



A. Butte County Water Suppliers and Managers

A.1. Overview

Butte County residents, agriculture, and businesses receive water from both surface water and groundwater sources. Surface water deliveries are dictated by an extensive water rights law doctrine that establishes uses of water and priority of different users. California does not have a similarly defined system of groundwater rights, although there are statutes that regulate uses of groundwater. The implementation of the Sustainable Groundwater Management Act of 2014 will be the cornerstone of groundwater management.

A.2. Surface Water Rights

Water has always been an important commodity in California, and a complex system of water rights has developed. Water resources were first significantly used during the Gold Rush of 1848, and competition for water resources intensified with the growth of agriculture and industry.

The highest priority rights are “riparian rights,” which are attached to properties that border natural waterways. Water from riparian rights can be used only on the property adjacent to the waterway, and riparian right-holders cannot transfer their water. Originally, riparian water rights secured water with no limits placed on its use. However, a later court case changed this position and established that water users with riparian rights must be held to a standard of “reasonable use.”

The second type of water rights are appropriative rights, which can be secured by properties not immediately adjacent to waterways. This water rights system was initiated by miners, who would post a notice to divert water and that posting would secure the water right.

Appropriative water rights were recognized legally in 1855, and are prioritized according to a “first in time, first in right” hierarchy. Appropriative water rights are dependent on the water being put to beneficial use. If the water is not used for a period of 5 years, the water rights can expire.

The two types of water rights systems created conflicts between water users, so the Water Commission Act of 1913 was passed to allow more rational control of water rights. The Act declared that water is a property of the state and established a permit process to control water rights. The State Water Resources Control Board (SWRCB) was established to govern the permit process. The Water Commission Act became the basis for appropriating water, but it does not apply to groundwater, riparian rights or appropriative rights established prior to 1914 (“Pre-1914” rights).

Water use must be “reasonable and beneficial.” Beneficial uses include irrigation, domestic, municipal and industrial, hydroelectric power, recreational uses, protection and enhancement



of fish, wildlife habitat, fire protection, frost protection, stock watering, and aesthetic enjoyment.

In years of water shortage, appropriative right-holders must reduce their water use according to inverse priority. Priority is established by the year that the rights were secured, so the most recent right-holders are the most junior and will be subject to cutbacks first during shortages. Appropriative right-holders will continue to be cut back in inverse priority until the shortage is corrected. If the shortage is so severe that a shortfall remains after all appropriative right-holders have stopped using water, then the riparian right-holders must share the remaining reduction.

The many natural waterways in Butte County allow riparian rights for landowners bordering these waterways. The major individual appropriative water right holders in Butte County searched through the State Water Resources Control Board's eWRIMS database at: http://www.swrcb.ca.gov/waterrights/water_issues/programs/ewrims. The major water right holders are defined as those holders having right(s) that provide quantities of water equal to or greater than 1,000 acre-feet.

Adjudicated rights are those assigned by a court judgment that divides the water of a natural waterway between all of the parties within the drainage area. There are two adjudications of water rights in Butte County. One adjudication is known as the Pine Creek adjudication (No. 7814) and involves lands located in the northwestern corner of Butte County and a portion of Tehama County. The major adjudication within Butte County is known as the Butte Creek adjudication (No. 18917).

A.3. The State Water Project

In 1960, California voters approved the Burns-Porter Act, a \$1.75 billion bond issue to finance development of the State Water Project (SWP). Designed and implemented by the DWR, the SWP's main purpose was management of water resources in northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and southern California. Today, the SWP management goals include supply (maximizing diversion, storage, and redistribution of surplus water from wet periods), flood control, power generation, recreation, fish and wildlife protection and habitat enhancement, and water quality improvement. The SWP manages 29 water storage facilities, 18 pumping plants, five hydroelectric power plants, four pumping-generating plants, and 660 miles of canals and pipelines. The SWP has contracts for 4.2 million acre-feet of water, but not all of this water has been developed. Approximately 70 percent of SWP deliveries go to urban users, and 30 percent to agricultural uses. The SWP is the largest state-built, multipurpose water project in the United States.

When the SWP was first under consideration, residents of northern California were concerned that the project would impact their water rights. The state addressed these concerns by including an "area-of-origin" statute, which protects water within areas that the water originates.



The SWP has entered into several contracts within Butte County. Water right settlement agreements were executed with the Joint Water District Boards (555,000 acre-feet) and Western Canal Water District (295,000 acre-feet) to settle protests over the construction of State Water Project facilities at Oroville. Under these agreements, the DWR provides the districts with a water supply from Lake Oroville in exchange for the districts exercising their individual water rights.

The County has an allocation of 27,500 acre feet from the State Water Project for in-county water demand. The County currently contracts with Del Oro Water Company and California Water Service Company in Oroville. Until 2008, the state allowed the County to only pay for the amount of water used. However beginning in 2008, the state required that the County pay the annual cost of the entire allocation. In 2008, the Department of Water and Resource Conservation secured a two-year sale of surplus Table A allocation that provided the County with revenue to cover the cost for almost four years. The unprecedented sale avoided an immediate fiscal crisis and allowed time for the County to explore a long term strategy. The long term strategy was set in motion in 2011. The County entered into a ten year agreement with the Palmdale Water District and Westside Water Districts to lease a portion of the County's Table A allocation not needed for in-county uses. The lease agreements provide financial stability to the management of Table A while retaining the option for meeting future in-county demands.

A.4. Central Valley Project

In the 1930s, as an attempt to protect the Central Valley from water shortages and flooding, the state formulated the Central Valley Project (CVP). However, due to its coincidence with the depression era, the state was unable to finance the project. Despite the shortfall, Federal funding and authorization was provided in 1935 for the U.S. Bureau of Reclamation (USBR) to begin work on the project. The CVP includes 18 reservoirs (with four additional reservoirs jointly owned with the SWP), the largest of which is Lake Shasta on the Sacramento River. The CVP delivers approximately seven million acre-feet (MAF) of water per year, with 6.2 MAF to agricultural uses, 0.5 MAF to urban uses, and 0.3 MAF to wildlife refuge use (DWR Bulletin 160-98).

USBR entered into water rights settlement contracts with various water right holders along the Sacramento River in 1964. The purpose of entering into those contracts was to provide for partial repayment of the construction costs of Shasta Dam, which recognized the benefits they received from that facility and provided agreement with those having water rights for diversions from the Sacramento River (the contracts are for a period of 40 years and are subject to renewal in 2004). USBR also determined deficiencies of those water rights in the critical summer months and provided in contracts for delivery of CVP water during those summer months. One water right holder in Butte County included in this program is M&T, Incorporated. Under its contract with USBR, the total amount of water rights agreed upon is 16,980 acre-feet and a Project water supply of 976 acre-feet for a total of 17,956 acre-feet. The Gray Lodge



Wildlife Area is in the southern portion of Butte County, and a portion of its water supply is served by the CVP.

A.5. East Butte Inventory Unit

The East Butte Inventory Unit includes approximately 219,000 acres in the southern part of the County. It is bordered by Butte Creek to the north and west, the Butte County line to the south, the foothills to the northeast and the Feather River to the southwest. East Butte contains the cities of Biggs and Gridley, and a portion of the city of Oroville. The primary crop types in the region are rice and orchards. The Gray Lodge Wildlife Area is in the southwestern corner of the unit. The cities of Biggs and Gridley use groundwater, but the remainder of the unit primarily utilizes surface-water supplies.

