refuge water)	20,000	0	20,000
1997	Sacramento Area Flood Control Agency	48,857	0	48,857
2001	Environmental Water Account/ Department of Water Resources	102,119	61,140	163,259
2002	Environmental Water Account/ Department of Water Resources	101,792	55,258	157,050
2002	Contra Costa Water District	5,000	0	5,000
2003	Environmental Water Account/ Department of Water Resources	65,000	0	65,000
2003	Contra Costa Water District	5,000	0	5,000

Source: Yuba County Water Agency

*East Bay Municipal Utility District did not take delivery of the water.

1.4 Groundwater Management Plan Components

The YCWA's GMP includes the following required and recommended components:

CWC § 10750 *et seq.* (seven mandatory components). Recent amendments to the CWC § 10750 *et seq.* require GMPs to include several components to be eligible for the award of funds administered by DWR for the construction of groundwater projects or groundwater quality projects[5].

DWR Bulletin 118 (2003) components (seven recommended components).

CWC § 10750 *et seq.* (12 voluntary components). CWC § 10750 *et seq.* includes 12 specific technical issues that could be addressed in GMPs to manage the basin optimally and protect against adverse conditions.

Table 2 lists the section(s) in which each component is addressed.

[5] These amendments to the CWC were included in Senate Bill 1938, effective January 1, 2003.

TABLE 2.
Location of Yuba County Water Agency's GMP Components

Description	Section(s)
A. CWC § 10750 *et seq.*, Mandatory Components	
1. Documentation of public involvement statement.	3.4.1, 3.4.2
2. Basin Management Objectives (BMOs).	3.2
3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land surface subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality or are caused by pumping.	3.5
4. Plan to involve other agencies located within groundwater basin.	3.4.2
5. Adoption of monitoring protocols by basin stakeholders.	3.5
6. Map of groundwater basin showing area of agency subject to GMP, other local agency boundaries, and groundwater basin boundary as defined in DWR Bulletin 118.	Figure 2
7. For agencies not overlying groundwater basins, prepare GMP using appropriate geologic and hydrogeologic principles.	N/A
B. DWR's Suggested Components	
1. Manage with guidance of advisory committee.	3.4.2
2. Describe area to be managed under GMP.	2.1 – 2.3
3. Create link between BMOs and goals and actions of GMP.	3.5
4. Describe GMP monitoring program.	3.5
5. Describe integrated water management planning efforts.	3.7
6. Report on implementation of GMP.	4.1
7. Evaluate GMP periodically.	4.2
C. CWC § 10750 *et seq.*, Voluntary Components	
1. Control of saline water intrusion.	3.6.7
2. Identification and management of wellhead protection areas and recharge areas.	3.6.4
3. Regulation of the migration of contaminated groundwater.	3.6.5
4. Administration of well abandonment and well destruction program.	3.6.2
5. Mitigation of conditions of overdraft.	3.5.1
6. Replenishment of groundwater extracted by water producers.	3.7
7. Monitoring of groundwater levels and storage.	3.5.1
8. Facilitating conjunctive use operations.	3.7
9. Identification of well construction policies.	3.6.3
10. Construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.	NA
11. Development of relationships with state and federal regulatory agencies.	3.4.3
12. Review of land use plans and coordination with land use planning agencies to assess activities that create reasonable risk of groundwater contamination.	3.6.4

2.0 YUBA COUNTY WATER RESOURCES

Within the County boundary water purveyors currently utilize both surface water and groundwater to meet demand. The YCWA, by its Act, wholesales water to entities authorized to purvey water. The YCWA has water service agreements to deliver surface water to its member units and several former river diverters. The member units are: Browns Valley Irrigation District, Brophy Water District, Cordua Water District, Dry Creek Mutual Water Company, Hallwood Irrigation District, Rameriz Water District, South Yuba Water District and Wheatland Water District. In addition to the surface water delivered by the YCWA the member units have existing capacity to pump groundwater to meet part of their demand.

The five municipal purveyors located in the County groundwater basin rely exclusively on groundwater to meet their needs. The municipal purveyors are California Water Service, Linda County Water District, the City of Wheatland, Olivehurst Public Utility District (OPUD)[6], and Beale Air Force Base (Beale AFB). Other water purveyors in the County use a combination of groundwater and surface water supplies to meet demand. Locations of all water purveyors within the County boundaries are shown in **Figure 2**. The groundwater and surface water supplies available to the County are summarized below.

2.1 Groundwater Supplies

This section provides a regional description of the geologic and hydrogeologic conditions of the underlying groundwater basin. The area of the groundwater aquifer, as defined by DWR Bulletin 118 (2003), is shown on **Figure 1**.

The groundwater aquifer underlying Yuba County is divided by the Yuba River creating the two subbasins -- Yuba North and Yuba South. DWR defines the subbasins as follows:

- *North Yuba subbasin* (groundwater basin number 5-21.60) is bounded on the north by Honcut Creek, the Feather River on the west, on the south by the Yuba River and on the east by the Sierra Nevada.
- *South Yuba subbasin* (groundwater basin number 5-21.61) is bounded on the north by the Yuba River, the Feather River on the west, on the south by the Bear River and on the east by the Sierra Nevada.

These two subbasins are considered subbasins to the larger Sacramento Valley groundwater basin, and are hydraulically isolated from the rest of the Sacramento basin by the surface streams that surround it. The Yuba County groundwater subbasins encompass an area of approximately 270 square miles.

The combined volume of water stored in the North and South Yuba subbasins is estimated at 1.7 million acre-feet. The potential usable portion of this volume has been estimated at more than 340,000 acre-feet (Bookman-Edmonston Engineering, Inc.). The estimated usable portion of the groundwater basin is not a definitive amount as this quantity is restricted by extraction capacity,

[6] The OPUD is currently scheduled to provide water to the Plumas Lake Specific Plan Area. At which time the area will be annexed into OPUD's Service Area. The Specific Plan Area is shown on **Figure 2** as the cross-hatched area just south of the current OPUD boundary.

the potential for impacts, both to the environment and to other basin groundwater users and the need to maintain groundwater quality.

Information provided herein has been excerpted from the extensive investigation and report titled *Groundwater Resources and Management in Yuba County* (Bookman-Edmonston 1992) and other studies conducted over the past decade. Although the North Yuba subbasin and the South Yuba subbasin are hydraulically isolated from each other the underlying geology of the two subbasins is similar. Therefore, the following description of the geologic setting discusses the two subbasins as if they are one.

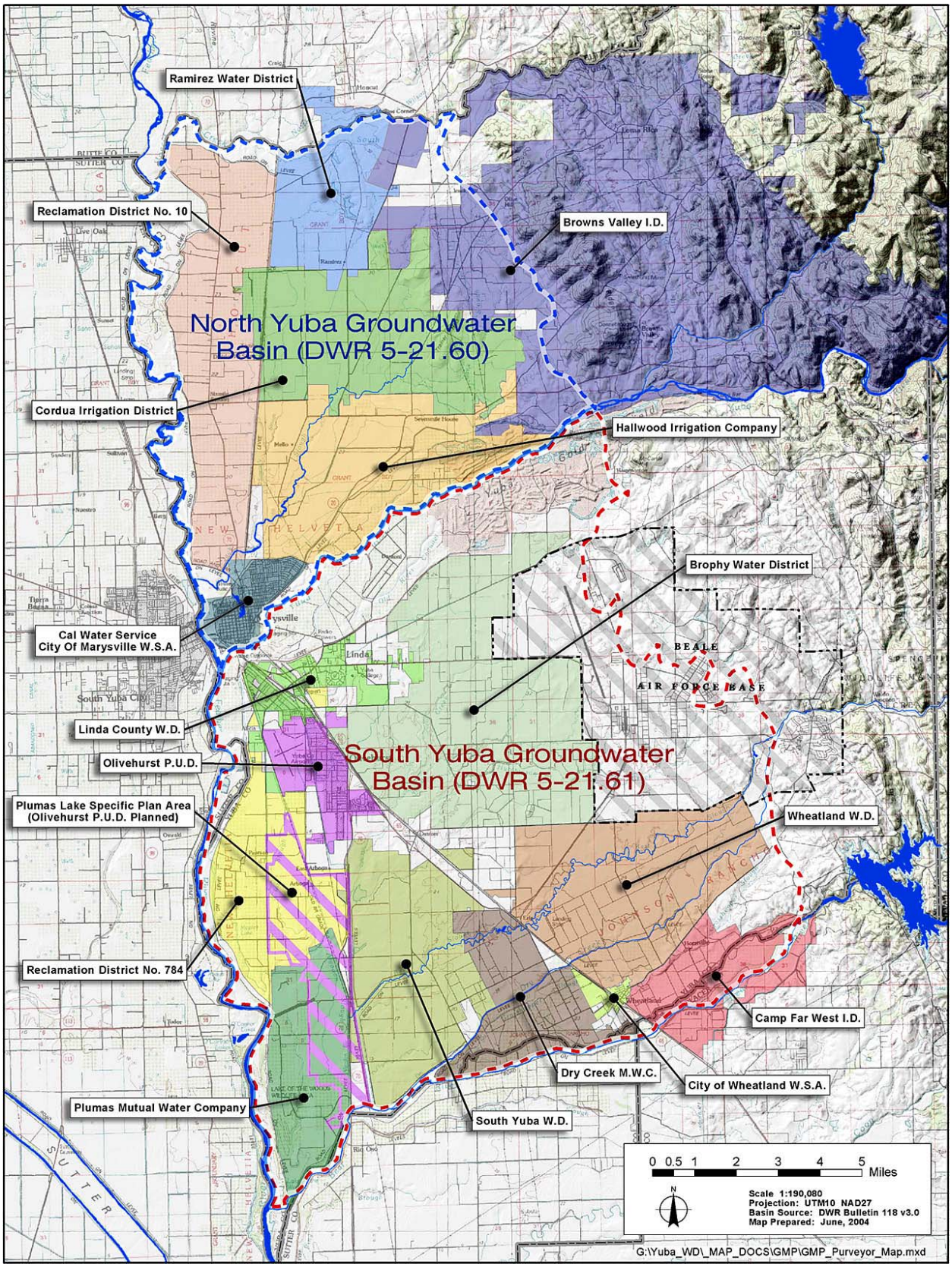

Figure 2. Location of Water Purveyors within Yuba County

2.1.1 Overview of the Hydrogeologic Setting

2.1.1.1 Geologic Setting

The subbasin area is bounded on the east by the impermeable rocks of the Sierra Nevada. These same rocks and younger consolidated rocks extend beneath the subbasin at a gradually increasing depth toward the Feather River and beyond to the trough of the Sacramento Valley. Fresh groundwater is stored in this wedge-shaped body of alluvial material to depths of 1,000 feet. Beneath these alluvial deposits are consolidated rocks, which may contain saline water and are effectively, non-water-bearing.

2.1.1.2 Physical Structure of Freshwater-Bearing Formation

The freshwater-bearing formation structure is thickest along the Feather River and thinnest along the Sierra Nevada boundary. The thickness varies from 1,000 feet in the southwest corner near the Bear River to less than 300 feet at the base of the Sierra foothills. All of the stratified alluvial deposits slope gently to the west. No faults or folding of strata are known to occur within the freshwater-bearing area.

2.1.1.3 Description of Geologic Formations

All alluvial deposits and adjacent nonwater-bearing rocks are subdivided into geologic units called formations, which are described below in sequence of age from oldest to youngest. They range in age from the very old Paleozoic Sierran bedrock to the overlying alluvial materials that are still being deposited. Between these are the nonwater-bearing Eocene and Cretaceous Age rocks and the two principal water-bearing formations, the Laguna Formation and the Older Alluvium Formation, that together comprise over 95 percent of the subbasin water storage volume. The remaining volume includes the superficial stream channel and floodplain deposits. The geologic formations described below are summarized and shown in **Figure 3**.

2.1.1.3.1 Sierra Nevada Bedrock Formation

The Sierra Nevada Bedrock Formation does not store or yield significant amounts of groundwater. Shallow domestic wells can obtain small quantities of water from the weathered zone in these rocks, but the supply is not usually dependable. These rocks form the eastern boundary of the Yuba County groundwater subbasin and extend beneath the subbasin and Sacramento Valley to a considerable depth. At the west end of the dredger tailings, these rocks were found at a depth of 1,222 feet. Along the eastern boundary, north of the Yuba River, they occur within the subbasin as “islands” of bedrock surrounded by alluvial materials. These rocks are found beneath dredger tailings at a shallow depth upstream from Daguerre Point Dam.

Volcanic rocks are included with the Sierran bedrock formations within the property of Beale AFB. They may be an important source of groundwater, but very little is known about their occurrence.

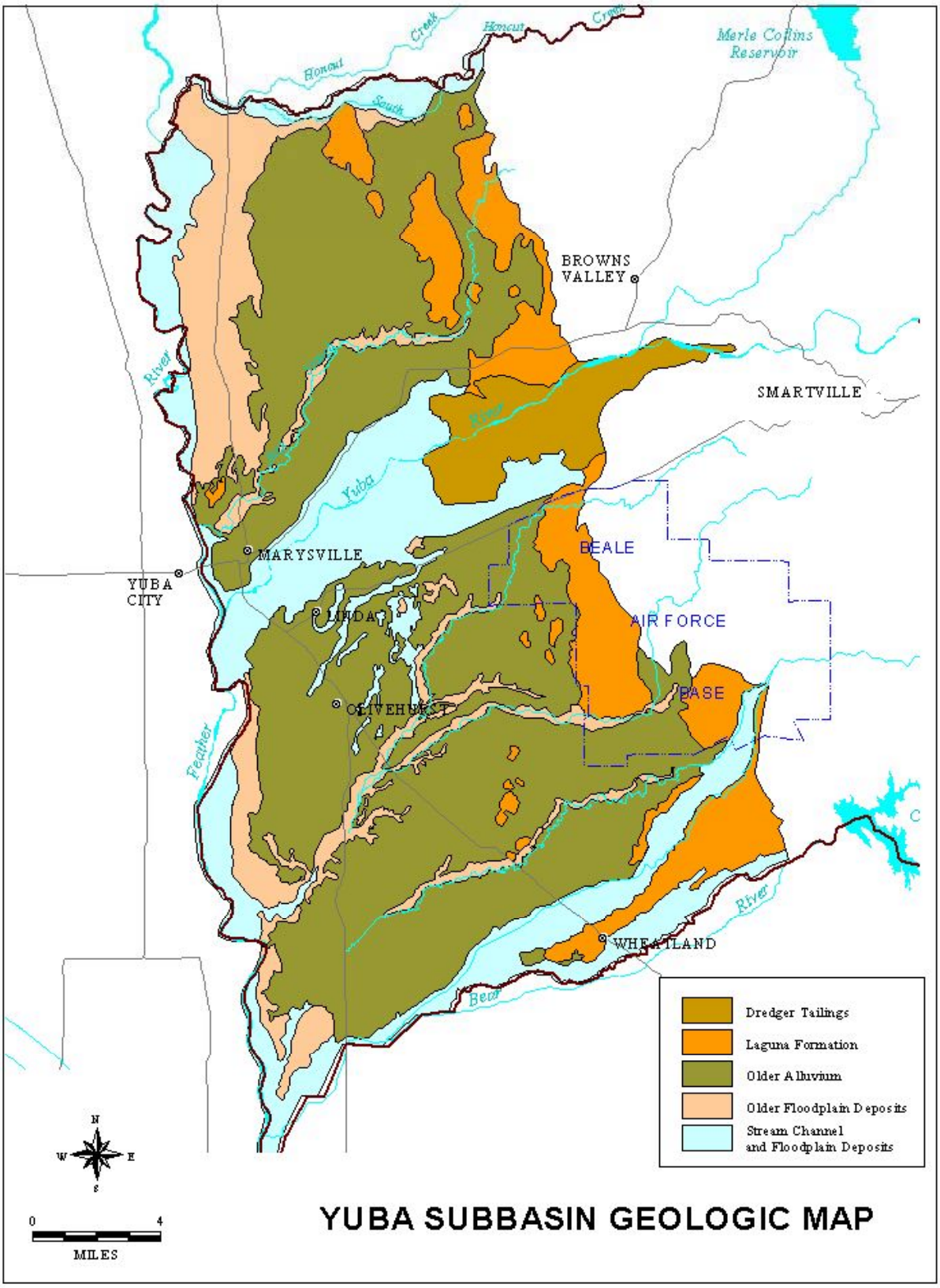

Figure 3. Geologic Map

2.1.1.3.2 Cretaceous Age Formations

Rocks from Cretaceous Age formations are common to the entire Sacramento Valley and occur at a depth of about 600 feet in the Goldfields area, although they are typically found at much greater depth. Marine in origin, they originally contained saline water; however, it is believed that through most of the subbasin, the salt water in these formations has been mostly flushed out toward the valley trough.