A.5.1. Biggs-West Gridley Subinventory Unit

Biggs-West Gridley is located in the southwest corner of the East Butte Subbasin. The majority of the subinventory unit is composed of Biggs-West Gridley Water District, an agricultural water supplier that provides surface water from the Feather River. The subinventory unit also contains a small part of Gray Lodge Wildlife Area, roughly 2600 acres, which is within the boundaries of the Biggs-West Gridley Water District.

Biggs-West Gridley Water District

Biggs-West Gridley Water District was formed in 1942, and has grown to occupy approximately 34,785 acres. Of Biggs-West Gridley's total area, 31,300 acres are irrigated for agriculture and managed wetland uses. The district's primary crop is rice, with approximately 20,897 acres dedicated to the crop in 2016. Biggs-West Gridley also provides water to the Gray Lodge Wildlife Area, of which 2,600 acres are within their service area. In addition to providing water to the portion of the refuge within their service area, they provide water to an additional 5,900 acres of the refuge as part of an agreement with the USBR to meet CVPIA requirements. There are three other areas south of Gray Lodge (outside of Butte County, but within the District's service area) to which Biggs-West Gridley provides a total of 800 acre-feet of water. Biggs-West Gridley does not make additional deliveries to these areas, but the areas recapture drainage water to use for irrigation purposes.

Biggs-West Gridley joined together with Butte Water District, Richvale Irrigation District, and Sutter Extension Water District to coordinate the acquisition, maintenance and operation of a water supply and distribution facility. Sutter Extension is entirely within Sutter County, and parts of Butte Water District and Biggs-West Gridley are within Sutter County, while Richvale is entirely within Butte County. These districts cooperated to purchase water rights and a canal system from the Sutter Butte Canal Company. The four districts and the Sutter Butte Canal Company entered into an agreement dated July 12, 1956, covering the maintenance and operation of the canal system. This agreement was amended by: (a) an agreement and conveyance dated September 21, 1966, entered into by the District; and (b) an agreement and conveyance dated April 11, 1969, entered into at Biggs and Richvale and consented to by Butte



and Sutter. The districts then entered into four additional agreements affecting their operation, diversion facilities, main canal, and available water. These included: (a) an agreement dated July 6, 1964, entered into by the DWR; (b) an agreement on diversion of water from the Feather River, dated May 27, 1969, entered into by the DWR; (c) a water sale and exchange agreement entered into by PG&E and the districts on or about May 27, 1969; and (d) a consent agreement, dated May 27, 1969, entered into by PG&E and the districts. The four districts created the Joint Water District in 1968 with powers to control, maintain, and operate the joint water distribution facilities of each district, and required the continued maintenance of rainfall, snowfall, weather, evaporation, hydrographic, engineering, and other data and records available and continuously accumulated relating to Feather River water flows, water diversion rights and the use of water within the districts. The Joint Water District's settlement agreement with DWR preserves the Joint Water Board's pre-1914 water rights to the Feather River, allows DWR to divert water from the Feather River for the State Water Project at Lake Oroville, and requires DWR to supply water from the Lake Oroville via Thermalito Afterbay at no charge. The settlement agreement supplies are subject to reductions in water-short years of up to 50% in any one year and not to exceed a total of 100% in any 7 year period.

Some landowners within the District have backup wells to make up for water lost during droughts, or to provide all water during droughts so that the remaining surface water can be marketed. However, the District itself has no production wells. Biggs-West Gridley has up to 3,000 acres of "second status" lands that were brought into the District after 1979. During years when the DWR reduces water deliveries, the second status lands are the first to have their water deliveries reduced. Biggs-West Gridley has a past history of being chronically water short. They have an entitlement of 160,958 acre-feet as an upper limit for their District, but they have been as much as 5 TAF short. In these years, they have bought added supply from other districts within the Joint Board. They also have numerous recapture systems throughout the district that provides approximately 25 TAF and could serve as an additional drought management tool. There are no surface storage facilities within the District. Biggs-West Gridley has a system of canals to distribute water throughout their service area, and they estimate that the system has approximately 1% losses per mile, which include seepage, evapotranspiration, and associated losses. They are 17 miles long, which results in a 17% loss as canals traverse the district. The conveyance system in Biggs-West Gridley is currently handling 700 cfs of diversions during the summer, but it was not designed for this flow. In 2014, USBR commenced construction to enlarge BWGD's conveyance system to meet additional flow requirements associated with delivering new water (CVPIA water) to the Gray Lodge Wildlife Area. USBR's construction is planned over multiple years, and will increase the District's capacity to a flow of 850 cfs.

In 2014 Biggs-West Gridley began the implementation of a Customer Delivery Measurement System to comply with the Water Conservation Act of 2009 (SBX7-7) on their 360 outlets to growers. At 2014 dollars, implementation of the measurement system was estimated to be



approximately \$1,360,202, and to be a multi-year project. Biggs-West Gridley in December of 2015 updated their Agricultural Water Management Plan in accordance with the requirements of the Water Conservation Act of 2009 and Executive Order B-29-15, as issued on April 1, 2015. Additionally, in 2015 Biggs-West Gridley filed with DWR as a Groundwater Sustainability Agency for a portion of the East Butte Groundwater Basin under the Sustainable Groundwater Act of 2014.

Gray Lodge Wildlife Area

Portions of Gray Lodge Wildlife Area are located within the Biggs-West Gridley inventory sub-unit. The refuge is described as part of the Butte Sink subinventory unit because the majority of the refuge is located in that area.

A.5.2. Butte Subinventory Unit

The Butte Subinventory Unit is located in the southeast portion of the East Butte Subbasin. The Butte Subinventory Unit includes Butte Water District, which provides Feather River water for agricultural uses, and the cities of Biggs and Gridley.

Butte Water District

In the spring of 1952, the Sutter Butte Canal Company implemented a 30 percent rate increase. The landowners in the Gridley and Biggs area were concerned about the rising cost of water, and this additional increase provided a strong motivation to take action. The Butte Water District (Butte) was formed in 1953 with plans to acquire 11 percent of the Sutter Butte Canal Company's original water right on the Feather River as well as some of its canals. The District was formed primarily to provide irrigation water for farms in the Gridley and East Biggs area. Butte Water District is slightly more than 18,000 acres in size at present. Butte's surface water is diverted from the Thermalito Afterbay through the Sutter Butte Canal.

Almost all of Butte's acreage is irrigated for agricultural use. The District borders the Feather River, so it has mostly permanent crops such as orchards (10,000 are permanent, which represents 55% of its total irrigated acres). Because it borders the river, Butte has predominantly sandier soils, such as Gridley Loam to Columbia Loam. Farmers grow peaches, prunes, walnuts, almonds, kiwis, melons, rice, small grains, pasture, and alfalfa. At present there are no anticipated changes in crop mix, but city growth has begun to penetrate into agricultural areas.

Butte provides surface water, but many individual farmers have groundwater wells for backup. Surface water is often cheaper than groundwater because customers pay only for the operations and maintenance of the conveyance system that delivers the water, and not for the water itself. The use of surface water instead of groundwater is dependent on the irrigation method. If a farmer is using micro-jet irrigation, it works better with groundwater because it does not require filtration and has adequate pressure for distribution. Farmers sometimes prefer this method because they can easily inject fertilizers, and it is less labor-intensive. However, surface water is much cheaper for rice irrigation.