2.1.1.3.3 Eocene Age Formations

Underlying nearly all the Yuba County groundwater basin and overlying Cretaceous Age formations are rocks of Eocene Age. These rocks are probably nonmarine in origin. Although well drillers have given the Eocene rock various names depending upon their location in the valley, the Ione Formation is considered the most commonly occurring formation name. Typically clay, samples of this formation have been found at depths of 255 to 483 feet in the easterly thinner area of the groundwater subbasin.

2.1.1.3.4 Laguna Formation

The Laguna Formation is the thickest and most extensive water-bearing unit in the Sacramento Valley groundwater basin. The formation is exposed intermittently along the east side of the valley from Oroville south to Stockton. In Yuba County, the Laguna Formation is well exposed all along the foothills adjacent to the eastern boundary of the groundwater basin. It is also exposed in isolated hills between Beale Air Force Base and Wheatland, where the thin surrounding younger sediments allow the Laguna Formation to be exposed in “windows.” Farther west, the formation is only found in deep wells.

The overall composition of the formation is silts to sandy silts with abundant clay. Gravel or sand deposits are uncommon in surface exposures. In the subsurface, well logs indicate that the formation is predominantly blue clay. Sand and gravel layers are thin and discontinuous and are commonly cemented. Although the amount of coarse-grained material appears to decrease toward the north and south away from the Yuba River vicinity, considerable coarse materials occur in the Yuba River vicinity between depths of 150 to 600 feet.

The overall low permeability of the Laguna Formation provides low well yields in comparison to the overlying younger deposits. In addition to the formation’s fine-grained character, permeability is also reduced because much of the thin sand and gravelly zones are cemented.

The Laguna Formation varies in thickness from 400 feet toward the center of the Yuba County groundwater subbasin to 1,000 feet in the southwestern portion of the basin.

2.1.1.3.5 Older Alluvium Formation

The Older Alluvium is the predominant surficial geologic formation. It extends from Dry Creek north to Honcut Creek, interrupted only by the wide floodplain of the Yuba River. On the west, it is bounded by the Older Floodplain Deposit Formation and on the east by the Laguna Formation.

This formation was created by alluvial materials laid down into alluvial fans by streams flowing from the Sierra Nevada. The alluvial materials were created through erosion of the Sierra

Mountains by streams. When compared to the Laguna Formation, this formation has a greater proportion of sands and gravels.

The Older Alluvium Formation is comprised of loosely compacted silt, sand, and gravel with some clay. The deposits occur in lenticular beds and are more stratified than the Laguna Formation. Gravel deposits are more concentrated in the upper 150 feet of the formation. The amount of gravel and the thickness of the layer decrease in a westward downstream direction as the distance from the Yuba River increases.

The thickness of the formation varies widely. It is difficult to distinguish the contact of this formation with the Laguna Formation. Based on the concentration of gravel and sand deposits, it appears that the formation is about 150 feet thick in the Yuba River vicinity and thins to less than 100 feet to the south.

Wells drilled into this formation may yield up to 2,000 gpm. In water-bearing character, the Older Alluvium Formation is moderately permeable throughout, except at its surface, where hardpan and claypan soils have developed. Hardpan soils, a characteristic of the formation, provide an impediment to the infiltration of precipitation and unconsumed applied water. Nearly all domestic wells and shallow irrigation wells in the Yuba County groundwater subbasin have been drilled and completed in this formation because the gravels found in this formation usually provide adequate yields. Several wells with depths of less than 150 feet are known to yield 1,000 to 1,200 gpm. Higher-yielding wells in these areas are usually much deeper and obtain their additional yield from the underlying Laguna Formation.

2.1.1.3.6 Older Floodplain Deposit Formation

Bordering the Feather River adjacent to more recent alluvium is a 1- to 2-mile-wide bank of gravelly sand, silt, and clay deposited during flooding events. These deposits predate the younger stream and overbank deposits of the Feather River and overlie the Older Alluvium Formation on the east. Well logs show 5 to 15 feet of “topsoil” often overlying hardpan that is probably the buried surface of the Older Alluvium Formation. The formation is too thin to store appreciable amounts of groundwater and has no value as a source of extractions. Its moderate permeability, however, provides for the infiltration of precipitation and return of unconsumed irrigation water to the water table unless they are prevented by buried hardpan soils.

2.1.1.3.7 Stream Channel and Floodplain Deposit Formation

The alluvial materials in the Stream Channel and Floodplain Deposit Formation are of recent age and are made up of coarse sand and gravels along the present stream channels of Honcut Creek and the Yuba, Bear, and Feather Rivers. They also occur as abandoned overflow channels two to five miles south of the Yuba River. The greatest volume of coarse gravel occurs along the Yuba River in a band up to three and one-half miles in width. Huge quantities of rounded, very coarse, boulder- and cobble-sized gravel were laid down in the upper reach of the Yuba River after it flowed out of its canyon in the Sierras. Farther downstream in the agricultural areas, thick deposits of highly permeable sands and gravels provide large quantities of water to wells. These deposits are up to 110 feet thick. All of the stream channels and floodplain deposits along the Yuba River act as a large water intake area for recharge of the subbasin.

2.1.1.3.8 Dredger Tailings

In the upper reach of the Yuba River, extending from the Sierras for 15 miles downstream, are large piles of very coarse gravels and cobbles that have been extensively dredged for gold. The thickness of the dredged gravels in the eastern area above Daguerre Point Dam is 60 to 80 feet. West and southwest of Hammonton, for a distance of one or two miles, the dredger tailings are 100 to 125 feet thick. In this central area of tailings, the gravels are underlain by white sands and clays, as revealed by mineral exploration bore holes. Here the underlying fine-grained sedimentary materials are probably part of the Laguna Formation.

2.1.2 Groundwater Occurrence and Development

Groundwater occurs generally under water table or unconfined conditions throughout most of the groundwater subbasin. Well drillers generally report no changes in water levels during the drilling in many wells, both moderately deep and shallow, indicating a lack of confinement. In some areas, the water levels in cable-tool-drilled holes are reported to rise after water was first encountered. This condition is more common in the deeper wells, particularly in the Laguna Formation, where groundwater is considered to be confined by overlying clay layers. Confinement probably occurs mostly at depths in excess of 300 to 400 feet.

2.1.3 Well Yields

Well yields and water level drawdowns are known through the testing of industrial, irrigation, and community supply wells soon after they were drilled by either well drillers or pump installers. These yields may be recorded along with the well logs on the “Well Drillers Report” filed with the DWR. Ninety-two driller reports filed with the DWR and reviewed for the report Groundwater Resources and Management in Yuba County (Bookman-Edmonston 1992) have production data. The average well yield per township area (36 square miles) range from 1,000 to 2,300 gpm and the average specific capacity can range from 16 to 74 gallons per minute per foot. The specific capacity of a well is the well yield (the flow from the well in gpm that the well produces) divided by the drawdown in feet, measured as the distance from the water surface in the well from static to the pumping condition. The specific capacity is a relative measure of the rate at which a well produces water for each foot of drawdown.

The area of highest well yields is in the Stream Channel and Floodplain Deposit Formation of the Yuba River. Wells with depths of 200 to 400 feet can yield 2,000 to 4,000 gpm, with most of the yield derived from the upper 100 feet or more of sand and gravel. The area with the lowest yield can found on the Beale Air Force Base property. Wells near the property range in depth from 264 to 354 feet and supply an average of 1,000 gpm per well.

Irrigation wells commonly produce between 1,000 to 2,000 gpm and range in depth from a few hundred feet to 700 feet. Typically, the well yield is primarily derived from the Older Alluvium Formation because the underlying Laguna Formation is much less permeable.

2.1.4 Groundwater Storage

Specific yield[7] can be used to estimate the amount of groundwater storage. Average specific yield amounts by depth zone were taken from the studies by the U.S. Geological Survey that were presented in Bulletin No. 6 of the SWRCB. Estimates of storage capacity for equivalent depth zones are presented separately in **Table 3** for the North Yuba and South Yuba subbasins. These storage capacity estimates were computed directly from the area of each subarea, average specific yield in each depth zone, and the thickness of each depth zone.

TABLE 3.
Estimated Storage Capacities and Specific Yields

	Depth Zones (feet)			
	20 to 50	**50 to 100**	**100 to 200**	**20 to 200**
North Yuba subbasin				
Specific Yield (percent)	8.9	8.3	5.5	6.9
Storage Capacity (acre-feet)	130,000	210,000	280,000	620,000
South Yuba subbasin				
Specific Yield (percent)	8.0	7.4	6.2	6.8
Storage Capacity (acre-feet)	210,000	330,000	550,000	1,090,000
Total Storage by Depth Zone (acre-feet)	340,000	540,000	830,000	1,710,000

For the North Yuba the groundwater storage capacity estimated to a depth of 200 feet is 620,000 acre-feet. Storage capacity in the South Yuba subbasin is estimated to be 1,090,000 acre-feet. The total storage capacity in the study area was estimated as 1,710,000 acre-feet. This amount represents the entire quantity of ground water contained to a depth of 200 feet. As can be seen from **Table 3**, the portion of the subbasin between 20 and 50 feet in depth provides storage of about 340,000 acre-feet. For the range between 50 and 100 foot, the storage amount is about 540,000 acre-feet. A portion of this storage is currently exercised for local groundwater use and some portion is vacant. Caution should be taken when using these numbers because they do not represent the operational characteristics such as recharge rate, recharge origin, and pumping issues that significantly reduce the usable amount of groundwater. However, they do indicate that a significant body of water is available from which to draw under various management scenarios.

2.1.5 Groundwater Storage Conditions

The North Yuba subbasin and the South Yuba subbasin, provide 40 percent and 60 percent, respectively, of the total groundwater storage capacity of the Yuba groundwater aquifer. Historically, irrigation demands in the North Yuba subbasin area have been sufficiently supplied

[7] Specific yield is the amount of water available for extraction from water storage in the ground. This available amount of water is the total amount of water in storage that will drain under the influence of gravity.
source: Heath, Ralph C., 1993. "Basic Ground-Water Hydrology," USGS Water-Supply Paper 2220. p.8.

with diversions from the Yuba River. Conversely, in the South Yuba subbasin, surface water supplies were limited until the Yuba South Canal was developed in 1983.

Figure 4 shows the historical groundwater surface elevations in both Subbasins. Historically, agricultural and urban water uses in the South Yuba subbasin area relied heavily on groundwater supplies, resulting in a large pumping depression across the entire subbasin and especially near the Wheatland area. Since the construction of the Yuba South Canal, and delivery of surface water by the YCWA to the member districts of Brophy Water District, South Yuba Water District, and, more recently, Dry Creek Mutual Water Company, groundwater storage has recovered to the extent that current groundwater storage in the South Yuba subbasin area probably exceeds that of 1960 and is near the levels of the pre-development era. The exception to this is in the area of Wheatland Water District, which is currently still utilizing groundwater for irrigation. In Wheatland, a depression still exists.

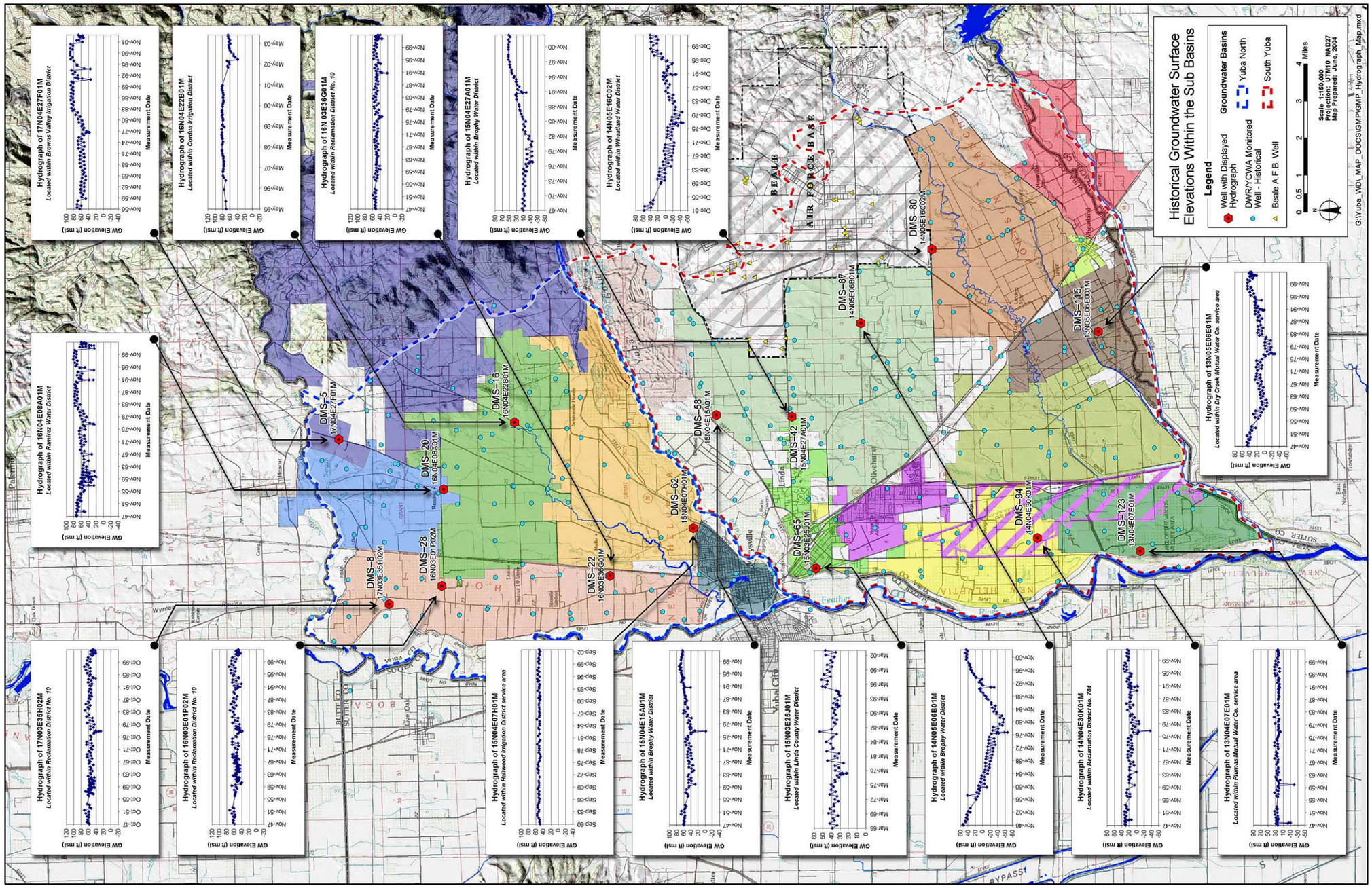

Figure 4. Historical Groundwater Surface Elevations within Subbasins

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The recovery of the South Yuba subbasin is clear to see by examining the hydrographs in **Figure 4**. The replenishment of the groundwater basin is a direct result of the Yuba River Development Project, water supply operations of the YCWA, and the facilities installed by the member units and the YCWA.

Figure 5 shows that the estimated increases in the annual groundwater storage rate for the South Yuba subbasin area range from 15,100 acre-feet to 21,200 acre-feet, depending on year type, since the construction of the South Yuba Canal. Based on the estimated average specific yield of the South Yuba subbasin of 6.8 percent, the importation of surface water through operation of the Yuba River Development Project has resulted in an increase in storage of about 250,000 acre-feet from 1983 to 1998.