Butte Water District is a member of the Joint Water Districts, as discussed in the above description under the Biggs-West Gridley Water District. Butte Water District is allotted a portion of 133,000 acre-feet/year out of the total Joint Water District entitlement, and they currently use 70-80% of this total.

City of Biggs

The City of Biggs operates a public freshwater system providing clean water to residents and businesses for drinking, households, and irrigation. Three groundwater wells are operated by certified operators in the City's Public Works Department. Each well is closely monitored and controlled by high-tech state-of-the-art control systems. Water is delivered through the City through a subterranean network of interconnected pipes, over half of which were upgraded and replaced in 2007. Certified operators maintain the system daily and take weekly samples to testing labs. Very little treatment is required for Biggs' water, as the local groundwater sources are excellent in quantity and quality. The city consistently serves high quality water to its residents and provides an annual water quality assessment report. The city recently completed a major water system upgrade including replacement of approximately 30,000 lineal feet of waterline mains; complete refurbishment of two wells; abandonment of the old elevated water tank; and installation of automated telemetry controls, automated emergency generator back-up, a 10,000 gallon hydropneumatic tank, new fire hydrants, and water meters. This project helped the operations costs of the public works department by reducing maintenance caused by leaks within the old system. Additionally, the new upgrade improved service reliability and boosted water pressures city wide from the former 38 psi to approximately 55 psi. The fire department has significantly greater ability to extract water from the system to fight fires. The city has a current adopted Water Master Plan.

City of Gridley

The City of Gridley (Gridley) began to provide water to its residents through the Public Works Department around 1949. There are approximately 960 acres within the city limits. In 2013, the population of Gridley was approximately 6,561 people. Domestic water is provided within city limits primarily by the city's water system, with the exception of private wells at the Butte County Fairgrounds and the Signature Fruit cannery (south of downtown). City water is provided from wells located throughout the city ranging in depth from 240 to 450 feet. The water is treated with chlorine at each well site prior to delivery to customers. Wells are equipped with backup generators. The city's system, has a pumping capacity of 6,280 gallons of water per minute (gpm). The City's distribution system consists of almost 40 miles of pipes that carry water from groundwater wells to Gridley's homes and businesses.

The U.S. Environmental Protection Agency (EPA) is responsible for enforcing drinking water quality standards, although much of this authority is delegated to the states. The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of Americans' drinking water. EPA drinking water standards are developed as a Maximum Contaminant Level (MCL) for each chemical or microbe. The MCL is the concentration that is not anticipated to produce adverse



health effects after a lifetime of exposure, based upon toxicity data and risk assessment principles. The California Department of Health Services (DHS) implements the SDWA in California. DHS requires public water systems to perform routine monitoring for regulated contaminants that may be present in their drinking water supply. A water system with a contaminant exceeding an MCL must notify the public and remove the source from service or initiate a process and schedule to install treatment for removing the contaminant.

A.5.3. Butte Sink Subinventory Unit

Butte Sink is located in the southwest corner of Butte County and receives much of the runoff from the remainder of the county. The Gray Lodge Wildlife Area is located within Butte Sink. Part of the Butte Sink still remains comparatively unchanged from its original condition, although water developments have reduced the amount of flooding. Water for wetlands in the Butte Sink is derived from flood waters, Butte Creek, Sacramento River, and agricultural return flows from rice fields. Within the Butte Basin, 67 organized hunting clubs are now maintained over 52,000 acres of habitat including over 22,000 acres of flooded lands.

Gray Lodge Wildlife Area

In 1931 the DFG purchased the 2,540-acre Gray Lodge Gun Club to establish the first Sacramento Valley wildlife refuge. In 1971, an additional 5,860-acres were purchased, which increased the refuge area to 8,400 acres. The Refuge is located adjacent to the Butte Sink, which is an overflow area of Butte Creek and the Sacramento River. The Refuge's 8,000 acre-feet of firm water supplies are from the Biggs-West Gridley Water District. In addition, Biggs-West Gridley has allocated 12,000 acre-feet of water per year to the Refuge. However, only 8,000 acre-feet are available during the irrigation season from April to November. The Refuge also diverts water from the Reclamation Districts 833 and 2054 Drains, which convey agricultural return flows. The return flows are available only during the summer and early fall when the rice fields are drained. The Reclamation Districts relinquish any right to the water that leaves their boundaries during the period of time that the rice fields are being drained. This water then becomes abandoned, and DFG has filed water rights permits on this abandoned water. Based upon existing data, water quality appears to be adequate for refuge management.

In October 1992, the United States Congress passed Public Law 102-575, known as the Central Valley Project Improvement Act. Part of that legislation made the Secretary of the Interior (Secretary) responsible for providing firm water supplies of suitable quality to maintain and improve wetland habitat areas on units of the National Wildlife Refuge System in the Central Valley of California, including Gray Lodge Wildlife Area. The Secretary is to provide up to current average annual water deliveries, known as level 2, and optimum management water supplies, known as level 4. The amount of water the Secretary is responsible for is that quantity of water less any other water supplies that are available from existing water rights, long-term contracts, and groundwater to the refuges. The refuge has a fairly extensive groundwater well network that provides over four thousand acre-feet per year.



Since the Secretary is responsible, it becomes an obligation of USBR, the operator of the CVP. The USBR does not have facilities to directly serve water to Gray Lodge and must rely on the State Water Project to provide the water from Thermalito Afterbay. The USBR will then enter into a long-term contract with the DWR that will provide replacement for the water delivered from Thermalito Afterbay by making Central Valley Project water available in the Sacramento-San Joaquin Delta. Additional water potentially may be obtained from Thermalito Afterbay and conveyed through Biggs-West Gridley facilities, the Cherokee Canal, or Western Canal Water Users Association (WCWUA) facilities. The Cherokee Canal, an old mining drainage channel, is operated by Richvale Irrigation District, a member of the Joint Water District. Water from the Cherokee Canal could be diverted to BWGWD for delivery to the Refuge. The WCWUA facilities divert water from Thermalito Afterbay and are operated year-round to deliver water to hunting clubs in the Butte Sink.

A.5.4. Cherokee Subinventory Unit

Cherokee Sub-Inventory Unit covers an area of approximately 14,700 acres. Cherokee Sub-Inventory Unit (SIU) is bordered on the north and east by the foothill area. To the northwest are the Pentz and Esquon Sub-Inventory Units (SIU), to the southwest lies the Western Canal SIU, and due south is the Thermalito SIU. The majority of water volume pumped from groundwater in the Cherokee SIU is for farmland irrigation. Domestic water supply usage from the aquifer is of smaller volume but equally critical. There are presently few other sources of water for domestic use in the Cherokee SIU. All residents are totally dependent on water from the aquifer system except for few who use water from natural springs near the eastern perimeter of the Cherokee SIU. Rural housing is quickly developing and increasing in numbers in Butte Valley and will increase demands for groundwater in the Cherokee SIU.