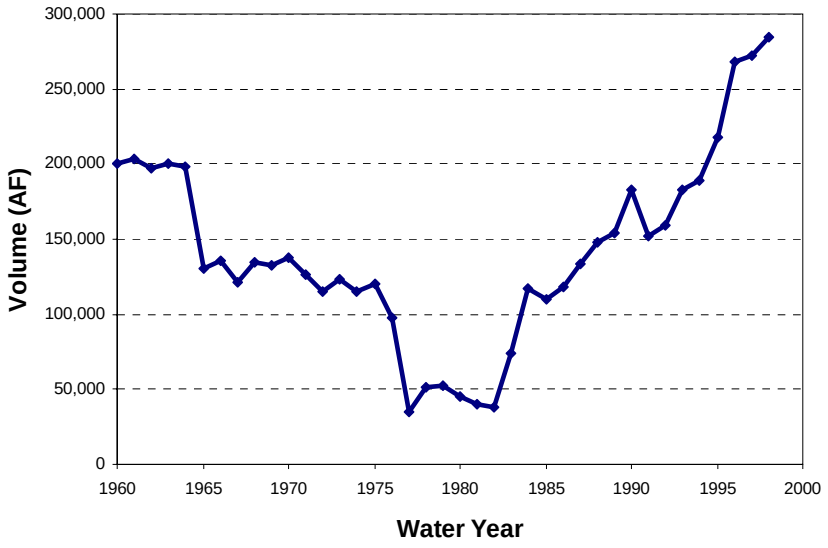

Figure 5. Estimated Groundwater Storage in the South Yuba Subbasin Area from 1960 to 1998 (based on 200,000 acre-feet of storage in 1960)

2.1.6 Water Quality

Groundwater in the subbasins has similar water quality characteristics and for the most part is of good quality for both domestic and agricultural uses. Groundwater quality is generally characterized by major cations (calcium, magnesium, sodium, and potassium) and anions (carbonate, bicarbonate, sulfate, and chloride). Groundwater is generally characterized and given a name, based on the percentage of each of these major cations and anions (Piper 1953). The nomenclature methods are:

Calcium bicarbonate designates water in which calcium amounts to 50 percent or more of the cations and bicarbonate amounts to 50 percent or more of the anions (in milliequivalents per liter).

Sodium-calcium bicarbonate designates water in which sodium and calcium are first and second in order of abundance of the cations, respectively, but neither one amounts to 50 percent or more of the total cations.

Sodium sulfate-bicarbonate designates water in which sulfate and bicarbonate are first and second in order of abundance of the anions, respectively, but neither one amounts to 50 percent or more of the total anions.

Sodium-calcium sulfate-bicarbonate designates water where neither a single cation or anion amounts to 50 percent. The water is typically designated as a "transitional" water type.

2.1.6.1 Baseline Water Quality Conditions

The groundwater in the Yuba subbasins is mostly calcium-magnesium or magnesium-calcium bicarbonate water (USGS 1979). Exceptions to this consistent water quality type occur near the town of Wheatland, where sodium-calcium chloride water has been encountered. Scattered occurrences of calcium-sodium bicarbonate water have been reported in various wells.

Sodium is of particular concern for irrigation of salt-sensitive crops. Based on methods developed by the U.S. Salinity Laboratory, water in the subbasins was classified by its suitability for irrigation water. Most of the Yuba subbasins contain water that has low TDS and low sodium concentrations (irrigation water classification code C1-S1), making the water ideal for irrigation.

2.1.6.2 Current Conditions

In the Wheatland area poorer water quality is forcing farmers to abandon some wells and pump longer on wells that still provide good quality water. Within the WWD, at least two wells have been capped because of poor water quality and more are being considered (Winchester 2001). For at least one ranch, crop damage has occurred.

2.2 Surface Water Supplies

The Yuba River basin drains approximately 1,339 square miles of the western Sierra Nevada slope, including portions of Sierra, Placer, Yuba, and Nevada Counties. The Yuba River is a tributary of the Feather River, which, in turn, is a tributary of the Sacramento River (**Figure 1**). The average annual unimpaired flow of the Yuba River at Smartville is 2.45 million acre-feet; however, a significant portion of this water is diverted out of the watershed and is not available to the lower Yuba River. The annual unimpaired flow has ranged from a high of 4,925,000 acre-feet in 1986 to a low of 370,000 acre-feet in 1977.

2.3 Surface Water Facilities

Since the mid 1800's, the Yuba River basin has been significantly developed for gold mining, debris control, water supply, power generation, flood control, fish enhancement and recreation. This development includes the upstream hydroelectric diversions by Pacific Gas and Electric Company (PG&E); hydroelectric and water supply diversions by Nevada Irrigation District and South Feather Water and Power Agency; the construction of Daguerre Point Dam and Englebright Dam by the California Debris Commission, now operated and maintained by the

U.S. Army Corps of Engineers (Corps) for debris control; and the construction of New Bullards Bar Dam by the YCWA for water supply, flood control, hydroelectric generation, recreation, and fish and wildlife enhancement (see **Figure 6**).

Daguerre Point Dam, the first dam constructed on the lower Yuba River that still exists, is located about 12.5 miles downstream of the current Englebright Dam. Construction was completed in 1906, with diversion of the river over the dam being completed in 1910.

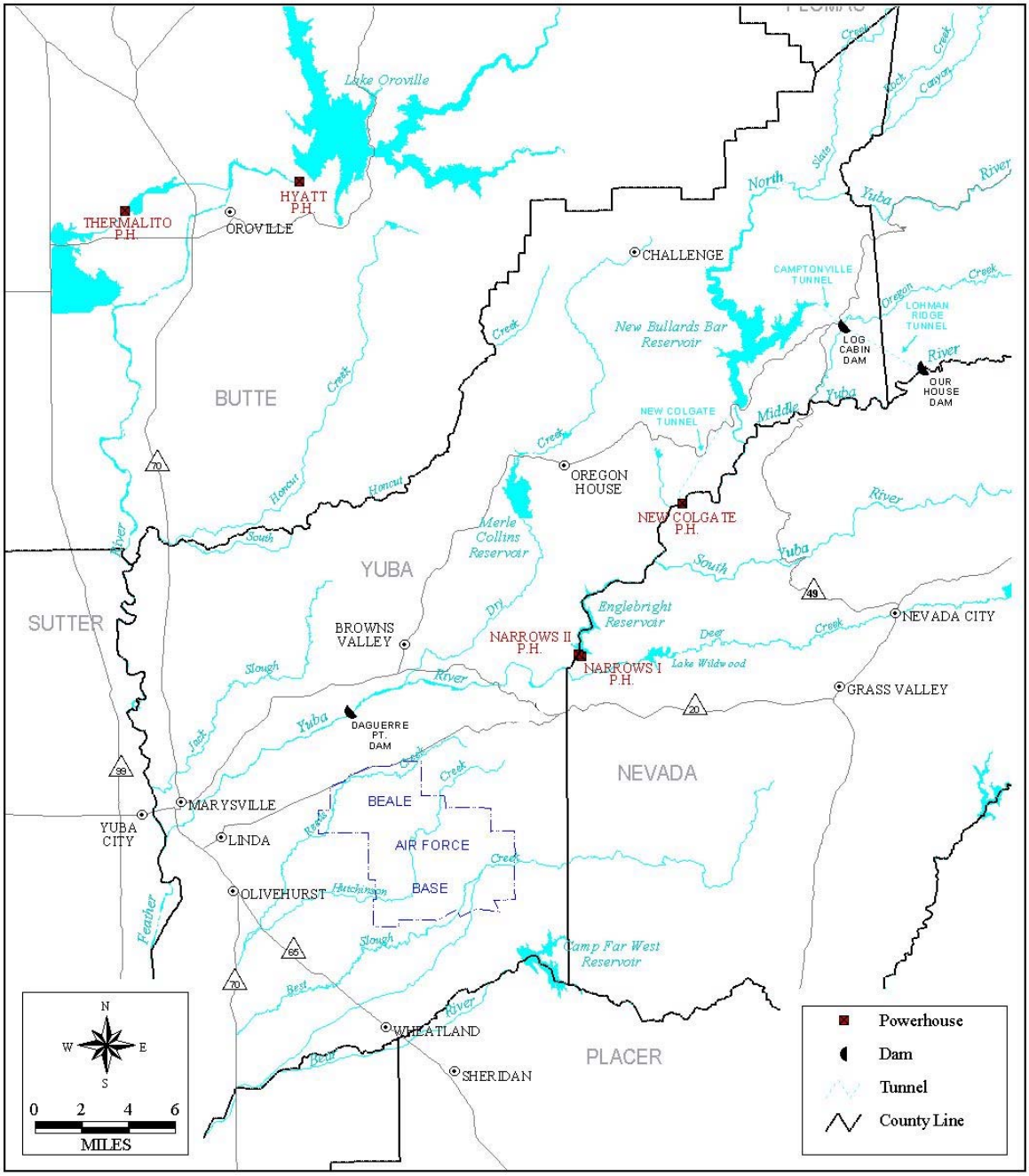

Figure 6. Major Water Development Facilities in the Yuba River Basin

Today, Daguerre Point Dam is the location of the majority of water diversions from the lower Yuba River. Daguerre Point Dam, due to its impoundment of water, provides enhanced recharge from the Yuba River to both the North and South Yuba groundwater subbasins.

Englebright Dam, the second dam constructed on the lower river, was built in 1941 by the California Debris Commission, now operated and maintained by the Corps, to collect placer-mining debris that was moving down the Yuba River into the Sacramento Valley, provide for beneficial use of water, recreation, flood control and downstream navigation. The North, Middle and South branches of the Yuba River flow into Englebright Reservoir. Consequently, construction of Englebright Dam completely blocked anadromous fish migration into the North, Middle, and South branches of the Yuba River. The dam constitutes the upstream extent of anadromous fish migration today. The approximately 24-mile-long reach of the Yuba River between Englebright Dam and its confluence with the Feather River has been defined as the lower Yuba River (**Figure 6**).

The YCWA began operation of its Yuba River Development Project (YRDP) in 1970. As part of the YRDP, New Bullards Bar Dam was built on the North Yuba River. The YCWA owns and operates the Colgate and Narrows II Powerhouses below New Bullards Bar and Englebright Dams, respectively. The release capacity of the Narrows II Powerhouse is approximately 3,400 cubic feet per second (cfs), which defines the YCWA's greatest controlled release capability from Englebright Reservoir into the lower Yuba River.

New Bullards Bar Reservoir, located upstream of Englebright Dam, is the primary storage reservoir within the Yuba River basin, with a storage capacity of about 966,000 acre-feet. Fifteen other reservoirs have been constructed in the upper portion of the basin on the Middle and South Yuba Rivers, with a combined storage capacity of approximately 400,000 acre-feet. Except for New Bullards Bar Reservoir, there is only minimal storage for regulation of snowmelt within the basin. The smaller storage facilities on the headwaters of the South Yuba and Middle Yuba River usually fill with early runoff. Hence, in wetter years much of the spring and early summer flow to the lower Yuba River is a result of uncontrolled snowmelt within the basin. In the summer and early fall, prior to the precipitation season, most of the flow in the lower Yuba River is provided by releases from New Bullards Bar Reservoir.

The coupled operation of New Bullards Bar Reservoir and Englebright Reservoir includes releases through the New Colgate, Narrows I (owned by PG&E), and Narrows II hydroelectric generating facilities, providing the principal regulation of the lower Yuba River. Under existing water rights and agreements, PG&E may operate up to 45,000 of the 75,000 acre-feet of Englebright Reservoir storage, but only about 10,000 acre-feet of this capacity is typically exercised. This fluctuation of the Englebright Reservoir storage is principally for daily or weekly regulation of winter freshets and because Englebright Reservoir is an afterbay for Colgate Power House operations. The average impaired inflow into Englebright Reservoir is about 1.6 million acre-feet per year. On average, 1.1 million acre-feet per year passes through New Bullards Bar Reservoir; the remaining 500,000 acre-feet is local inflow and flow from the South Yuba and Middle Yuba Rivers directly into Englebright Reservoir. Below Englebright Reservoir, local inflow and runoff from Deer Creek contributes, on average, additional 170,000 acre-feet per year below the Smartville gage, just below Englebright Dam.

The New Bullards Bar Dam and Reservoir, Our House and Log Cabin diversion dams, Colgate Power House, Narrows II Powerhouse, and Lower Yuba River diversions and other conveyance

facilities make up the principal components of the YRDP, which the YCWA constructed in the late 1960s.

2.4 Yuba County Water Agency

2.4.1 Institutional

The YCWA plays a major role in management and allocation of surface water supplies in Yuba County. The YCWA constructed and operates the Yuba River Development Project, a water storage and hydroelectric project, a primary feature of which is the New Bullards Bar Dam and Reservoir on the North Yuba River. This multi-purpose development began operation in 1970 and provides electric power generation, water supply, flood control and instream flows for fisheries and recreation. Utilizing the YRDP, the YCWA provides base and supplemental water supply to its member units through its water rights and facilities on the Yuba River. In the area of groundwater management, the YCWA assists local districts, has commissioned and conducted monitoring and studies of groundwater use, groundwater levels, and groundwater quality. In addition, the YCWA has managed groundwater substitution transfers since 1991, in cooperation with member districts, to provide water to other parts of the state and which generate revenue to fund YCWA programs.

2.4.2 Water Rights

As part of conjunctive use operations within Yuba County, the YCWA has and will continue to utilize its water rights to regulate waters of the Yuba River in coordination with groundwater pumping activities. This coordinated operation is intended to increase the overall yield of Yuba County's water resources for beneficial use. For the diversion and use of waters within the Yuba River watershed, the YCWA holds various water right permits and licenses for power, irrigation, domestic, and industrial uses in conjunction with its YRDP. The YCWA's consumptive use water right permits total more than 1 million acre-feet per year. The place of use of these rights is the YCWA's service area, which covers the areas of its member districts and includes most of the agricultural land in Yuba County.

2.5 Use of Water in Yuba County

Groundwater is an important source of supply in Yuba County. All urban areas in the subbasin, including Marysville, Olivehurst, Linda, and Wheatland, as well as Beale Air Force Base, are all dependent on pumped groundwater for their municipal and industrial water supply. In addition, approximately 30 percent of the county's irrigation supply comes from groundwater. Most of this groundwater pumping for irrigation occurs south of the Yuba River.

Irrigation north of the Yuba River is primarily supplied by surface water except in Reclamation District 10. Groundwater is a primary source of water for irrigation north of the Yuba River on the western portion of the basin, in Reclamation District 10. In the South subbasin, portions of Reclamation District 784 and all of the Wheatland Water District (WWD) rely upon groundwater, while Brophy Water District, South Yuba Water District and Dry Creek Mutual Water Company currently receive surface water from the Yuba River. A surface water delivery system is currently being designed for WWD.

Use of groundwater for irrigation and municipal supply developed gradually as the need for water increased. This provided benefits to water users in the basin, but as early as the 1950s, groundwater levels were falling in the southern portion of Yuba County due to overdraft. During this period pumping of groundwater was exceeding the rate of recharge to the groundwater basin.

Partly in response to this water table decline, the YCWA began to provide Yuba River water to Brophy Water District and South Yuba Water District in 1983. Monitoring indicates groundwater levels have recovered since the early 1980's. Currently both the Yuba North Subbasin and the Yuba South Subbasin are in good health. Water levels have rebounded to near historical high levels and a substantial amount of water has been replenished into the basins, with the greatest portion of the replenishment in the Yuba South subbasin.

In 1991 the State was in the throws of a major drought. Five years of very dry condition had taken its toll on the water supplies of the State. In response to a call for aggressive water management by the Governor, the YCWA, together with its Member Units, developed a groundwater substitution program to pump over 80,000 acre-feet of water for use on local lands for irrigation. This allowed for the release of an equal amount of water from New Bullards Bar Reservoir for use throughout the State. This type of groundwater substitution transfer has been completed in three dry years since that time, 1994, 2001, and 2002.

2.6 Future Facilities and Operations

When the YRDP was constructed, financing limitations resulted in postponing the construction of the conveyance facilities, which would have delivered water to WWD. WWD continues to use groundwater for irrigation. As a result the Wheatland area contains a noticeable depression caused by the continued pumping. A major concern is that, with continued pumping, the Wheatland area has gradually seen an increase in salinity concentrations and water quality has been significantly degraded.

In order to complete surface water delivery to the South Basin of the YRDP and bring surface water to WWD, the YCWA and WWD applied for and received a grant from DWR. This grant and local funds will fund construction of the project, which is expected to begin in the near future.

The proposed project is the construction of a new canal system for delivery of surface water to the District. Delivery of surface water would allow for in-lieu recharge of the South Yuba subbasin. In-lieu recharge consists of a change in the water balance of the basin, to allow for an increase in the basin storage volume. Based on year 2000 water level data for the entire South Yuba subbasin, about 70,000 acre-feet of voided aquifer storage is available for in-lieu recharge. This project will increase the safe yield of the Yuba South subbasin, creating an additional water supply that can be used to meet local and out-of-county water needs.

At the time of this writing the project final design is just beginning.

3.0 MANAGEMENT PLAN ELEMENTS

The elements of this GMP include an overall goal, a set of management objectives, and a series of plan components that discuss and identify the actions necessary for meeting the goal and objectives.

3.1 Groundwater Management Goal

The goal of this GMP is to build upon and formalize Yuba County's historically successful conjunctive management of groundwater resources and to provide future management of this resource in order to ensure continued local supply reliability, contribute to the Sacramento Valley Water Management Program, and maintain the ability to enter into transfers that assist in alleviating water shortages throughout the state.

3.2 Basin Management Objectives

To meet the goal stated above, the YCWA has adopted four specific basin management objectives (BMOs). These BMOs include the following:

Achieve groundwater storage levels that result in a net benefit to basin groundwater users. The YCWA intends to manage groundwater through conjunctive use activities to avoid unreasonable impacts that may occur from changes in groundwater elevations due to external transfers. Groundwater elevation reduction which may occur as a result of groundwater extraction to meet local and out of county demands in drier years, will be monitored by the YCWA.

Maintain or improve groundwater quality in the Basin for the benefit of groundwater users. Generally, the groundwater in the Basin is of excellent quality. However, occurrences of both groundwater contamination and increases in total dissolved solids are documented in the Basin. In these instances the YCWA will coordinate with appropriate local, state and federal agencies to pursue actions that result in the remediation of the problem.

Protect against potential inelastic land surface subsidence. Land subsidence can cause significant damage to essential infrastructure. Historically land surface subsidence within the County area has been minimal, with no known significant impacts to existing infrastructure. Given the historical trends, the potential for land surface subsidence from groundwater extraction in the north and south subbasin areas is remote. However, the YCWA intends to coordinate with DWR to monitor for potential land surface subsidence. If inelastic subsidence is documented in conjunction with declining groundwater elevations, the YCWA will investigate appropriate actions to avoid adverse impacts

Protect against adverse impacts to surface water flows. Among other important uses the Yuba River provides habitat for a variety of fish and wildlife species. The YCWA is committed to meeting the flow requirements in the Yuba River for protection of habitat. In addition, the YCWA plans to coordinate with DWR in monitoring efforts that evaluate the relationship (if any) between groundwater pumping and adjacent river or stream flows.

3.3 GMP Components

The GMP includes a variety of components that are required by CWC § 10753.7, recommended by DWR Bulletin 118 (2003), and optional under CWC § 10753.8. These components can be grouped into five general categories: (1) stakeholder involvement, (2) monitoring program, (3) groundwater resource protection, (4) groundwater replenishment, and (5) planning integration. Each category and its components are presented in this section. Under each component is a discussion, proposed actions, and identification of the objectives toward which the component is directed.

3.4 Component Category 1: Stakeholder Involvement Plan

The YCWA actively promotes the involvement of stakeholders when fulfilling its responsibilities as described in the Water Agency Act to:

…develop and promote the beneficial use and regulation of the water resources of Yuba County.…

Many and various water purveyors, agencies and organizations actively participate in basin monitoring and measurement throughout Yuba County. The YCWA utilized the GMP development process to consolidate information and, to the extent appropriate, improve management efficiency by formalizing the existing process of basin management. The GMP was developed with the involvement of the YCWA's eight member units, municipal purveyors within the County, other agricultural purveyors, members of the public and the state Department of Water Resources (DWR). To include all of these stakeholders, the YCWA pursued several avenues. These avenues include, (1) public notices, (2) using advisory committees for development of the GMP and (3) coordination with the DWR. Each of these is discussed further below.

3.4.1 Involving the Public

Groundwater in California is used by the public, and the YCWA is committed to involving the public in the development and implementation of its GMP. In the preparation of this GMP, the YCWA filed notices in the Appeal Democrat (**Appendix B**). First, in accordance with CWC § 10753.2, a notice of intent to adopt a resolution to prepare a GMP was published in the Appeal Democrat on August 12, 2002 and again on August 19, 2002. The Yuba County Water Agency Board of Directors adopted the resolution of intent on August 27, 2002, at a publicly held Board meeting. However, the Agency was unable to complete the GMP within two years as required by CWC § 10753.4. Therefore, the Agency prepared and published another notice of intent to prepare a GMP on September 24, 2004 and October 1, 2004, adopted the resolution of intention 2004-15 on October 12, 2004 (included in Appendix B). Finally, the YCWA provided a public comment period from February 1, 2005 to February 22, 2005 on the draft GMP and noticed and held a meeting for the public to comment on the GMP prior to its adoption on March 1, 2005.

3.4.1.1 Actions

The YCWA will take the following actions:

- Continue efforts to encourage public participation as opportunities arise.

- Provide public briefings at meetings of the YCWA's Board of Directors regarding GMP implementation progress.
- Work with member units to maximize outreach on GMP activities including the use of the YCWA Web site.

3.4.2 Formation of an Advisory Committee for GMP Development

The YCWA used an advisory committee in its GMP development. On November 7, 2003 the YCWA held a meeting to discuss the formation of a Water Advisory Committee (WAC) that would assist in development of the GMP (see **Appendix C**). An invitation to the meeting was mailed to all of the water purveyors shown on **Figure 2** plus the Departments of Agriculture and Planning at Yuba County, the Community Services Districts of Camptonville and River Highland, the Yuba County Resource Conservation District and Beale Air Force Base (Beale AFB).[8] The committee met on approximately a monthly basis during GMP development

The primary groups represented on the WAC include:

- Browns Valley Irrigation District
- California Water Service
- Camp Far West Irrigation District
- City of Wheatland
- Cordua Irrigation District
- Dry Creek Mutual Water Company
- Hallwood Irrigation District
- Linda County Water District
- Olivehurst Public Utility District
- Rameriz Water District
- Reclamation District 784
- River Highlands Community Services District
- Yuba County Resources Conservation District
- Yuba County Water Agency
- Wheatland Water District
- Yuba County Department of Agriculture
- Butte Pump & Well Service

3.4.2.1 Actions

The YCWA will take the following actions:

- Upon adoption of the GMP, the YCWA will discuss the continuation and composition of the WAC to guide implementation of the plan.
- The YCWA will ensure effective outreach to other self-supplied pumpers in the area.
- The YCWA's monitoring plan includes coordination with personnel involved in the remediation plan at Beale AFB.

[8] Beale Air Force Base is currently implementing a remediation plan for known contaminant plumes of the Base Property. Extensive monitoring is part of the remediation plan.

3.4.3 Developing Relationships with State and Federal Agencies

Working relationships between the YCWA and the local, state, and federal regulatory agencies are critical to developing and implementing the various groundwater management strategies and actions detailed in this GMP. The water transfers described in Section 1.0 of the GMP provide examples of the YCWA ability to work cooperatively with the regulatory agencies.

Building upon the existing relationships with the DWR, the YCWA will refine and formalize the existing monitoring and measurement program in cooperation with the DWR Central District.

3.4.3.1 Actions

The YCWA will take the following action:

- Continue to develop working relationships with local, state, and federal regulatory agencies.

3.5 Component Category 2: Monitoring Program

The YCWA participates in monitoring and measurement of the water resources as part of the power granted in the Water Agency Act to:

…carry on technical and other necessary investigations, make measurements, collect data, make analyses, studies, and inspections pertaining to water supply …

This section of the report describes the monitoring programs for all four categories of monitoring required by the CWC:

- Groundwater Storage and Elevation
- Groundwater Quality
- Inelastic Subsidence
- Groundwater and Surface Water Interaction

Each of these categories is discussed below in turn. The intent of this section of the GMP is to review the monitoring efforts to date and determine if any enhancements are needed.

3.5.1 Groundwater Storage and Elevation

The basin is monitored both for the health of the *long-term basin storage* and for *localized-short-term* impacts of pumping on groundwater elevations. Long-term basin health is monitored as changes in groundwater storage over time. Managing the long-term health of the basin meets the BMO of achieving groundwater storage levels that result in a net benefit to basin groundwater users. Estimates of changes in groundwater storage are developed using monitoring data that report the changes in groundwater surface elevation throughout the basin[9].

Such monitoring data also serve another purpose, to indicate potential localized, short-term impacts of pumping. As stated in BMO #1 the YCWA strives to:

- Avoid potential unreasonable impacts that may occur from changes in groundwater surface elevations due to external transfers.

[9] By using water level measurements and estimates of specific yield, the change in groundwater storage may be estimated.

- Monitor any lowering of groundwater surface elevations that may occur, as a result of groundwater extraction to meet local demands in drier years.

The YCWA is compiling historic water level data measurements extending back from 1947 to the present. Sources of historic water level data for the North and South Yuba subbasins include:

- DWR
- YCWA
- Member Units
- Beale AFB
- Municipalities

3.5.1.1 Groundwater Storage and Elevation Monitoring Efforts in Yuba County

Groundwater elevation monitoring in Yuba County wells has evolved over time. DWR maintains a database that contains records dating back to 1947. Originally, water level measurements were collected by DWR. When DWR budget cuts threatened to eliminate its monitoring program, the Yuba County Agriculture Department agreed to continue measuring water levels because of the value of the data. When the Yuba County Agriculture Department budget cuts threatened to eliminate its monitoring activities, the YCWA agreed to continue collecting water level data.

Currently, groundwater monitoring is done cooperatively between DWR and the YCWA. In 1995, the DWR-YCWA monitoring network was modified to increase efficiency. To reduce ongoing monitoring costs, DWR developed a plan that discontinued monitoring a number of wells in exchange for installing fewer, more strategically located wells. The YCWA paid approximately $100,000 to DWR to install the new wells. Currently, both YCWA personnel and DWR personnel measure water levels for these wells.

There are 74 wells in the current DWR/YCWA monitoring program. The location of those wells is shown on **Figure 7**.

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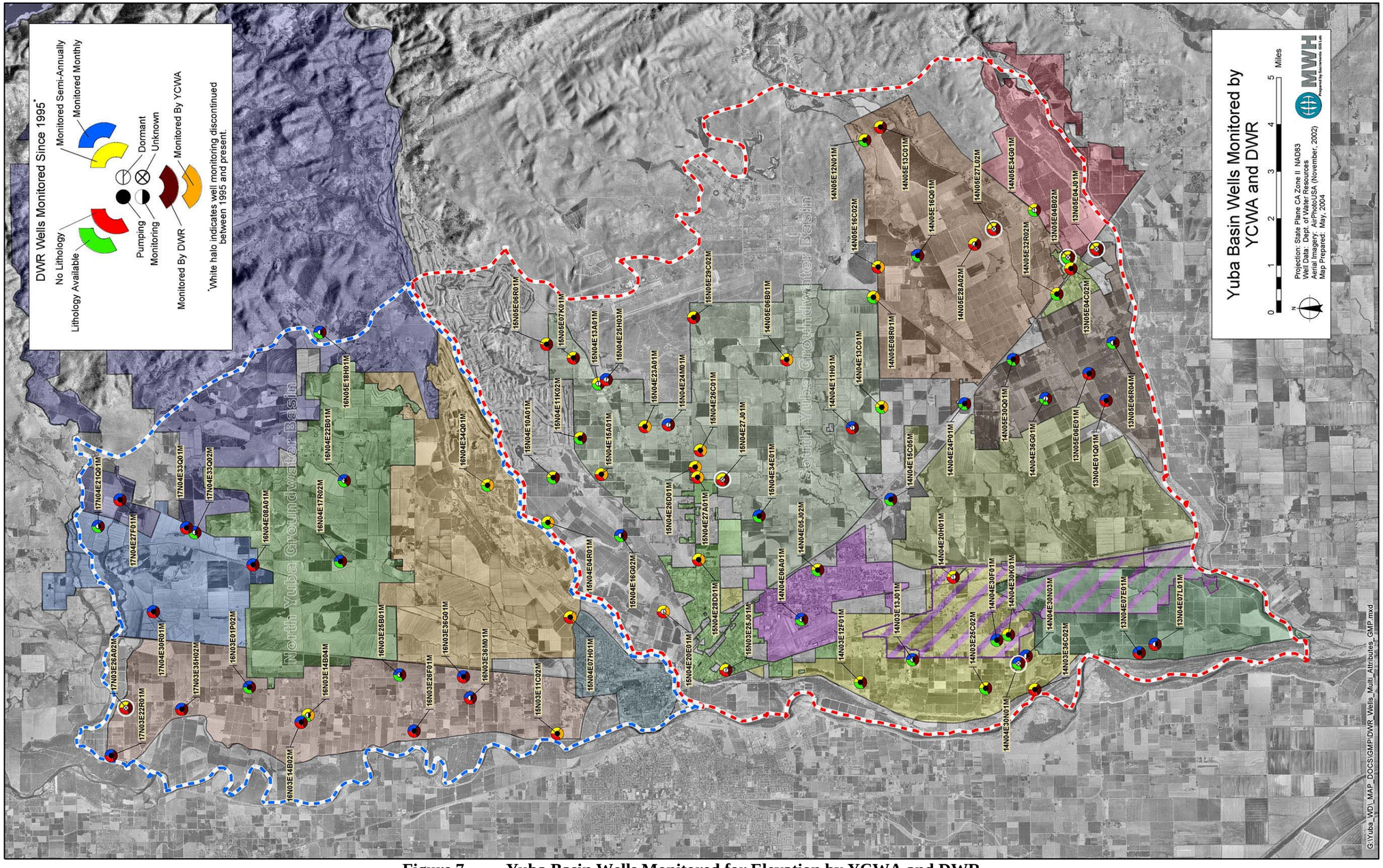

Figure 7. Yuba Basin Wells Monitored for Elevation by YCWA and DWR

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In addition to showing the location of the wells monitored for groundwater surface elevations, **Figure 7** also details the following:

- Whether the well is a dedicated monitoring well or a production well[10]
- Who monitors the well
- How often the well is monitored
- Whether the data on the well contains lithologic data

The responsibilities of both DWR and YCWA in the monitoring program follows.

DWR. As of 2004, 58 of the wells in the monitoring network are monitored by DWR. Of those wells, 22 are monitored semi-yearly and 36 are monitored monthly. The water level in each well is measured manually by DWR staff, using a water level indicator. As the term implies, "monthly" measurements are taken 12 times a year. Semi-annual measurements are generally taken within three-week windows in the spring (e.g., March) and fall (e.g., October).

YCWA. The YCWA monitors 16 of the wells in the monitoring network. Measurements are generally taken in either (1) March and October or (2) April and November. The water level in each well is measured manually by YCWA staff, using a water level indicator.

In addition to the groundwater surface elevation monitoring done by YCWA and DWR the YCWA **Member Units** also monitor groundwater surface elevation**.** During 1991, the State experienced a major drought emergency, and the governor was proposing to suspend agricultural water right diversions in order to meet urban demands. The YCWA was instrumental in working with the State to develop a groundwater substitution drought water bank program in which groundwater was pumped for crop irrigation, and the surface water normally used for irrigation was transferred to urban users for a fee. Additional groundwater substitution transfers occurred in 1994, 2001, and 2002 (See **Table 1** in Section 1 of this document for details of these transfers).

During the transfer years of 2001 and 2002 there was increased monitoring of groundwater surface elevations. This increased monitoring effort focused on monitoring wells involved in the transfer and was done to, (1) assess the effects of the transfer on the groundwater resource, and (2) provide reasonable assurance that the water pumped and accounted for, as part of the transfer, was in lieu of surface water deliveries.

The YCWA and its Member Units have implemented an informal Third Party Impact Action Plan and will discuss a formal Third Party Impact Action Plan which would include a series of steps to be taken to ensure that a groundwater substitution transfer does not impose significant unmitigated impacts on third parties (i.e., other legal users of water).

Municipalities. The following municipalities measure water levels in their wells on at least a monthly basis:

- California Water Services Company
- Olivehurst Public Utilities District
- Linda County Water District

[10] **Figure 7** includes the category 'unknown' for wells that were in the set of monitoring wells in the 1995 revision of the monitoring program, but are not currently being monitored.

- City of Wheatland

The Cities of Marysville and Wheatland have developed a supervisory control and data acquisition {SCADA} system. Use of SCADA in monitoring implies that monitoring occurs in real time.

Table 4 presents a tabular summary of the number, frequency and type of well currently being monitored for groundwater surface elevation in the Yuba Subbasins.

Table 4.
Summary of DWR/YCWA Well Monitoring

	Type of Well	Number of Wells Monitored			Notes
		Semi-annually	Monthly	Total	
DWR	Production	15	20	35	
	Monitoring	3	12	15	
	Dormant	4	4	8	
	Total	22	36	58	
YCWA	Production	16	0	16	
	Monitoring	0	0	0	
	Dormant	0	0	0	
	Total	16	0	16	
Transfer	Production	Between 0 and 146			(1)
Municipal	Production	~35	~35	~35	(2)

(1) Data for 2002 monitoring only

(2) Cities of Marysville and Wheatland have SCADA systems, so monitoring data is real-time

3.5.1.2 Refinement of Existing Groundwater Storage and Elevation Monitoring

The compositions of the monitoring networks have been in continual flux (i.e., wells added and dropped over time). Additionally, protocols for measuring water levels have likely been (and continue to be) inconsistent over the aggregate set of wells monitored. For these reasons, the YCWA is coordinating with its Member Units, DWR, and other basin groundwater extractors to determine if any refinements are needed to provide adequate basin coverage.