A.5.5. Esquon Subinventory Unit

The Esquon Subinventory Unit is in the northern portion of the East Butte Subbasin. Esquon contains the Durham Mutual Water Company, an agricultural water supplier. Rancho Esquon (Adams-Esquon Ranch), a large, privately owned agricultural facility, is also in the Esquon Subinventory Unit. The majority of land use within Esquon is agricultural, with crops including rice, almonds, corn, pasture, and others.

Rancho Esquon

Rancho Esquon is a major landowner within the Esquon Subinventory Unit. Rancho Esquon is also part of the Butte Creek adjudication, and has water rights to divert water from Adams-Esquon Dam. They have rights (of varying priority) to 7.14 cfs of water throughout the year, with an additional 13.25 cfs from April 1 to September 30 and 8 cfs from April 1 to June 15. In addition to the diversion from Butte Creek, Rancho Esquon has water rights to Hamlin Slough, which is a tributary to Butte Creek and also part of the Butte Creek adjudication. The ranch utilizes groundwater to meet demands not met by surface water.



Durham Mutual Water Company

Durham Mutual Water Company was created by area residents. The company provides surface water for agricultural uses from Butte Creek. Durham Mutual Water Company is part of the Butte Creek adjudication, and has first priority rights to 44.7 cubic feet per second (cfs). The water is diverted at Durham Mutual Dam, and is then conveyed to customers in the service area.

A.5.6. Pentz Subinventory Unit

The Pentz Sub-Inventory Unit (SIU) covers an area of about 1,900 acres in the northern portion of the East Butte Inventory Unit. It is bordered by Butte Creek to the north, the North Fork of Dry Creek to the south, foothills to the east, and Highway 99 to the west. The land uses within this SIU are non-irrigated native vegetation, pasture, and low density residential. Current groundwater use in the Pentz SIU is minimal. Pentz is located at the edge of the foothills, so the terrain is starting to become rocky and more difficult to develop. The low levels of development correspond to low water uses in the region. The main source of water is groundwater, and it is used for domestic water supply.

A.5.7. Richvale Subinventory Unit

The Richvale Subinventory Unit is located on the west side of the East Butte Subbasin. Richvale contains Richvale Irrigation District, an agricultural surface water supplier, and the Little Dry Creek Unit of the California Department of Fish and Game.

Richvale Irrigation District

Richvale Irrigation District was formed by a vote of the landowners on June 23, 1930 to provide agricultural water. Richvale is allocated 27% of 555,000 acre-feet (i.e. 149,850 acre-feet) of water annually acquired by the Joint Water District pursuant to pre-1914 water rights, subject to deficiency limitations in the May 1969 agreement.

The Joint Water District and associated agreements are described in greater detail under the Biggs-West Gridley Water District. In addition, Richvale has a riparian water right on Little Dry Creek for 18,300 acre-feet that can only be used during April – September. The District encompasses a land area of approximately 33,000 irrigable acres in Butte County. Richvale distributes its water supplies annually during the irrigation season, generally commencing by charging its water distribution system with surface water supplies from Thermalito Afterbay in April each year, and generally completing its water distribution by October 31 each year. The District may continue water distribution from November to January for rice straw decomposition, to benefit wildlife habitat in the Butte Basin, and to comply with restrictions on rice straw burning. Water supplies distributed during times of shortage are allocated pursuant to a proration and water duty imposed upon crops grown by district landowners as determined by the Board of Directors.



Little Dry Creek Unit (DFG)

DFG bought 3,736 acres of what was formally the Schohr Ranch in 1988 and 1999. This property is a secondary annex to the Richvale Irrigation District and the Biggs-West Gridley Water District. It has water rights to Butte Creek, the 833 drain, and the Cherokee Canal. The main source of water is the 100 drain from Richvale Irrigation District, which enters approximately the center of the Unit from the north and eventually flows into Butte Creek (within the Unit). Water is lifted primarily by low lift pumps into delivery channels to be distributed throughout the area. The water issues in the Little Dry Creek Unit are layered with legal easements and court decisions as to how the water is to be shared with the neighbors. There are six agricultural wells on the property located along the northern boundary.

The water flow is primarily north to south. Five of these wells came with the purchase of the property. DFG installed one well on the area, which has a 16-inch casing and is 500-feet deep to produce approximately 5,000 gpm. Well water is used primarily in the spring before irrigation water is available and in the fall when the agricultural canals are down for rice harvest. In addition, the wells are used to irrigate many wildlife plantings. Water rights to Butte Creek have not been used so that the water can be left in the channel for in-stream flows to help with the salmon issues in Butte Creek. The Little Dry Creek Unit has not been fully developed or funded by DFG, and water allotments have not been fully used. Drought years reduce irrigation district water and drastically increase well water use. Estimated water use at full development is approximately 16,000 acre-feet.

A.5.8. Thermalito Subinventory Unit

The Thermalito subinventory unit is located on the east side of the East Butte subbasin. Thermalito contains part of the City of Oroville, as well as agricultural areas that are not served by a water supplier. Portions of Thermalito Irrigation District and California Water Service Company-Oroville are both included within the Thermalito subinventory unit, and they both provide urban water to Oroville residents. The southern portion of the Thermalito subinventory unit is south of the Thermalito Afterbay, and consists primarily of agricultural land that uses groundwater to irrigate crops.

Thermalito Water and Sewer District

Thermalito Water and Sewer District was originally organized as an agricultural water supplier in 1922. There are approximately 14,000 acres within the service area, with 4,000 to 5,000 acres being served by Thermalito. There is a population of approximately 11,000 in the District and 2,982 connections. The farmers that originally used the majority of the water in Thermalito farmed olives, figs, cotton, and oranges. Agriculture slowly declined within the District due to a combination of factors, including marginal soil. Thermalito now delivers only potable water to a combination of residential, industrial, and governmental users.

Thermalito obtains its surface water from the Concow Reservoir (also known as Wilenor Reservoir). The water enters the West Branch of the Feather River through Concow Creek, then



is released from Oroville Dam and delivered to the District through the Thermalito Power Canal. Thermalito also has five groundwater wells that combine with surface water for a total capacity of 10 mgd (11.2 TAF/yr). However, it is more energy efficient to deliver surface water, so groundwater is used only as a backup. Last year, approximately 1,900 acre-feet of water were supplied within the service area. Thermalito obtained appropriative water rights in 1928 and 1929 to 45% of the stored water in Concow Reservoir, which amounts to a total of 7,225 acre-feet. In 1985, a SWRCB decision allowed the District to receive 8,200 acre-feet. Thermalito uses about 2,000 acre-feet of the 8,200 acre-feet water allotment.

The District stores some of its water in a 2.5 million-gallon storage tank in the distribution center, and another 7,225 acre-feet within Concow Reservoir. Losses of water within the District are believed to be insignificant. Thermalito discovered that many of the apparent leaks were caused by old meters, which had slowed down and were under-indicating the water delivered. As the old meters are replaced, calculations indicate that less water is lost throughout the system.

Thermalito collects sewage within its service area, which is conveyed to a plant run by the Joint Powers Authority, which includes Thermalito, the Sewer Commission Oroville Region (SCOR), and the Lake Oroville Area Public Utilities District. Together they send around 4.5 million gallons per day (MGD) of treated wastewater into the Feather River.