3.5.1.3 Actions

Enhancements to existing groundwater storage and elevation monitoring efforts will be considered on a cost-effective basis by the YCWA when and if:

- Existing monitoring efforts continually report confusing or spurious findings, or the findings are considered to have a deleterious impact on the groundwater resource.
- Potential impacts to the groundwater basin are reported in areas where little or no existing monitoring occurs.
- State regulations require more stringent monitoring, particularly to maintain local control of the groundwater resource.
- Coordination with monitoring activities that occur at Beale AFB for both the remediation program and water service.

The types of actions to be pursued if enhancements are required include:

- Coordinate with Member Units, DWR, and other basin groundwater extractors (e.g., Beale AFB, municipalities, etc.) to identify an appropriate group of wells for monitoring both during transfer and non-transfer years. Preference will be given to wells currently in an agency's monitoring network that (a) have long records of historic water level data and are useful in assessing trends within the subbasins, (b) have uniform protocols used for measuring and recording the water level data, (c) are non-producing wells or have relatively low extraction volumes so water level readings represent relatively static levels, and (d) have well construction information. Geographic distribution, basin hydrogeology, and areas of extraction will also be considered.
- Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that the selected wells are maintained as part of a long-term monitoring network.
- Coordinate with DWR to ensure that the timing of water level data collection by Member Units and other basin groundwater extractors in transfer years coincides within one month of DWR data collection on wells measured twice a year.
- Coordinate with Member Units, DWR, and other basin groundwater extractors on the development of uniform data collection protocols and data sharing and archiving procedures.
- Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that needed water level data are collected, verify that uniform data collection protocols are used among the agencies, and confirm that data sharing and archiving procedures are implemented.
- Provide training for the Member Units and other basin groundwater extractors on implementation of data collection protocols, if requested.
- Consider ways to fill gaps in the monitoring well network by identifying additional suitable existing wells or identifying opportunities for constructing new monitoring wells.
- Assess groundwater storage and elevation trends and conditions based on the network annually. Compare current trends to historical trends. Present findings to DWR and coordinate on future program modifications.
- Assess the adequacy of the groundwater storage and elevation monitoring well network annually.

3.5.2 Groundwater Quality

The purpose of the groundwater quality component of the overall monitoring program is to develop and implement actions that will help the YCWA meet BMO #2 – maintain or improve groundwater quality in the Basin for the benefit of groundwater users. This process requires (1) collection and analysis of adequate data; and (2) in the event of a detected problem, coordination with appropriate local, State, and federal agencies to pursue actions resulting in remediation.

Because the majority of the wells in the basin are used for agricultural supplies, limited water quality data exists. The YCWA is compiling available historical water quality data extending from the 1940s to the present. Sources of water quality data include:

- DWR
- Municipalities
- SWRCB
- Beale AFB

3.5.2.1 Groundwater Quality Monitoring Efforts in Yuba County

DWR. DWR Central District maintains data for 62 water quality wells in the two subbasins (35 in the north, 27 in the south). These data were collected starting in the 1940s. Currently, DWR collects data for 13 water quality wells in the two subbasins on a regular basis (i.e., data for seven wells are collected in one year and data for the other six wells are collected the next year). Samples are collected after the onset of pumping in the months of May, June, and July. Constituents analyzed include minerals, nutrients, and nitrates.

During 2002, the most recent transfer year involving groundwater substitution, water quality samples were collected by DWR Central District for 84 of the approximately 200 wells subscribed in the YCWA transfer program. Constituents included minerals, nutrients, nitrates, pH, total dissolved solids, turbidity, and temperature. This occurred during the months of July, August, and September.

Municipalities. As required under Title 22, the municipalities collect water quality data for required constituents and report that data to the Department of Health Services (DHS). This level of monitoring is sufficient under existing regulatory guidelines to ensure that the public is provided with a safe, reliable drinking water supply. The municipalities include:

- California Water Services Company
- Olivehurst Public Utilities District
- Linda County Water District
- City of Wheatland

SWRCB. The California Legislature and Governor, as well as private citizens, have become increasingly concerned about the recent public supply well closures due to the detection of chemicals, such as MTBE from gasoline and various solvents from industrial sources. As a result of the increased awareness toward groundwater quality, the Supplemental Report of the 1999 Budget Act required the SWRCB to develop a comprehensive ambient groundwater monitoring plan.

To meet this mandate, the SWRCB created the Groundwater Ambient Monitoring and Assessment (GAMA) Program. The primary objective of the GAMA Program is to assess the water quality and relative susceptibility of groundwater resources.

The GAMA Program has two sampling components: the California Aquifer Susceptibility (CAS) Assessment which primarily addresses public supply drinking water wells and the Voluntary Domestic Well Assessment Project which addresses private drinking water wells. The GAMA Program is being directed out of the SWRCB Division of Water Quality, Land Disposal Section, Groundwater Special Studies Unit.

The Voluntary Domestic Well Assessment Project samples domestic wells for various constituents commonly found in domestic well water and provides that information to the domestic well owners. In addition, the Voluntary Domestic Well Assessment Project includes a public education component to aid the public in understanding water quality data and water quality issues affecting domestic water wells. The Voluntary Domestic Well Assessment Project focuses on specific areas, as resources permit. The focus areas are chosen based upon existing knowledge of water quality and land use, in coordination with local environmental agencies. The SWRCB incurs the costs of sampling and analysis, and the results are provided to domestic well owners as quickly as possible. During April through June, 2002, Voluntary Project staff sampled 119 domestic supply wells in Yuba County.

Beale AFB. Water quality data is collected at Beale for both the groundwater remediation program and the service of municipal water. The YCWA will be coordinating with Beale to review the monitoring activities.

Figure 8 shows the locations of the wells monitored by DWR and the SWRCB.

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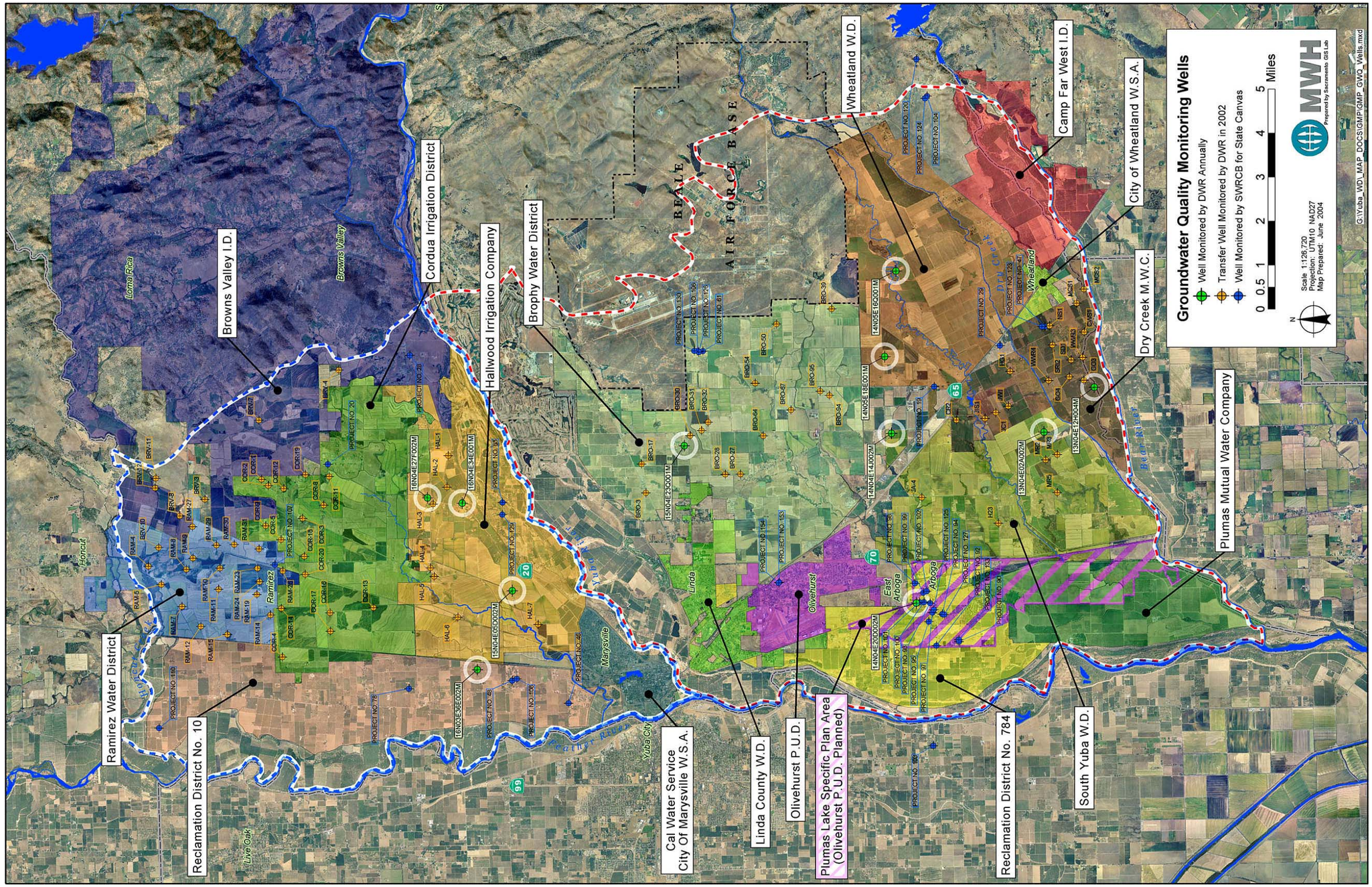

Figure 8. Yuba Basin Wells Monitored for Water Quality in the Subbasins

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3.5.2.2 Refinement of Existing Groundwater Quality Monitoring

The compositions of the monitoring networks have been in continual flux (i.e., wells added and dropped over time). Additionally, protocols for measuring water quality have likely been (and continue to be) inconsistent over the aggregate set of wells monitored. For these reasons, the YCWA is coordinating with its Member Units, DWR, and other basin groundwater extractors to determine if any refinements are needed to provide adequate basin coverage.

3.5.2.3 Actions

Enhancements to existing groundwater quality monitoring efforts will be considered on a cost-effective basis by the YCWA when and if:

- Existing monitoring efforts continually report confusing or spurious findings, or the findings are considered to have a deleterious impact on the groundwater resource.
- Potential impacts to the groundwater basin are reported in areas where little or no existing monitoring occurs.
- State regulations require more stringent monitoring, particularly to maintain local control of the groundwater resource.

The types of actions to be pursued if enhancements are required include:

- Coordinate with Member Units, DWR, and other basin groundwater extractors (e.g., Beale AFB, municipalities, etc.) to identify an appropriate group of wells for monitoring both during transfer and non-transfer years. Preference will be given to wells currently in an agency's monitoring network that (a) have long records of historic water quality data and are useful in assessing trends within the subbasins, (b) have uniform protocols used for measuring and recording the water quality data, (c) are either producing or non-producing wells, appropriately selected for the constituent being monitored , and (d) have well construction information. Geographic distribution, basin hydrogeology, and areas of extraction will also be considered.
- Coordinate with DWR to ensure that the selected wells are maintained as part of a long-term monitoring network.
- Coordinate with appropriate state and local agencies to ensure that the timing of water quality data collected by Member Units and other basin groundwater extractors in transfer years coincides within one month of DWR data collection.
- Coordinate with Member Units, DWR, and other basin groundwater extractors on the development of uniform data collection protocols and data sharing and archiving procedures.
- Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that needed water quality data are collected, verify that uniform data collection protocols are used among the agencies, and confirm that data sharing and archiving procedures are implemented.
- Provide training for the Member Units and other basin groundwater extractors on implementation of Action Item #5, if requested.
- Consider ways to fill gaps in the monitoring well network by identifying additional suitable existing wells or identifying opportunities for constructing new monitoring wells.

- Coordinate with Member Units, DWR, other basin groundwater extractors, and other local, State, and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples from those wells. If wells are sampled through other programs, coordinate with the appropriate agency on sharing of data.
- Coordinate with Member Units, DWR, other basin groundwater extractors, and other local, State, and federal agencies to pursue actions that result in containment and remediation of water quality problems within the subbasins.
- Assess current groundwater quality trends in comparison to historical trends. Present findings to DWR and coordinate on future program modifications.
- Obtain DWR's 2002 water quality data for the 84 wells that were sampled and prepare Stiff Plots[11] and tri-linear diagrams to evaluate geographical trends in groundwater quality.
- Assess the adequacy of the groundwater quality monitoring well network annually.

3.5.3 Inelastic Subsidence

Subsidence of the land surface resulting from compaction of underlying formations affected by head (water level) decline is a well-documented concern throughout much of the Central Valley. During a typical pumping season, changes in land surface elevation can be observed as a result of both elastic and inelastic subsidence in the underlying basin. Elastic subsidence results from the reduction of pore fluid pressures in the aquifer and typically rebounds when pumping ceases or when groundwater is otherwise recharged resulting in increased pore fluid pressure. Inelastic subsidence occurs when pore fluid pressures decline to the point that aquitard (a clay bed of an aquifer system) sediments collapse resulting in permanent compaction and reduced ability to store water in that portion of the aquifer.

The purpose of the inelastic subsidence component of the overall monitoring program is to develop and implement actions that will help the YCWA meet BMO #3 – protect against potential inelastic land surface subsidence. This process requires (1) coordination with DWR to monitor for potential land surface subsidence, (2) collection and analysis of adequate data, and (3) investigation of appropriate actions to avoid adverse impacts (in the event inelastic subsidence is documented in conjunction with declining groundwater elevations).

3.5.3.1 Inelastic Subsidence Monitoring Efforts in Yuba County

To date, minimal subsidence monitoring activity has occurred in Yuba County. In recent years, DWR and the YCWA developed a preliminary monument network by correlating National Oceanic and Atmospheric Administration's National Geodetic Survey (NGS) monuments with topographic data to determine proposed locations for new monuments. That network has not been finalized nor an implementation plan developed. The YCWA is not aware of any existing efforts to monitor inelastic groundwater subsidence within the county, but DWR has expressed

[11] The Stiff Plot represents four major anions and four major cations present in a water-composition. The ionic concentrations should be plotted in the same sequence on four different parallel axis. The resulting points are connected to give an irregular polygonal shape or pattern. The width of the pattern is an approximate indication of total ionic content.
source Peck, Dallas L., 1989. "Study and Interpretation of the Chemical Characteristics of Natural Water," USGS Water-Supply Paper 2254. p.175.

interest in coordinating with the YCWA on the development and implementation of a monitoring program.

3.5.3.2 Actions

- Coordinate with DWR on the necessity of developing and implementing a monitoring program. This program will include uniform data collection protocols and data sharing and archiving procedures.
- Explore funding opportunities for the installation of subsidence extensometers and other benchmarks to perform periodic repeat-level surveys at the benchmarks.
- Coordinate with other agencies (particularly the County of Yuba, the municipalities, and the NGS) to determine if there are other suitable benchmark locations in Yuba County to aid in the analysis of potential land surface subsidence.
- Educate Member Units and other basin groundwater extractors on the potential for land surface subsidence and signs that could be indicators of subsidence.

3.5.4 Groundwater and Surface Water Interaction

The purpose of the groundwater and surface water interaction component of the overall monitoring program is to develop and implement actions that will help the YCWA meet BMO #4 – protect against adverse impacts to surface water flows. The YCWA is committed to meeting the flow requirements in the Yuba River for protection of fish and wildlife habitat. In addition, the YCWA plans to coordinate with DWR in monitoring efforts that evaluate the relationship (if any) between groundwater pumping and adjacent river or stream flows.

3.5.4.1 Groundwater and Surface Water Interaction Monitoring Efforts in Yuba County

The interaction between groundwater and surface water has not been extensively evaluated within the two subbasins. Both DWR and the YCWA have initiated evaluation efforts.

DWR. In recent years, DWR has studied groundwater and surface water interaction in the basin. It conducted aquifer pump tests at eight locations and is utilizing multi-level piezometers. In March 2003, DWR installed a multi-level piezometer in close proximity to both its Bear River stream gage (near Pleasant Grove Road) and a production well subscribed in the YCWA transfer program. Data were recorded at both the piezometer and stream gage on synced, 15-minute intervals and stable isotope samples were taken and analyzed. DWR has collected data for over 14 months and is preparing a report based on that data. In summer 2004, DWR installed another multi-level piezometer in close proximity to the YCWA's Yuba River stream gage (near Marysville). The data collected and analyzed at these two stations in non-transfer years will establish a baseline that will allow DWR to observe changes in water levels and composition resulting from transfer program extractions. DWR is exploring the installation of additional groundwater/surface water interaction stations.

YCWA and Member Units. The YCWA and its Member Units collect less data related to groundwater and surface water interaction in non-transfer years. During transfer years, the YCWA and its Member Units increased their monitoring efforts by implementing (1) the *Groundwater Monitoring and Reporting Program* that specified EC measurements and monitoring of the potential for impact to the Bear River, and (2) the *Groundwater Substitution*

Program Third Party Action Plan to ensure that a groundwater substitution transfer does not impose significant unmitigated impacts on third parties (i.e., other legal users of water).

3.5.4.2 Actions

- Meet with DWR to understand the results of its Bear River study and the need for other future groundwater surface water interaction studies.
- Meet with DWR to determine the need and cost effectiveness of installing additional monitoring stations.

Coordinate with DWR on the development of uniform data collection protocols and data sharing and archiving procedures.

-

3.5.5 Data Management

The YCWA, DWR, the YCWA's eight member units, the four municipal water purveyors and Beale Air Force Base maintain a varying range of groundwater-related data in a wide variety of formats. The YCWA is examining the extent to which there is value to be added by organizing all or part of this data into one central repository.

The DWR currently maintains much of the groundwater elevation data described in section 3.5.1, above. The groundwater substitution transfers done in 2001 and 2002 required that the YCWA's member units collect monthly groundwater elevation data at the beginning of the transfer, during the transfer and for a period of time after the transfer. The YCWA is committed to coordinating with the member units to assure that such measurements, as required, are obtained and the data maintained.

To the extent that groundwater quality data becomes necessary for the YCWA to meet its objective to develop and promote the beneficial use and regulation of the water resources of Yuba County, the YCWA will also develop a system for collecting and maintaining groundwater quality data. The same is true of data for inelastic ground subsidence and groundwater and surface water interaction.

Other data that will be gathered and maintained on as needed basis includes well construction details, lithologic data available from borings and construction of wells.

3.5.5.1 Actions

To maintain and improve the usability of the data regarding groundwater and aquifer properties in Yuba County, the YCWA will take the following actions:

- Continue to coordinate with member units and other water purveyors to determine what types of data are currently available and in what formats.
- Develop data management methods on an as needed basis for data determined critical to the management of water resources in Yuba County.

3.6 Component Category 3: Groundwater Resource Protection

The YCWA considers groundwater protection to be one of the most critical components of ensuring a sustainable groundwater resource and is empowered through the Agency Act to;

…prevent contamination, pollution or otherwise rendering unfit for beneficial use the subsurface or subsurface water used in said agency, and to commence, maintain and defend actions and proceedings to prevent any such interference with such waters as may endanger or damage the inhabitants, lands, or use of water in, or flowing into the agency;….

In this GMP, resource protection includes both prevention of contamination from entering the groundwater basin and remediation of existing contamination. Prevention measures include proper well construction and destruction practices, development of wellhead protection measures, and protection of recharge areas. Containment and remediation include measures to prevent contamination from human activities as well as contamination from natural substances such as saline water bodies.

YCWA is committed to coordinating with the various state, local and federal agencies that monitor groundwater quality and are responsible for projects that clean-up groundwater contamination where it may exist. Specifically, YCWA does not operate a project related to groundwater contamination cleanup, recharge, storage or extraction. YCWA's involvement in various aspects of groundwater resource protection are detailed below by category.

3.6.1 Well Construction, Abandonment and Destruction Policies

3.6.1.1 Well Construction Policies

Proper construction of water wells is necessary to not only provide a reliable water supply, but also to protect the groundwater resource. Section 231 of the California Water Code requires the DWR to develop well standards to protect groundwater quality. DWR has documented the well standards in Bulletin 74-81 (DWR, 1981) and Bulletin 74-90 (DWR, 1991), the supplement to Bulletin 74-81.

Most counties and some cities have adopted ordinances to protect groundwater quality. In Yuba County the agency responsible for well construction permitting and inspection is the Environmental Health Department (EHD) per Chapter 7.03 of the County Ordinances. Yuba County EHD enforces the DWR well standards and as such, requires a permit (**Appendix D**) to be issued before a well can be drilled or modified. Yuba County reviews the permit application to verify that proposed well location and construction details meet the DWR requirements. When a well is constructed, modified, or destroyed, the law requires that the drilling contractor submit a Well Completion Report to the Department. The well owner should obtain a copy of this report from the drilling contractor. The well completion report for an existing well should be available in the files of DWR's Central District Office.

Only qualified personnel can deepen an existing well, drill a new well, or destroy a well. The California Business and Professions Code requires that, "No person shall undertake to dig, bore,

or drill a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well, to deepen or reperforate such a well, or to abandon or destroy such a well, unless the person responsible for that construction, alteration, destruction, or abandonment possesses a C-57 Water Well Contractor's License." The California Contractor's State License Board web page can be checked to find out whether a contractor is licensed and the status of a license, as well as providing information on hiring a contractor.

The contact information for the County regarding wells is:

Yuba County Environmental Health Department
915 8th Street, Suite 123
Marysville, CA 95901-5273
(530) 749-5450

3.6.1.2 Well Abandonment Policies

The water well standards used by the DWR defines a well as being either abandoned or permanently inactive if it has not been used for one year, unless the owner demonstrates intention to use the well again. In accordance with Section 24400 of the California Health and Safety Code, the well owner shall properly maintain an inactive well as evidence of intention for future use in such a way that follows strict requirements enforced by the DWR. According to the Yuba County Ordinance 7.03.090, a well is deemed abandoned by the definition in DWR Bulletin 74-81 and such abandoned well shall be destroyed or placed inactive by its owner.

3.6.1.3 Well Destruction Policies

Proper destruction of water wells is necessary to protect the groundwater resource. In Yuba County the agency responsible for well destruction oversight is the Environmental Health Department per Chapter 7.03 of the County ordinances. The Yuba County ordinance requires a permit to be issued before a well can be drilled or modified. Yuba County reviews the permit application to verify that proposed abandonment and destruction details meet the DWR requirements (DWR 1981, 1991) Therefore, when a well is destroyed, the law requires that the drilling contractor submit a Well Completion Report to the Department. The well owner should obtain a copy of this report from the drilling contractor. The well completion report for an existing well should be available in the files of DWR's Central District Office.

The actions listed below will provide improved dissemination of information regarding well construction, well abandonment and well destruction policies within Yuba County to appropriate agencies.

3.6.1.4 Actions

The YCWA will take the following actions:

- Schedule a meeting with the County Department of Environmental Services, Member Units and interested M&I water purveyors to facilitate the an exchange of information of existing

County well ordinances and discuss possible new ordinances, such as a minimum depth for new wells.

- Request that Beale AFB provide a copy of the most recently delineated investigation borders for remediation sites originating from Beale AFB, and other known groundwater contaminant sources, to YCWA; Members Units and M&I water purveyors within the County for their review and possible use (i.e. locating and designing new wells and for possible transfer pumping).
- Provide information to Member Units and M7I water purveyors on well construction, destruction and abandonment as requested. For example, providing access to existing analysis on subsurface hydrogeology for the construction of new wells.

- Obtain "wildcat" well map from California Division of Oil and Gas to ascertain the extent of historic gas well drilling operations in the area as these wells could function as conduits of contamination if not properly destroyed.

3.6.2 Wellhead Protection Measures

Identification of wellhead protection areas is a component of the Drinking Water Source Assessment and Protection (DWSAP) Program administered by the Department of Health Services (DHS). DHS set a goal for all water systems statewide to complete Drinking Water Source Assessments by mid-2003. All municipalities within Yuba County have completed their required assessments by performing the three major components required by DHS:

- Delineation of capture zones around sources (wells).
- Inventory of Potential Contaminating Activities (PCAs) within protection areas.
- Vulnerability analysis to identify the PCAs to which the source is most vulnerable.

Delineation of capture zones includes using groundwater gradient and hydraulic conductivity data to calculate the surface area overlying the portion of the aquifer that contributes water to a well within specified time-of-travel periods. Typically, areas are delineated representing 2-, 5-, and 10-year time-of-travel periods. These protection areas need to be managed to protect the drinking water supply from viral, microbial, and direct chemical contamination.

Inventories of PCAs include identifying potential origins of contamination to the drinking water source and protection areas. PCAs may consist of commercial, industrial, agricultural, and residential sites, or infrastructure sources such as utilities and roads. Depending on the type of source, each PCA is assigned a risk ranking, ranging from "very high" for such sources as gas stations, dry cleaners, and landfills, to "low" for such sources as schools, lakes, and non-irrigated cropland.

Vulnerability analysis includes determining the most significant threats to the quality of the water supply by evaluating PCAs in terms of risk rankings, proximity to wells, and Physical Barrier Effectiveness (PBE). PBE takes into account factors that could limit infiltration of contaminants including type of aquifer, aquifer material (for unconfined aquifers), pathways of contamination, static water conditions, hydraulic head (for confined aquifers), well operation, and well construction. The vulnerability analysis scoring system assigns point values for PCA risk rankings, PCA locations within wellhead protection areas, and well area PBE; the PCAs to

which drinking water wells are most vulnerable are apparent once vulnerability scoring is complete.

3.6.2.1 Actions

The YCWA will take the following actions:

- Request that municipalities provide vulnerability summaries from the DWSAP to the YCWA to be used for guiding management decisions in the basin.

3.6.3 Protection of Recharge Areas

The California Legislature and Governor, as well as private citizens have become increasingly concerned about groundwater quality and public supply well closures due to the detection of chemicals, such as the gasoline additive MTBE, solvents from industrial sources, and more recently perchlorate. To address these concerns the Supplemental Report of the 1999 Budget Act and later the Groundwater Quality Monitoring Act of 2001 (AB 599 – Statutes of 2001) required the SWRCB to develop a comprehensive ambient groundwater monitoring plan. The SWRCB is collaborating with the U.S. Geological Survey (USGS) and Lawrence Livermore National Laboratory (LLNL) to implement the GAMA Program. The GAMA Program prioritizes groundwater basins for assessment based on groundwater use. Currently, the Yuba County North and South subbasins are not scheduled for assessment.

Local participation in the GAMA Program is voluntary. YCWA will assist in the assessment by facilitating information exchange with the County, the Member Units and interested M&I water purveyors when the Yuba County North and South subbasin assessment is underway.

3.6.3.1 Actions

The YCWA will take the following actions:

- Track the inclusion of Yuba County in the SWRCB GAMA Program. Program when appropriate.

3.6.4 Control of the Migration and Remediation of Contaminated Groundwater

The North and South Yuba Basins are primarily farmland and as such have potential for contaminating activities from nitrates and pesticides. Additionally, potential sources of groundwater contamination may occur around urban growth areas, such as Wheatland, Olivehurst, and Marysville, and from Beale AFB.

Evaluation of the extent and types of contaminants present at Beale AFB began in 1985 and has resulted in the removal of source areas and the implementation of remedial activities such as installation of groundwater treatment plants. Beale AFB's goal is to prevent contaminants that exceed drinking water maximum contaminant levels from leaving the property. The lead agency for the groundwater cleanup at the base is the Central Valley Regional Water Quality Control Board (RWQCB). The YCWA will coordinate with the RWQCB on aspects of this project that could affect groundwater levels near Beale AFB.

Twenty-two locations on the base have been investigated for soil and groundwater contamination. The most common contaminant is trichloroethylene (TCE), a volatile organic compound that was commonly used as a degreaser. There are several distinct TCE groundwater contamination plumes scattered throughout the base. Most plumes are contained within the base with the exception of Site 13, which is located near the western boundary of the base. Concentrations of TCE below drinking water maximum contaminant levels have been detected in some off-site domestic and monitoring wells along North Beale Road. The RWCQB has suggested consideration of establishing "Consultation Zones"in the areas where groundwater actions such as pumping could affect migration or containment of groundwater plumes. However, at this time no action has been considered by the RWQCB or Beale AFB.

There are other remedial actions occurring at Beale AFB to prevent the migration of contaminated groundwater. This information is published in annual reports by the Office of Environmental Restoration at Beale. The contact information at Beale AFB is:

Environmental Restoration
9 CES/CEVR
6601 B Street
Beale AFB, CA 95903-1708
DSN: 368-3856
(530) 634-3856

3.6.5 Fuel Storage Tanks

Leaky underground storage tanks (LUST) are another source of groundwater contamination in the area. There are 43 LUST sites in the area with potential or actual groundwater contamination in the project area. The sites are in various stages from initial characterization to remediation. Groundwater contamination is typically limited to shallow groundwater bearing zones with down-gradient areas being the most affected. MTBE has been detected in groundwater near some of the LUST. MTBE is a gasoline oxygenate that is very mobile in groundwater.

3.6.5.1 Actions

The YCWA will take the following actions:

- Request information from the RWQCB and other responsible agencies with regard to water quality concerns within the Basin and locations of known and potential groundwater contamination.
- Request copies of annual monitoring reports from Beale AFB that describe the extent of groundwater contamination plumes on Base.
- Provide YCWA Members Units with all information obtained from OES and the RWQCB on the extent of the investigation areas of contaminant plumes and LUST sites for their information in developing groundwater extraction patterns and in the siting of future production or monitoring wells.

3.6.6 Control of Saline Water Intrusion

Saline water can slowly degrade a groundwater basin and ultimately render all or part of a basin unusable. Several sources can contribute to increased salinity in groundwater. In addition to sea

water intrusion, saline degradation of groundwater can be caused by use and re-use of the water supply; lateral or upward migration of saline water; downward seepage of sewage and industrial wastes; downward seepage of mineralized surface water from streams, lakes, and lagoons; and interzonal or interaquifer migration of saline water.

At present, saline water intrusion has not been identified as a problem in the Yuba Subbasin, but saline water impacts can be a threat to water quality. The YCWA will test for saline water when appropriate.

The YCWA, in cooperation with DWR has undertaken the task of better understanding the quality of groundwater throughout the basin. This information will be used in the management of groundwater resources throughout the basin. Activities under this component may include water quality monitoring, investigation into causes, analysis of impacts, and development and implementation of solutions.

3.6.6.1 Action.

The YCWA will take the following actions:

- Observe TDS concentrations in transfer wells sampled by DWR in 2002. Correlate TDS with depth and distance from recharge areas and describe observed trends.
- Acquire geophysical logs for oil and gas exploration borings. These logs are available through the State of Department of Conservation Division of Oil and Gas. These electrical geophysical logs will delineate the base of freshwater at each boring location.
- Publish information obtained from DWR and other sources on salinity trends in annual basin report.

3.7 Component Category 4: Groundwater Sustainability

To ensure a long-term viable supply of groundwater, the YCWA and its member units are seeking ways to increase the conjunctive management abilities in the subbasins over the long-term. The YCWA is currently in the process of constructing the infrastructure needed to deliver surface water to approximately 7,750 acres of land within Wheatland Water District. This land is currently being served by groundwater. This project allows groundwater elevations underlying the WWD to increase naturally (in-lieu recharge) by providing surface water to an area that has historically relied on groundwater.

Recharge can also occur via direct recharge. At the present the YCWA is not investigating direct recharge because natural recharge and in-lieu recharge have proved sufficient methods to maintain the health of the basin.

3.7.1 Actions

To maintain storage volume of groundwater in the Yuba north and south subbasins the YCWA will take the following actions:

- Continue pursuing the project to deliver surface water to WWD.
- Coordinate with member units to use monitoring data to maintain the health of the subbasins.

4.0 PLAN IMPLEMENTATION

Table 5 summarizes the action items presented in Section 3 and an implementation schedule. Many of these actions involve coordination by the DWR with other local and federal agencies and most of these will begin within 6 months, following adoption of this GMP. A few activities involve assessing trends in basin monitoring data for the purpose of determining the adequacy of the monitoring network. These assessments will be made as new monitoring data become available for review by the YCWA, and results will be documented in an annual Monitoring and Measurement report (see below).

4.1 Annual Monitoring and Measurement Report

The YCWA will report on progress made implementing the GMP in an annual Monitoring and Measurement report, which will summarize groundwater conditions in the subbasins and document groundwater management activities from the previous year. This report will include:

- Summary of monitoring results, including a discussion of historical trends.
- Summary of management actions during the period covered by the report.
- A discussion, supported by monitoring results, of whether management actions are achieving progress in meeting BMOs.
- Summary of any plan component changes, including addition or modification of BMOs, during the period covered by the report.