Thermalito has some concerns within its District. It is trying to extend water mains to vacant land to help accelerate development. The District also has estimated that the water treatment plant will need to be expanded within 8-10 years. The current capacity of the treatment plant is 4.5 MGD. The plant full build-out capacity is 10 MGD. During periods of high turbidity in the raw water, groundwater wells can be utilized to avoid excessive backwashing of the treatment plant filters. Groundwater wells can also be utilized supplement plant output during peak consumption.

California Water Service Company, Oroville

California Water Service Company, Oroville (CalWater-Oroville) is a private water supplier that purchased a local water district in Oroville in 1927. CalWater-Oroville provides water within the Oroville city limits, minus areas served by other Oroville water suppliers (Thermalito Water & Sewer and South Feather Water & Power).

The population within CalWater-Oroville is approximately 10,400 and almost all of the water that CalWater-Oroville provides is dedicated to urban use (residential, industrial, and commercial). The company does provide agricultural water to farmers along the delivery canal. However, during a drought the agricultural users are the first to be cut back.

CalWater-Oroville purchases its raw water supply from PG&E, which diverts water from the West Branch of the Feather River, which travels along PG&E's ditch and is dumped into Lake



Oroville from PG&E's Lime Saddle Power House. The water is then picked up on the Powers Canal at station 14. The company also purchases Table A Water from Butte County.

CalWater-Oroville has four groundwater wells, but they are only used during PG&E shutdowns or during high demand periods. The average water quantity supplied by the company is 4.85 TAF/yr. The peak daily use is approximately 6.5 mgd. The average daily use during high demand is 5.5 mgd. CalWater-Oroville has two reservoirs and two storage tanks, providing a total of 7.209 million gallons of storage.

Conveyance losses from the Miocene Canal, used for irrigation customers do occur, but they are difficult to determine with any certainty because quantities vary with deliveries. Losses in the distribution system are a minor concern. CalWater-Oroville detects major losses through pressure gauges on pumps, and the company has a leak detection program that checks the entire system for leaks once or twice a year. This program has found and repaired several leaks. Also, operators check daily for unusual changes in meter readings, which may indicate a leak or other anomaly.

CalWater-Oroville has access to a considerable supply of water with two raw water sources and 4 deep water wells. The past 4 years of drought confirm conservation is important even though there is ample water available for this district.

A.5.9. Western Canal Subinventory Unit

The Western Canal Subinventory Unit is on the west side of the East Butte Subbasin. Western Canal contains the portion of the Western Canal Water District that is east of Butte Creek.

Western Canal Water District

The WCWD was formed to provide agricultural water by vote of landowners on December 18, 1984. The District purchased the Western Canal Company water system from the PG&E, which had acquired it from Great Western Power Company. The canal was originally developed by the Western Canal Company, which began operations in 1915. The District encompasses a land area of approximately 59,000 irrigable acres in both Butte and Glenn Counties, with approximately 30,700 acres in the East Butte Subbasin and 14,000 in the West Butte Subbasin.

WCWD's original diversion was located at the Western Canal Company's Dam on the Feather River. The diversion facilities and upstream portion of the Western Canal were displaced by the Oroville Reservoir Complex. The supply is now provided by two outlet structures located on the northwest corner of the Thermalito Afterbay. The maximum combined outlet flow is 1,250 cubic feet per second.

The pre-1914 surface water rights of the District comprise 150,000 acre-feet of natural flow of the Feather River, subject to reduction during drought, and 145,000 acre-feet from upstream stored water that is not subject to reduction. Water from the North Fork of the Feather River is stored in a series of reservoirs, known as the Feather River North Fork Project. This water must be taken during the period of March through October (also known as the "quantified period").



Additionally WCWD maintains a water right on Butte Creek for up to 11,400 acre-feet, which can be diverted only during the period of April 1 through June 15.

On May 27, 1969, PG&E entered into an agreement with the DWR to provide for the diversion of Feather River water below Oroville Dam. This agreement spells out the timing and quantity of deliveries by the DWR to WCWD. During drought years, WCWD'S rights to natural flows (150,000 AF) are reduced up to 50% in any one year, not to exceed 100% in seven years.

The District does not own any irrigation wells. Any groundwater used within WCWD is from individual landowners' wells. Many landowners have constructed agricultural production wells to provide a conjunctive-use capability during drought years. A number of the farms to the north of the main canal were entirely dependent upon groundwater supplies until canals and low-lift pumps were installed to provide surface water supply. Current groundwater use within the district boundaries is estimated to be 7,000 acre-feet annually.

WCWD's recent cropping pattern is approximately 90% rice and 10% in other uses (orchards, wildlife habitat and row crops). The cropping pattern is determined through user applications to WCWD and the use of aerial photographs. WCWD is currently observing a minor conversion of rice to orchard crops at slow pace in certain areas of the District.

The conveyance losses within the District are estimated to be about 5%. The losses are calculated from the total diversions from Thermalito Afterbay less the total metered water diversions from the delivery system. Conveyance losses also include losses from water that is conveyed to lands in Glenn County. A portion of WCWD is in Glenn County, and the water must be transported through the Butte County part of the District before it is delivered. In addition, WCWD provides environmental water supply to the Howard Slough Unit of the California Department of Fish and Wildlife in Glenn County.

Finally, WCWD also provides water under obligation to the 1922 Agreement Lands located in Butte Sink. These lands are managed for waterfowl habitat using Butte Creek natural flow and return rice flows and supplemented by WCWD water when flows are inadequate to maintain habitat purposes.

A.6. Foothill Inventory Unit

The Foothill Inventory Unit encompasses approximately 217,300 acres in the foothills of Butte County. The approximate change in elevation within the unit is 1,200 feet. The Foothill Unit contains the city of Paradise as well as a portion of the city of Oroville. The foothills have limited groundwater, and the majority of the water is supplied from surface water.

A.6.1. Cohasset Subinventory Unit

The Cohasset Subinventory Unit is located at the northern end of the Foothill Inventory Unit. The terrain in Cohasset is not conducive to agriculture, so the water use within the area is mainly domestic. The population is approximately 3,500 residents, and they utilize groundwater. The per capita water use is limited in the area because of low yields from wells.



A.6.2. Ridge Subinventory Unit

The Ridge Subinventory Unit is in the center of the Foothill Subinventory Unit, bordered on the north by Butte Creek and on the south by the Feather River. The Ridge contains the City of Paradise and surrounding urban developments, and water supply is a mix of surface water and groundwater. Del Oro Water Company and Paradise Irrigation District provide water to these urban areas.

Del Oro Water Company

Del Oro Water Company serves multiple unincorporated urban areas around the Town of Paradise, Stirling City, Magalia, and the Upper Stilson Canyon area northeast of Chico. Del Oro has five separate service areas: Buzztail, Lime Saddle, Magalia, Paradise Pines, and Stirling Bluffs. The service areas are separated geographically and by the sources of water they utilize.

Buzztail District was acquired by Del Oro from Buzztail Community Services District at the end of 2015. Buzztail is approximately 0.27 square miles, with 35 metered service connections and is served by one groundwater well. The well was not metered prior to 2016, so production data is not available; however 4.58 acre-feet were delivered to customers in 2015.

The Lime Saddle District is approximately 4.64 square miles, with 392 metered service connections (primarily residential). All connections are metered, and losses are not found to be significant. Lime Saddle has two groundwater wells, and also has a contract with Butte County for 300 acre-feet of surface water from Lake Oroville. With the completion of the Regional Intertie Project in 2012, Lime Saddle is able to draw, treat, and distribute sufficient water from Lake Oroville to serve the entire District. In 2015, Lime Saddle treated 128 acre-feet of water from Lake Oroville. In addition, Lime Saddle's two groundwater wells produced 66.51 acre-feet in 2015.