The Monitoring and Measurement report will be completed by June 1st each year and will report on conditions and activities completed through April 31st of the prior year. Annual meetings will be held with the local agencies that are managing groundwater within the basin and are complying with the YCWA GMP. (pursuant to CWC §10755.3).

4.2 Future Review of GMP

This GMP is intended to be a framework for the first regionally-coordinated management efforts in the Yuba subbasins. As such, many of the identified actions will likely evolve as the YCWA actively manages and learns more about the basin. Many additional actions will also be identified in the annual Monitoring and Measurement report described above. The GMP is therefore intended to be a living document, and it will be important to evaluate all of the actions and objectives over time to determine how well they are meeting the overall goal of the plan. The YCWA plans to evaluate this entire plan within five years of adoption.

4.3 Financing

It is envisioned that implementation of the GMP, as well as many other groundwater management-related activities will be funded from a variety of sources including revenues from the Sacramento Valley Water Management Plan; the YCWA; in-kind services by member units; state or federal grant programs; and local, state, and federal partnerships. Some of the items that would likely require additional resources include:

- Monitoring for groundwater quality and elevation.
- Preparation of GMP annual reports.

- Updates of the overall GMP.
- Collection of additional subsidence data.
- Construction of monitoring wells where critical data gaps exist.
- Stream-aquifer interaction studies.
- Implementation of the GMP including:
- Committee coordination.
- Project management.
- Implementation of regional conjunctive use program.

During year one of plan implementation, YCWA will prepare an estimate of some of the likely costs associated with the above activities.

TABLE 5
Summary of Action Items

COMPONENT CATEGORY 1: STAKEHOLDER INVOLVEMENT PLAN

Involving the Public

1. Provide public briefings at meetings of the Agency's Board of Directors regarding GMP implementation progress.
2. Work with member units to maximize outreach on GMP activities.

Formation of an Advisory Committee for GMP Development

1. Invite M.U. to form a committee that meets to review progress on topics including, but not limited to; GMP implementation; monitoring reports, potential amendments to the GMP, etc.

COMPONENT CATEGORY 2: MONITORING PROGRAM

Groundwater Storage and Elevation

1. Coordinate with Member Units, DWR, and other basin groundwater extractors (e.g., Beale AFB, municipalities, etc.) to identify an appropriate group of wells for monitoring both during transfer and non-transfer years. Preference will be given to wells currently in an agency's monitoring network that (a) have long records of historic water level data and are useful in assessing trends within the subbasins, (b) have uniform protocols used for measuring and recording the water level data, (c) are non-producing wells or have relatively static levels, and (d) have well construction information. Geographic distribution, basin hydrogeology, and areas of extraction will also be considered.
2. Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that the selected wells are maintained as part of a long-term monitoring network.
3. Coordinate with DWR to ensure that the timing of water level data collection by Member Units and other basin groundwater extractors in transfer years coincides within one month of DWR data collection on wells measured twice a year.
4. Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that needed water level data are collected, verify that uniform data collection protocols are used among agencies, and confirm that data sharing and archiving procedures are implemented.
5. Provide training for the Member Units and other basin groundwater extractors on implementation of data collection protocol, if requested.
6. Consider ways to fill gaps in the monitoring well network by identifying additional suitable existing wells or identifying opportunities for constructing new monitoring wells.
7. Annually assess groundwater storage and elevation trends and conditions based on the network. Compare current trends to historical trends. Present findings to DWR and coordinate on future program modifications.
8. Assess the adequacy of the groundwater storage and elevation monitoring well networks annually.

Groundwater Quality

1. Coordinate with Member Units, DWR, and other basin groundwater extractors (e.g., Beale AFB, municipalities, etc.) to identify an appropriate group of wells for monitoring both during transfer and non-transfer years. Preference will be given to wells currently in an agency's monitoring network that (a) have long records of historic water quality data and are useful in assessing trends within the subbasins, (b) have uniform protocols used for measuring and recording the water quality data, (c) either producing or non-producing wells, appropriately selected for the constituent being monitored, and (d) have well construction information. Geographic distribution, basin hydrogeology, and areas of extraction will also be considered.
2. Coordinate with DWR to ensure that the selected wells are maintained as part of a long-term monitoring network.
3. Coordinate with DWR to ensure that the timing of water quality data collection by Member Units and other basin groundwater extractors in transfer years coincide within one month of DWR data collection.
4. Coordinate with Member Units, DWR, and other basin groundwater extractors on the development of uniform data collection protocols and data sharing and archiving procedures.
5. Coordinate with Member Units, DWR, and other basin groundwater extractors to ensure that needed water quality data are collected, verify that uniform data collection protocols are used among the agencies, and confirm that data sharing and archiving procedures are implemented.
6. Provide training for the Member Units and other basin groundwater extractors on implementation of Action Item #5, if requested.
7. Consider ways to fill gaps in the monitoring well network by identifying additional suitable existing wells or identifying opportunities for constructing new monitoring wells.
8. Coordinate with Member Units, DWR, other basin groundwater extractors, and other local, State, and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples from those wells. If wells are sampled through other programs, coordinate with the appropriate agency on sharing of data.
9. Assess current groundwater quality trends in comparison to historical trends. Present findings to DWR and coordinate on future program modifications.
10. Obtain DWR's 2002 water quality data for the 84 wells that were sampled and prepare Stiff plots and tri-linear diagrams to evaluate geographical trends in groundwater quality.
11. Assess the adequacy of the groundwater quality monitoring well network annually.

Inelastic Subsidence

1. Coordinate with DWR on the necessity of developing and implementing a monitoring program.
2. Explore funding opportunities for the installation of subsidence extensometers and other benchmarks to perform periodic repeat-level surveys at the benchmarks if a monitoring program is determined to be warranted.
3. Educate Member Units on the potential for land surface subsidence and signs that could be indicators of subsidence.

Groundwater and Surface Water Interaction

1. Meet with DWR to understand the results of its Bear River study and the need for future studies.
2. Meet with DWR to determine the need to and cost-effectiveness of installing additional monitoring stations.
3. Coordinate with DWR on the development of uniform data collection protocols and data sharing and archiving procedures.

Data Management System

1. Continue to coordinate with member units and other water purveyors to determine what types of data are currently available and in what formats.
2. Develop data management methods on an as needed basis for data determined critical to the management of water resources in Yuba County.

COMPONENT CATEGORY 3: GROUNDWATER RESOURCE PROTECTION

Well Construction, Abandonment and Destruction Policies

1. Schedule a meeting with the County Department of Environmental Services, Member Units and interested M&I water purveyors to facilitate the exchange of information of existing County well ordinances and discuss possible new ordinances, such as a minimum depth for new wells.
2. Request that Beale AFB provide a copy of the most recently delineated investigation borders for remediation sites originating from Beale AFB, and other known groundwater contaminant sources to; YCWA Members Units and M&I water purveyors within the County for their review and possible use (i.e. locating and designing new wells and for possible transfer pumping).
3. Provide support to Member Units on well construction, destruction and abandonment as requested. For example, providing access to existing analysis on subsurface hydrogeology for the construction of new wells.
4. Obtain "wildcat" well map from California Division of Oil and Gas to ascertain the extent of historical gas well drilling operations in the area as these wells could function as conduits of contamination if not properly destroyed.

Wellhead Protection Measures

1. Request that municipalities provide vulnerability summaries from the DWSAP to the YCWA to be used for guiding management decisions in the basin.

Protection of Recharge Areas

1.Coordinate with the SWRCB regarding participation in the GAMA Program when appropriate.

Fuel Storage Tanks

1. Request information from the RWQCB and other responsible agencies with regard to water quality concerns within the Basin.
2. Coordinate with Beale AFB to obtain annual monitoring reports describing extent of groundwater contamination plumes on Base.
3. Provide YCWA Members Units with all information obtained from OES and the RWQCB on the extent of the investigation areas of contaminant plumes and LUST sites for their information in developing groundwater extraction patterns and in the siting of future production or monitoring wells.

Control of Saline Water Intrusion

1. Request information from the RWQCB and other responsible agencies with regard to water quality concerns within Basin.
2. Acquire geophysical logs for oil and gas exploration borings. These logs are available through the State of Department of Conservation Division of Oil and Gas. These electrical geophysical logs will delineate the base of freshwater at each boring location.
3. Publish information obtained from DWR and other sources on salinity trends in annual basin report.

COMPONENT CATEGORY 4: GROUNDWATER SUSTAINABILITY

1. Continue pursuing the project to deliver surface water to WWD.
2. Coordinate with member units to use monitoring data to maintain the health of the subbasins.

5.0 REFERENCES

Bookman-Edmonston Engineering: Ground Water Resources and Management in Yuba County. September 1992.

California Department of Water Resources (DWR). California's Groundwater. Bulletin 118. Update 2003.

California Department of Water Resources (DWR). California Well Standards. Bulletin 74-81 & 74-90 combined. 1974, 1990.

Sacramento Groundwater Authority. Groundwater Management Plan. December 2003.

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6.0 APPENDICES

Appendix A The Yuba County Water Agency Act

Appendix B Copies Of Public Notices

Appendix C Copy of Invitation Letter for Formation of the WAC Dated Nov 1, 2003

Appendix D Copy of Yuba County Environmental Health Department Well Drilling Permit

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Appendix E

Linda County Water District Water Quality Consumer Confidence Report

Linda County Water District
2003 Water Quality Consumer Confidence Report
Public Water System Number 58-10002

Dear Customer:

Linda County Water District is required by the E.P.A. and the California Dept. of Health Services to provide you with an annual report on the quality of the water served to our customers. If you have any questions about the quality of the drinking water in Linda or would like additional information, please call me at 743-2043, or stop by my office at 1280 Scales Street between 8:00 a.m. and 5:00 p.m. Monday through Friday.

Douglas W. Lofton, ***District Manager***

The water supply for Linda originates from ground water pumped from 5 wells, Nos. 3, 4, 12, 14 and 15. These wells are strategically located throughout the District to ensure a constant pressure level.

DEFINITIONS OF SOME OF THE TERMS USED IN THIS REPORT

Maximum Contaminant level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is technologically, and economically feasible.
Primary Drinking Water Standards (PDWS): MCLs for contaminates that affect health along with their monitoring and reporting requirements, and surface water treatment requirements.
Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Federal Environmental Protection Agency (USEPA)
n/a: nonapplicable
ppb: parts per billion or micrograms per liter
ppm: parts per million or milligrams per liter
nd: non detectable at testing limit

MICROBIOLOGICAL WATER QUALITY:

Testing for bacteriological contaminates in the distribution system is required by State regulations. This testing is done regularly to verify that the water system is free from coliform bacteria. The minimum number of tests required per month is 12. In our distribution system, we test the water weekly for coliform bacteria. The highest number of samples found to contain coliform bacteria during any one month was zero.

LEAD & COPPER TESTING RESULTS:

Lead & copper testing of water from individual taps in the distribution system is required by State regulations. The table below summarizes the most recent monitoring for these constituents in parts per billion or micrograms per liter.

	Sample Date	No. of Samples Required	No. of Samples Collected	90th Percentile Results ppb	ActionLevel (ppb)	MCLG ppm	No. of samples that exceeded action level
Lead	2003	20	24	<2.0	15	2	0
Copper	2003	20	24	61	1300	170	0

DETECTED CONTAMINANTS IN OUR WATER:

The following table gives a list of all detected chemicals in our water during the most recent sampling. Please note that not all sampling is required annually so in some cases our results are more than one year old. These values are expressed in ppm unless otherwise stated. Milligrams per liter are equivalent to parts per million (ppm).

Chemical Detected	Units	Average or Source	Range	Date	MCL	PHG	Origin
Barium	ppb	76	65-120	1994	1000	n/a	oil drilling waste and natural deposits
Total Hardness	ppm	119	72-160	1994	n/a	n/a	naturally occuring
Sodium	ppm	17	0-34	1994	n/a	n/a	naturally occuring
TDS	ppm	201	146-260	1994	1500	n/a	naturally occuring
Chloride	ppm	24	12-44	1994	500	n/a	naturally occuring
Boron	ppm	140	nd-300	2002	n/a	n/a	naturally occuring
The following detected chemicals are source specific							
Benzene	ppb	nd Well 12	nd	2003	1.0	0.5	discharge from gas storage tanks and landfills
Sulfate	ppm	2.3 Well 14	n/a	1994	600	0.5	naturally occuring
Arsenic	ppb	2.4 Well 4	n/a	2000	50	n/a	erosion of natural deposits, run off from orchards, glass and electronics production waste

GENERAL INFORMATION ON DRINKING WATER:

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at 1-800-426-4791, or their web site at www.epa.gov/safe water.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly individuals, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Center for Disease Control guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

ADDITIONAL INFORMATION:

A source water assessment has been completed for the five wells serving the community of Linda. The sources are considered most vulnerable to the following activities. Well 12 has contaminants associated with these activities. Water from Well 12 is treated before it enters the distribution system.

Automobile Repair *(Wells 3 and 4)*
Automobile Gas Stations *(Wells 12 and 14)*
Sewer Collection Systems *(Wells 3, 4, and 15)*
Septic Systems *(Well 15)*

A copy of the complete assessment may be viewed at:

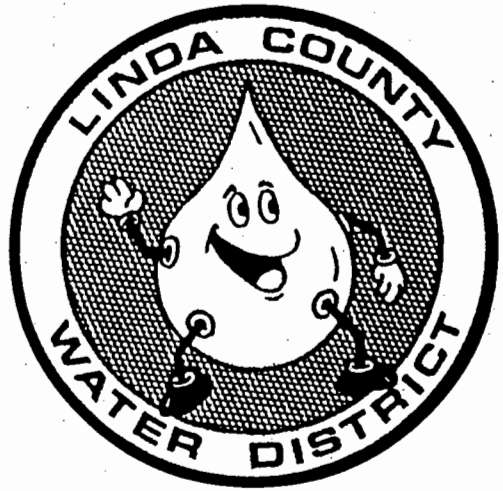
DHS Valley District Office
415 Knollcrest Drive, Suite 110
Redding, CA 96002
Attention: Gunther Sturm, 530-224-4866

or at

Linda County Water District
1280 Scales Street
Marysville, CA 95901
Attention: Doug Lofton, 530-743-2043

*******Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.**

2003
ANNUAL CONSUMER CONFIDENCE REPORT



LINDA COUNTY WATER DISTRICT

(530) 743-2043
1280 SCALES STREET
MARYSVILLE, CA 95901

LINDA COUNTY WATER DISTRICT
1280 Scales Street
Marysville, California 95901

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Linda County Water District
2004 Water Quality Consumer Confidence Report
Public Water System Number 58-1002

Dear Customer:

Linda County Water District is required by the E.P.A. and the California Dept. of Health Services to provide you with an annual report on the quality of the water served to our customers. If you have any questions about the quality of the drinking water in Linda or would like additional information, please call me at 743-2043, or stop by my office at 1280 Scales Street between 8:00 a.m. and 5:00 p.m. Monday through Friday. If you are a landowner of rental property, please provide copies to your tenants.

Douglas W. Lofton, *District Manager*

The water supply for Linda originates from ground water pumped from 5 wells, Nos. 3, 4, 12, 14 and 15. These wells are strategically located throughout the District to ensure a constant pressure level.

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Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Federal Environmental Protection Agency (USEPA)
Maximum Residual Disinfectant Level (MRDL): The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.
Maximum Residual Disinfectant Level Goal (MRDLG): The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.
n/a: nonapplicable
ppb: parts per billion or micrograms per liter
ppm: parts per million or milligrams per liter
nd: non detectable at testing limit

MICROBIOLOGICAL WATER QUALITY:

Testing for bacteriological contaminates in the distribution system is required by State regulations. This testing is done regularly to verify that the water system is free from coliform bacteria. The minimum number of tests required per month is 12. In our distribution system, we test the water weekly for coliform bacteria. The highest number of samples found to contain coliform bacteria during any one month was zero.

LEAD & COPPER TESTING RESULTS:

Lead & copper testing of water from individual taps in the distribution system is required by State regulations. The table below summarizes the most recent monitoring for these constituents in parts per billion or micrograms per liter.

	Sample Date	No. of Samples Required	No. of Samples Collected	90th Percentile Results ppb	Action Level (ppb)	MCLG ppm	No. of samples that exceeded action level
Lead	2004	20	21	<2.0	15	2	0
Copper	2004	20	21	62.5	1300	170	0

DETECTED CONTAMINANTS IN OUR WATER:

The following table gives a list of all detected chemicals in our water during the most recent sampling. Please note that not all sampling is required annually so in some cases our results are more than one year old. These values are expressed in ppm unless otherwise stated. Milligrams per liter are equivalent to parts per million (ppm).