The Magalia District is approximately 0.74 square miles, with 280 metered service connections, which are primarily residential. Magalia has two groundwater wells, which produced approximately 37.69 acre-feet in 2015. In addition to local groundwater wells, Magalia receives surface water from the Stirling Bluffs District. All connections are metered.

The Paradise Pines District is approximately 7.17 square miles, primarily utilizes groundwater, and has 4,808 metered service connections. In addition to local groundwater wells, Paradise Pines receives surface water from the Stirling Bluffs District. The primary water service is for single family residential dwellings. Paradise Pines has four active groundwater wells, which produced 741 acre-feet in 2015. All connections are metered.

The Stirling Bluffs District is approximately 1.35 square miles, with 164 metered service connections. Water use in the area is primarily residential. Stirling Bluffs has a contract to receive up to 365 acre-feet per year of water from PG&E through the Hendrick Canal. In 2015, they diverted 47.05 acre-feet of this water. All connections are metered.



The remaining water from Stirling Bluffs is available for transfer to Paradise Reservoir, which Paradise Irrigation District treats and wheels to Paradise Pines or Magalia. In 2015, of the 365 acre-feet, approximately 327 acre-feet was available to transfer. In 2015, Paradise Pines received 192.50 acre feet and Magalia received 39.95 acre-feet. This water can also be wheeled to Lime Saddle in an emergency.

Del Oro maintains an agreement with Paradise Irrigation District (PID) for the purposes of procuring additional surface water for Lime Saddle, Magalia, and Paradise Pines when necessary. Del Oro last purchased additional surface water from PID in 2012, with 58.56 acre-feet delivered to Lime Saddle. Since the completion of the Regional Intertie Project described above, Del Oro has not purchased water from PID. Del Oro does not expect to purchase water from PID again, barring an emergency situation.

Paradise Irrigation District

Located in central Butte County, California, the Paradise Irrigation District was established in 1916 to supply water to an area of approximately 11,250 acres. PID currently relies predominately on surface water sourced from the Little Butte Creek watershed, a minor stream in the Sacramento Valley drainage that rises in the northwestern foothills of the Sierra Nevada and lies wholly within Butte County. Although a perennial creek, Little Butte Creek receives a relatively large amount of precipitation and resulting runoff. Little Butte Creek conveys surface water and storm runoff into the Paradise Reservoir and Magalia Reservoir; the latter is located approximately one half mile north of the community of Magalia and approximately one mile north of the PID's service area. The PID has three water permits allowing diversion of water from Little Butte Creek: two storage rights and a direct flow right. The average runoff for the watershed is approximately 15,960 acre-feet per year.

Storage is provided by two reservoirs impounded by the Paradise and Magalia Dams located north of Paradise. The upstream reservoir, Paradise Lake, is the main storage facility with a storage capacity of approximately 11,500 acre-feet. Downstream of Paradise Dam, storage behind the Magalia Dam is presently restricted to approximately 800 acre-feet, as the reservoir operating level has been reduced due to dam seismic stability concerns. If repaired, the capacity of Magalia Reservoir is approximately 2,570 acre-feet. The District has approximately 6,000 acre-feet of additional water rights that are not being utilized because of a lack of storage.

Due to the reduced water level behind Magalia Dam, gravity feed to the water treatment plant was no longer possible. A pump station was installed at the base of Magalia Reservoir to pump raw water from the reservoir to the treatment plant. In 2007, a bypass pipeline was installed to provide gravity water to the treatment plant in addition to serving as an alternative source location if Magalia Reservoir is contaminated. The District supplies the majority of the Town's residents using a gravity distribution system and storage facilities with a total capacity of approximately 9.5 million gallons.



The Paradise Irrigation District was established in 1916 to supply water to an area of approximately 11,250 acres with a population of approximately 1,000 people. The District was formed with the express purpose of providing agricultural water to the Paradise area. The District was authorized to operate by the California Water Code, Division 11, Section 20500 to 29978 derived from the 1897 Irrigation District law. The District was organized to bond itself to the extent of \$350,000 to finance the Magalia Reservoir project.

Construction of the Magalia Dam on Little Butte Creek was begun in 1916 and completed in 1917. The Little Butte Creek watershed was chosen because of the relatively large amounts of precipitation and resulting runoff it received, even though it was seasonal. Magalia Dam was located approximately one-half mile north of the community of Magalia and approximately two miles north of the service area. During the early years, Magalia Reservoir water was used almost solely for irrigation, as domestic supplies were obtained from private wells. The primary agricultural crops within the area at that time were pears, apples, walnuts, olives and grapes. The reservoir's capacity was 1,950 acre-feet and water was delivered through an open canal that followed the eastern wall of Little Butte Creek Canyon.

On January 5, 1932, following a period of acute water shortage, the District's customers were asked to vote on whether or not they would permit the installation of water meters. Ballots were mailed out to 650 water consumers and the issue was voted down by a vote of 262 to 172. In May 1933, the District's directors called a meeting to find ways and means of financially sustaining PID. The meeting was attended by 200 customers and the following plan was adopted:

1. That each individual tract or establishment in the District be charged \$6.00 for service.
2. That water used between April and November be paid for at the rate of \$3.00 per acre-foot. This was a special charge for water users only.
3. If two or more families lived on one tract, they would be subject to a \$6.00 service charge for each family or household.

By 1934, meters were installed to all customers amidst a large uproar of the people.

In March of 1934, PID secured a loan of \$260,500 from the Reconstruction Finance Corporation, a federal agency. The outstanding indebtedness of the District at that time was \$521,020. This included \$12,000 worth of irrigation bonds purchased from PID by the State of California in December 1927. These securities bore interest at 6% and maturity dates between 1941 and 1955. A \$160,000 Works Progress Administration project for laying pipe in the District was approved on January 24, 1942. The Federal Reconstruction Corporation made available \$140,000 in bonds to purchase the pipe and fittings for the project.

The method for transporting water out of Magalia Reservoir was upgraded in 1954 when a steel pipeline was constructed to replace the open canal. This was necessary due to water losses, contamination and debris in the water. One attempt to increase the capacity of the reservoir



was the installations of flashboards in the spillway structure. This provided an additional 600 acre-feet of storage, but was later abandoned for safety reasons. The water supply was augmented by purchasing water from PG&E's Hendricks Canal, an option that is no longer available to the District.

The Mosquito Junction Dam (later the Paradise Dam and Reservoir) and Reservoir Project was proposed in 1956 to fulfill the growing requirements for water for both irrigation and domestic use. A special election was held in January 1956 to decide on \$1,500,000 worth of general obligation bonds to finance the project. The measure was approved by a majority of only 53% of the total votes cast. The Mosquito Junction Dam and Reservoir was located approximately two miles upstream from Magalia Reservoir and would provide an additional 6,300 acre-feet of storage area. Construction began on April 20, 1956 and in June 1956 the name was changed to Paradise Dam and Reservoir. This project increased the total usable capacity for the District to 8,350 acre-feet.

Remedial works were completed on Magalia Dam in 1964. The work consisted of stabilizing the existing dam by adding fill material to flatten the downstream slope of the western section below the county road. Approximately 13,000 cubic yards of earth were utilized in the reconstruction. Also 3,200 cubic yards of crushed drain and transition rock were placed on the bottom 3 to 8 feet of the embankment. The Bechtel Corporation served as engineer for the District, and District personnel and equipment were used whenever possible.

Paradise Dam was raised an additional 24.5 feet in 1976 increasing the available storage to 11,497 acre-feet. This project cost four million dollars and increased the District's total capacity to 14,140 acre-feet (a 69% increase), which has since been recalculated and determined to be 14,071 (1992 Topography and Hydrography Study, Harlan-Tait). In 1997, this was further reduced to 12,293 acre-feet as a result of a Magalia Reservoir draw down required by the Division of Safety of Dams due to concerns of seismic stability.

A water filtration plant was added to the District's water system in 1986 due to the increased turbidity within the reservoirs during the winter months. The filtration plant had the capacity to filter six million gallons (mgd) of water per day which met flow requirement during the winter but in the summer unfiltered water was added to the system to meet peak summer flow. The community would not approve a full filtration plant due to the costs involved.

An evaluation of alternatives for expanding the capacity of the existing treatment plant was presented by Brown & Caldwell, September, 1990. The need for the study was driven by changes in drinking water regulations which required the treatment of all surface water supplies. An election was held in June 1992 and the community voted to borrow five million dollars from the Department of Water Resources and to sell Certificates of Participation in the amount of eight million to finance the enlargement project. The measure was approved by a majority of 65% of the voters. In January, 1995 the new treatment plant was completed and placed in service. The new filtration plant has the capacity to treat 22.8 mgd.



A.7. Mountain Inventory Unit

The Mountain Unit includes approximately 407,100 acres in the mountains on the eastern side of the County. The steep terrain limits groundwater accessibility to areas of fractured or jointed rock. There is limited development in the mountain area, so there is little water demand. There are no subinventory units within Mountain, but a portion of the area is provided water from South Feather Water and Power Agency.

South Feather Water and Power Agency

The South Feather Water and Power Agency provides surface water for urban and agricultural uses. The Agency is also within the North Yuba Subbasin, so the District is described in detail in that section.

A.8. North Yuba Inventory Unit

The North Yuba Inventory Unit covers about 47,300 acres in the southeastern portion of the county. The Feather River to the north and west, the Butte County lines to the south, and the foothills to the east border it. North Yuba contains part of the city of Oroville, with a variety of agricultural crops in the remainder of the unit. The primary source of agricultural water is groundwater. North Yuba does not contain any inventory sub-units, but some areas receive water from South Feather Water and Power Agency and California Water Service Company, Oroville.

South Feather Water and Power Agency

South Feather Water and Power Agency, originally named Oroville Wyandotte Irrigation District (“OWID”), has roots extending back to the California gold rush. The ditch system utilized by the Agency today to distribute its irrigation water is a modification and expansion of the ditch network constructed by early miners who diverted water from tributaries of the Feather River to their mining claims.

In 1852, a small ditch company was organized to construct a ditch from the South Fork of the Feather River to the mining sites at Forbestown, Wyandotte, Honcut, Ophir, and Bangor. The Palermo Ditch, completed in 1856 by the Feather River and Ophir Water Company, was a major impetus to the growth of gold mining within the area occupied by the present City of Oroville where rich gold deposits were discovered in 1849. Oroville-Wyandotte Irrigation District was formed in 1919. Originally, the canals in Oroville-Wyandotte were constructed to convey water for hydraulic mining. Most of the infrastructure was built in the 1850s and 1860s, but due to severe environmental damage and associated erosion, hydraulic mining was outlawed in 1884. Two land and water companies, Palermo and South Feather, emerged in the area to take advantage of the existence of the infrastructure.



The land and water companies formed with the intent to sell land to Southern Californians to grow citrus fruits and olives, and they thought that the land would be attractive because it had a water supply.

However, the companies fell onto hard times because the construction costs exceeded original estimates, and the land was not selling as quickly as expected. Around this time, the Wright Act was passed, following the formation of irrigation districts that could levy land taxes. The prospect of collecting taxes was very appealing to the struggling companies, so they formed the Oroville-Wyandotte Irrigation District in 1919.

All residents in the area were not in favor of forming the irrigation district because they did not want to pay the land taxes. Therefore, when Oroville-Wyandotte was formed, customers of the original land and water companies were allowed to receive Oroville-Wyandotte water without needing to join the irrigation district. These customers would receive water at the same priority level as district customers and pay the same rate.

In the years following its formation, Oroville-Wyandotte was constantly faced with problems due to inadequate funding and lack of water supply. To alleviate both problems, it proposed and constructed the South Fork Power Project, which built 8 dams, 17 tunnels, 21 miles of canals and conduits, 4 hydroelectric power plants and 21 miles of road. As a part of this plan, water from the facilities must be delivered to North Yuba Water District to fulfill its water rights on the system. Power from the hydroelectric plants (as well as a hydro-plant built later) was and continues to be sold to PG&E. Today, South Feather Water and Power Agency encompasses 38,320 acres.

South Feather Water and Power Agency serves a population of 17,000, with 6,120 domestic water accounts and 525 irrigation accounts. Urban demand is expected to rise as the historical growth rate of 1.2% is increased because of the Oroville community's accelerated expansion plans.

Supplied water is used for agricultural, residential, and commercial purposes. South Feather Water and Power Agency does not keep track of cropping patterns within the Agency. The land has been subdivided into small parcels, or ranchettes, most of which are not commercial farms. Some farms irrigate, but some do not, such as those producing olive crops. The primary crops are citrus and olives, and viticulture is increasing as well. Viticulture is not commercial yet, but produces wines that are only sold locally.

South Feather Water and Power Agency has four major reservoirs: Little Grass Valley Sly Creek, Lost Creek, Ponderosa, and Miner's Ranch, which total approximately 172 TAF of storage. Sly Creek Reservoir is fed partially by Slate Creek, which is part of the Yuba River system. North Yuba Water District receives water through the Forbestown Ditch from Lost Creek Reservoir. The remainder of the water is for use. There are three canal systems within the Agency that provide raw water to agricultural customers: Forbestown, Bangor, and Palermo. South Feather



Water and Power Agency does not use groundwater but there are some pockets of land within the Agency that have independent private wells.

South Feather Water and Power Agency has both pre-1914 and appropriative water rights totaling 800 TAF, which is more water than is available from within the watershed. The Agency can take 172,145 acre-feet of water from the South Fork of the Feather River and the Yuba River and store it in its reservoirs. South Feather Water and Power Agency uses 27 TAF of water within their service area. The system is 100% metered (or volume-measured for raw water delivery systems, using instruments such as “miner’s-inch” boxes). Losses within the domestic system are believed to be negligible. In 1990, there were up to 160 leaks due to the poor condition of the old steel pipeline system, but with repairs there are now only 6-7 leaks. South Feather Water and Power Agency has completed an aggressive steel pipeline replacement project for their urban deliveries. Losses in the agricultural systems are more significant, with 93% in the Forbestown Canal, and approximately 70-80% in the remainder of the system. In recent years, it has coated canal areas with profuse leaks with concrete, and fixed sections with major leaks. Consideration has been given to rehabilitating the entire ditch system, but the cost is estimated between \$15-\$20 million. The ditch system is already subsidized by the power division, so the Agency cannot justify spending additional money on that system. The Agency would consider repairing the leaks if it could sell the water, but wheeling fees charged by the DWR have made transfers financially prohibitive.