Chemical Detected	Units	Average or Source	Range	Date	MCL	PHG	Origin
Barium	ppb	105	81-143	2004	1000	n/a	oil drilling waste and natural deposits
Total Hardness	ppm	119	72-160	1994	n/a	n/a	naturally occuring
Sodium	ppm	17	0-34	1994	n/a	n/a	naturally occuring
TDS	ppm	245	196-280	2004	1500	n/a	naturally occuring
Chloride	ppm	34	13-80	2004	500	n/a	naturally occuring
Boron	ppm	140	nd-300	2002	n/a	n/a	naturally occuring
Benzene	ppb	nd Well 12	nd	2004	1.0	0.5	discharge from gas storage tank and landfills
Sulfage	ppm	10	.04-32	2004	600	0.5	naturally occuring
Asenic	ppb	2.4 Well 4	n/a	2004	50	n/a	erosion of natural deposits, run off from orchards, glass and electronics production waste

GENERAL INFORMATION ON DRINKING WATER:

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at 1-800-426-4791, or their web site at www.epa.gov/safe water.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly individuals, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Center for Disease Control guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Disinfection Byproducts, Disinfectant Residuals, and Disinfection Byproducts Precursors

Contaminants	Distribution System Results	MCL or [MRDL]	PHG [MCLG or [MRDLG]	Major Sources in Drinking Water
TTHMs [Total Trihalomethanes] (ppb)	7.3	80	n/a	Byproduct of drinking water chlorination
Halocetic Acids (ppb)	nd	60	n/a	Byproduct of drinking water disinfection
Chlorine (ppm)	Range 0.05-0.7 Average 0.22	4.0	4.0	Drinking water disinfectant added for treatment

ADDITIONAL INFORMATION:

A source water assessment has been completed for the five wells serving the community of Linda. The sources are considered most vulnerable to the following activities. Well 12 has contaminants associated with these activities. Water from Well 12 is treated before it enters the distribution system.

Automobile Repair *(Wells 3 and 4)*
Automobile Gas Stations *(Wells 12 and 14)*
Sewer Collection Systems *(Wells 3, 4, and 15)*
Septic Systems *(Well 15)*

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DHS Valley District Office
415 Knollcrest Drive, Suite 110
Redding, CA 96002
Attention: Richard Hinrichs, (530) 224-4867

or at

Linda County Water District
1280 Scales Street
Marysville, CA 95901
Attention: Doug Lofton, (530) 743-2043

*******Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.**

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Appendix F

Proposed Water Shortage Contingency Ordinance/Resolution

DRAFT WATER SHORTAGE
CONTINGENCY RESOLUTION

LINDA COUNTY WATER DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

Introduced by:

Seconded by:

WHEREAS, the California Legislature amended Water Code Sections 10620, 10631, and 10652, and added to Section 10656 during the First Extraordinary Session of 1991-1992 such that each urban water supplier shall, not later than December 31, 2005, prepare, adopt, and submit to the California Department of Water Resources an amendment to its urban water management plan, the primary objective of which is to plan for water supply shortages; and

WHEREAS, this bill, commonly known as the Urban Water Management Planning Act requires all urban water purveyors serving more than 3,000 customers either directly or indirectly, or more than 3,000 acre-feet of water annually, to prepare and submit a plan, or plan update, once every five years; and

WHEREAS, Linda County Water District has prepared and circulated for public review a Draft Water Shortage Contingency Plan; and

WHEREAS, a duly noticed public hearing regarding said Draft Plan was held by Linda County Water District in October 2005; and

WHEREAS, the Board of Directors of Linda County Water District of Alameda County Flood Control and Water Conservation District adopted the Plan in October 2005, and said Plan was subsequently filed with the State of California Department of Water Resources; and

NOW, THEREFORE, BE IT RESOLVED, that said Urban Water Shortage Contingency Plan be approved; and

BE IT FURTHER RESOLVED, that said Plan be filed with the State of California Department of Water Resources.

ADOPTED this 10th day of October 2005, by the following vote:

AYES:
NOES:

ABSENT:
ABSTAIN:

ATTEST: _____
District Clerk

Linda County Board of Directors (indicate names)
Chief, Water Department

Approved as to Form and Legality: _____

District Attorney

No Waste Ordinance

Linda County Water District
Marysville, CALIFORNIA
10 October, 2005

The board of directors of the Linda County Water District does hereby resolve as follows:

The Municipal Code of Linda County Water District is hereby amended by adding Section XX to Chapter XX, to read as follows:

XX-1 PROHIBITING WASTEFUL USE OF WATER

REGULATIONS AND RESTRICTIONS ON WATER USE

It is hereby resolved by the board of directors that in order to conserve the district's water supply for the greatest public benefit, and to reduce the quantity of water used by the District's customers, that wasteful use of water should be eliminated. Customers of the District shall observe the following regulations and restrictions on water use:

1. No customer shall waste water. As used herein, the term "waste" means:

    a. Use of potable water to irrigate turf, ground-cover, shrubbery, crops, vegetation, and trees (agricultural accounts are excluded from the time of irrigation restriction) between the hours of 10:00 o'clock A.M. and 6:00 o'clock P.M. or in such a manner as to result in runoff for more than five (5) minutes;
    b. Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except where necessary for public health or safety;
    c. Allowing potable water to escape from breaks within the customer's plumbing system for more than twenty-four (24) hours after the customer is notified or discovers the break;
    d. Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle and bucket except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment.
    e. Use of potable water to clean, fill or maintain decorative fountains, lakes or ponds unless such water is reclaimed.

2. The following restrictions are effective during a declared Water-Shortage Emergency.

    a. No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless expressly requested.
    b. Use of potable water for construction, compaction, dust control, street or parking lot sweeping, building washdown where non-potable or recycled water is sufficient.
    c. Use of potable water for sewer system maintenance or fire protection training without prior approval by the District;
    d. Use of potable water for any purpose in excess of the amounts allocated or each class of service.

3. Other restrictions may be necessary during a declared Water Shortage Emergency, to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

Enforcement

Any customer violating the regulations and restrictions on water use set forth in this chapter shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the district may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the County District Attorney's Office for prosecution. The district may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the Board of Directors.

Penalty for violations

Except as provided in the enforcement section for the first and second violations any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this section or providing false information to the district in response to district's requests for information needed by the district to calculate consumer water allotments shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more that thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable.

Appeals

Variances from the requirements of this Section may be granted by the Board of Directors only after denial of a variance request by the general manager. Appeals of variance request denials shall be made in writing to the secretary of the Board at least 2 weeks prior to the meeting at which they will be heard. Upon granting any appeal, the Board of directors may impose any conditions it determines to be just and proper. Variances granted by the Board shall be prepared in writing, the furnished to the applicant. The board of Directors may require it to be recorded at applicant's expense.

Remedies/Cumulative

The remedies available to the district to enforce this ordinance are in addition to any other remedies available under the district's code or any state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative.

Resolution To Declare A Water Shortage Emergency

Linda County Water District
Marysville, CALIFORNIA
Date

Linda County Water District Board of Directors does hereby resolve as follows:

PURSUANT to California Water Code Section 350 et seq., the Board of Directors has conducted duly noticed public hearings to establish the criteria under which a water shortage emergency may be declared.

WHEREAS, the Board of Directors finds, determines and declares as follows:

(a) The District is the water purveyor for the property owners and inhabitants of New Albion;

(b) The demand for water service is not expected to lessen.

(c) When the combined total amount of water supply available to the District from all sources falls at or below the Stage II triggering levels described in the 2005 Urban Water Management Plan, the District will declare a water shortage emergency. The water supply would not be adequate to meet the ordinary demands and requirements of water consumers without depleting the District's water supply to the extent that there may be insufficient water for human consumption, sanitation, fire protection, and environmental requirements. This condition is likely to exist until precipitation and inflow dramatically increases or until water system damage resulting from a disaster are repaired and normal water service is restored.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Linda County Water District hereby directs the Mayor to find, determine, declare and conclude that a water shortage emergency condition exists that threatens the adequacy of water supply, until the District's water supply is deemed adequate. After the declaration of a water shortage emergency, the director is directed to determine the appropriate Rationing Stage and implement the District's Water Shortage Emergency Response.

FURTHERMORE, the Board of Directors shall periodically conduct proceedings to determine additional restrictions and regulations which may be necessary to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

Moratorium On New Connections During A Water Shortage

DISTRICT OF NEW ALBION
NEW ALBION COUNTY, CALIFORNIA
Date

The Board of Directors of Linda County Water District does hereby resolve as follows:
The Municipal Code of Linda County Water District is hereby amended to read as follows:

XX-1 MORATORIUM ON SERVICE COMMITMENTS AND CONNECTIONS

1 When the District declares a water shortage emergency, the following regulations shall become effective immediately and shall continue in full force and effect to prohibit the following while it remains in full force and effect:
   a. The District shall not issue oral or written commitments to provide new or expanded water service, including will-serve letters.
   b. The District shall not sell meters for water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments, unless building permits have been issued.
   c. The District shall not provide new or expanded water service connections, despite the prior issuance of will-serve letters or other oral or written service commitments and meters, unless building permits have been issued.
   d. The District shall not provide water for use on any new plantings installed after the declaration of a Water Shortage Emergency.
   e. The District shall not annex territory located outside the District's service boundary.

2. The following uses are exempt from the moratorium and upon application to the District shall receive necessary water service commitments and connections to receive water from the District:
   a. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a building permit has been issued by the District on or before the declaration of a Water Shortage Emergency.
   b. Uses, including but not limited to, commercial, industrial, single and multifamily residential, for which a retail meter had been purchased from the District before the declaration of a Water Shortage Emergency, as evidenced by a written receipt and for which a building permit has been issued and remains in full force and effect.
   c. Publicly owned and operated facilities, including but not limited to schools, fire stations, police stations, and hospitals and other facilities as necessary to protect the public health, safety and welfare.

Resolution To Adopt The Urban Water Management Plan

LINDA COUNTY WATER DISTRICT
MARYSVILLE, CALIFORNIA
DATE:OCTOBER 19, 2005

Linda County Water District Board of Directors does hereby resolve as follows:

WHEREAS the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS the District is an urban supplier of water providing water to a population over 9,000, and

WHEREAS the Plan shall be periodically reviewed at least once every five years, and that the District shall make any amendments or changes to its plan which are indicated by the review; and

WHEREAS the Plan must be adopted by December 31, 2005, after public review and hearing, and filed with the California Department of Water Resources within thirty days of adoption; and

WHEREAS the District has therefore, prepared and circulated for public review a draft Urban Water Management Plan, and a properly noticed public hearing regarding said Plan was held by the District on October 10th, 2005, and

WHEREAS Linda County Water District did prepare and shall file said Plan with the California Department of Water Resources by October 21st 2005;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Linda County Water District as
follows:

1. The 2005 Urban Water Management Plan is hereby adopted and ordered filed with the District Clerk;
The district director is hereby authorized and directed to file the 2005 Urban Water Management Plan with the California Department of Water Resources within 30 days after this date;

The district director is hereby authorized and directed to implement the Water Conservation Programs as set forth in the 2005 Urban Water Management Plan, which includes water shortage contingency analysis and recommendations to the District regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation and water recycling programs;

In a water shortage, the district director is hereby authorized to declare a Water Shortage Emergency according to the Water Shortage Stages and Triggers indicated in the Plan, and implement necessary elements of the Plan;

The district director shall recommend to the Board of Directors additional regulations to carry out effective and equitable allocation of water resources; and

The attached budget is approved and authorized for implementation.

ADOPTED this ___ day of _____ 2005, by the following vote:

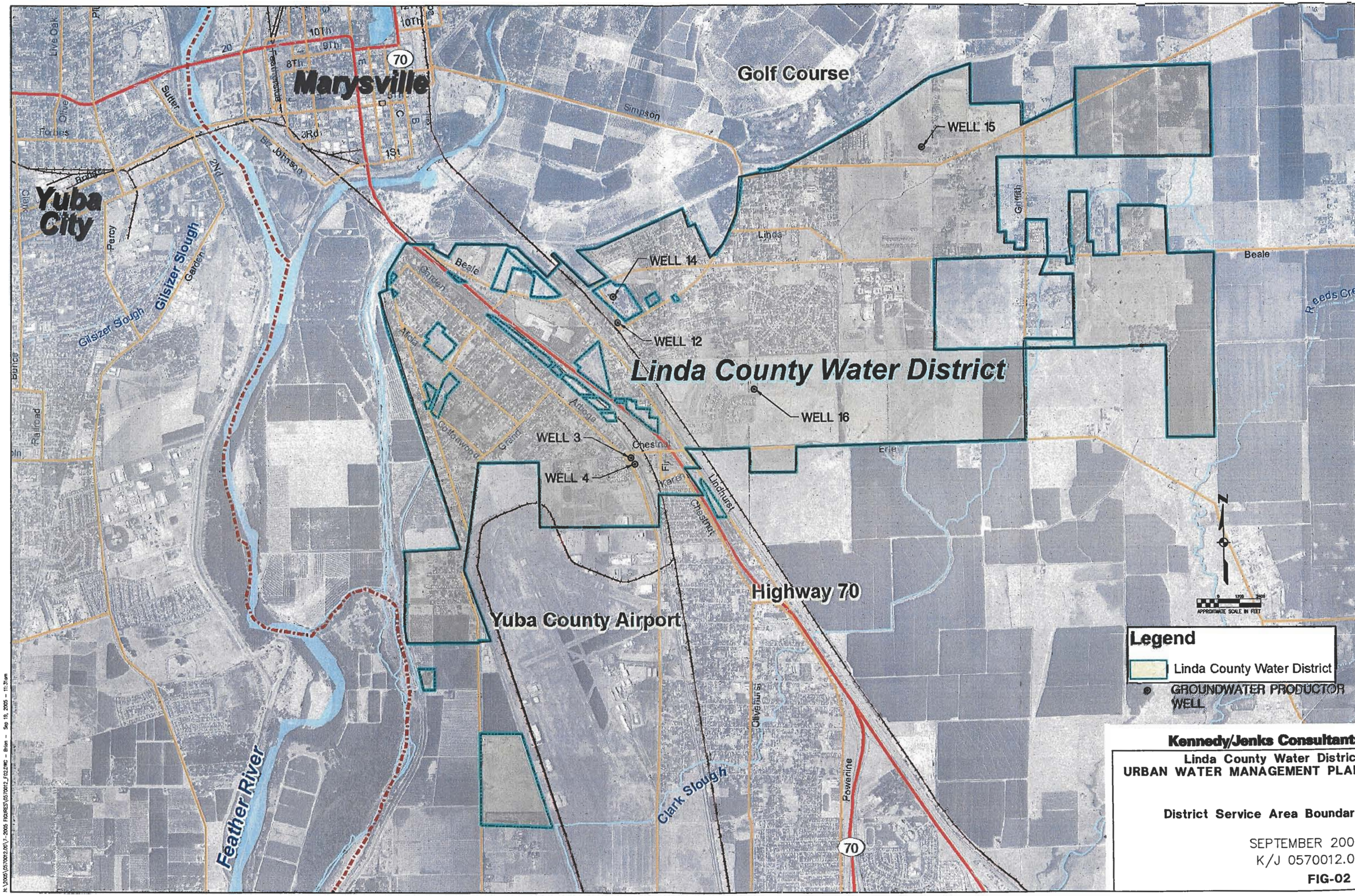
AYES:
NOES:

ABSENT:
ABSTAIN:

ATTEST: _____
District Clerk, _____

District Council Members (indicate names)
Mayor
Director, Public Works Department
Chief, Water Department

Approved as to Form and Legality: _____
District Attorney


Marysville
Yuba City
Golf Course
WELL 15
WELL 14
WELL 12
Linda County Water District
WELL 16
WELL 3
WELL 4
Yuba County Airport
Highway 70
Feather River
Gilsizer Slough
Clark Slough
Simpson
Beale
Linda
Erie
Chestnut
Lindhurst
Olivehurst
Powerline
Griffith
Garden
Atoga
Grand
Colleenwood
Karen
Fir
Sutter
Percy
Forbes
Live Oak
Olive
Bridge
Bunce
Railroad
Pine
Ellis
Biz Johnson
Freeway
10Th
9Th
8Th
5Th
3Rd
1St
2Nd
20
70
Reeds Cre
N
APPROXIMATE SCALE IN FEET
Legend
Linda County Water District
GROUNDWATER PRODUCTOR WELL
Kennedy/Jenks Consultants
Linda County Water District
URBAN WATER MANAGEMENT PLAN
District Service Area Boundary
SEPTEMBER 2005
K/J 0570012.00
FIG-02