A.9. Vina Inventory Unit

The Vina Inventory Unit includes approximately 88,100 acres in the northern valley area of Butte County. The Butte County line to the north, Big Chico Creek to the south, Sacramento River to the west, and the foothills to the east border it. Vina includes part of the city of Chico and agricultural land in the western half, with orchards as the major crop type. The predominant source of water is groundwater.

A.9.1. California Water Service Company, Chico

California Water Service Company, Chico (Cal Water Chico) is a private company that has been serving the water supply needs of the greater Chico area since 1926, when it purchased three smaller districts in the area. The greater Chico area includes some areas of Butte County as well as the City of Chico.

There are approximately 102,155 people in the service area, but Cal Water Chico does not provide water to the entire population within the service area because there are some private wells sprinkled within this area. Supplied water is used solely for urban purposes. Some water is provided to businesses for landscaping. Cal Water Chico has no surface water supply, so it takes all of its water from 68 deep wells. On average, the company supplies 25.9 TAF a year. In 2015 Cal Water Chico supplied 18.2 TAF due to conservation efforts driven by State mandated drought regulations.



There are 9 tanks (4 above ground) that are used for storage, for a total combined storage of 5.2 million gallons. In principle, losses are tracked by Cal Water Chico's central engineering department. The company has few leaks in the Cal Water Chico's distribution system that are repaired immediately when detected. All wells are monitored and 100% of the connections were metered by the end of 2014.

The treatment facility for the City of Chico is owned and operated by the City. The City of Chico operates and maintains a modern 12 MGD capacity, secondary treatment, activated sludge, wastewater treatment plant with future expandability to 15 MGD capacity. The Chico treatment plant is operating at a capacity to treat 9 MGD but currently receives 7.0 MGD from Cal Water's Chico service area. Treated wastewater from the Chico Wastewater Treatment Plant is not recycled at this point. The facility is in good to excellent condition and has good performance. The effluent is discharged into the Sacramento River from an outfall located 8,600 feet west of the wastewater treatment plant.

Cal Water Chico does not foresee any immediate supply problems within its service area. Its management believes that the water supply is adequate for future growth. The company plans to drill additional wells and pump more water to fulfill higher future demands but is also actively investigating surface water opportunities and recycled water opportunities in the Chico area.

A.10. West Butte Inventory Unit

The West Butte Inventory Unit encompasses approximately 93,900 acres on the west side of Butte County. It is bordered by Big Chico Creek to the north, the foothills to the northeast, the County line to the south, the Sacramento River to the west, and Butte Creek to the east. West Butte includes the town of Durham and part of the city of Chico, as well as agricultural land and environmental refuge areas. The primary source of water is groundwater, although Llano Seco Rancho and M&T Incorporated receive Sacramento River water through the CVP, and several water suppliers have water rights on Butte Creek.

A.10.1. Angel Slough Subinventory Unit

The Angel Slough Subinventory Unit covers an area of about 5,400 acres in the southwest portion of the West Butte Inventory Unit. In summer, in a normal year, at least 70% of this area is supported by groundwater. To the northern and easterly directions it is bordered by the M&T Sub-inventory Unit. The Llano Seco Sub-Inventory Unit borders it to the south and to the west it is bordered by the Sacramento River.

A.10.2. Durham/Dayton Subinventory Unit

Durham/Dayton subinventory unit is the area surrounding the communities of Durham, Dayton and part of Chico, located in the northeast of the West Butte Subbasin. Land use in the area includes urban land use around Durham, Dayton, and Chico, as well as extensive agricultural use, with primarily orchard crops.



Dayton Mutual Water Company

Dayton Mutual Water Company provides surface water to meet the area's agricultural water needs. Rice is the primary crop in the area, with small pockets of other crops. Dayton Mutual has water rights to Butte Creek and the West Branch of the Feather River (diverted through Butte Creek). PG&E diverts water from the West Branch of the Feather River through the Toadtown Canal to generate hydroelectric power before discharging flows to Butte Creek. Dayton Mutual has rights to 3.334 cfs of this water. In addition, Dayton Mutual has first priority rights to 16 cfs of water from Butte Creek.

Durham Irrigation District

The Durham Irrigation District (DID/District) provides domestic water services to approximately 350 parcels in an area south of the City of Chico. In 1935, the Bidwell Municipal Utility District took over a small private water utility that was inadequately serving the town of Durham. The new utility district drilled a new well, installed pumping equipment, and started delivering water to customers. The service area soon embraced the entire town of Durham, supplying 86 services with domestic and commercial water supplies, as well as water for fire protection. Bidwell Municipal Utility District was dissolved by voter mandate and all of its properties were turned over to Butte County. The county waterworks district (Butte County Water Works District No. 1) was then organized to operate the Durham water system under the County Board of Supervisors. However, this method of operation resulted in the rendering of unsatisfactory service and local interests expressed a desire to convert to the type of district that could be managed by a local board of directors. The Durham Irrigation District was formed to provide domestic water and was approved by the voters on February 17, 1948. At that time the District encompassed a total area of 93 acres.

A.10.3. Llano Seco Subinventory Unit

The Llano Seco Subinventory Unit is located in the southwest corner of the West Butte Subbasin. It is composed of the Llano Seco Rancho, which is largely a refuge area.

Llano Seco Rancho

Llano Seco Rancho (also known as Parrott Ranch) was historically agricultural, but a portion of the land was purchased by the U.S. Fish and Wildlife Service (FWS) in 1990. Approximately 2,570 acres were purchased outright, and is now owned by FWS as a reserve. The remaining 6,580 acres still belongs to the Parrott Investment Company, Inc. (PIC), but FWS purchased conservation easements, which are essentially the developmental rights to the land. PIC owns all other rights within the conservation easement areas. On the conservation easements held by FWS, PIC has converted some agricultural acres (mainly rice acreage) to wetland type habitats as well as grasslands.

The Ranch has two water rights, one to the Sacramento River and one to Butte Creek. The major water right is a riparian right on the Sacramento River, which is delivered to the Ranch through the M&T pumping plant. In addition, the Ranch has a water contract with PG&E to the



West Branch Feather River water delivered into Butte Creek through the Toadtown Canal. Finally, the Ranch has a low priority water right to Butte Creek water. Feather River and Butte Creek water is diverted at Parrott-Phelan Dam, and then conveyed to Llano Seco through Edgar Slough and the Parrott Lateral. The FWS and the DFG have an agreement with the Ranch and M&T to have their portion of the Butte Creek water right stay in Butte Creek for in-stream flow benefit for salmon. This agreement allows for the pooling of water during portions of the year to help meet salmon needs.

Llano Seco Rancho (DFW)

The California Department of Fish and Wildlife (DFW) bought 1,521 acres of the Llano Seco Rancho, also known as Parrott Ranch, which it calls the Llano Seco Unit of the Upper Butte Basin Wildlife Area. Llano Seco Rancho maintains the water rights to the property purchased by DFG. However, DFG was granted in the deed to the property the ability to buy water from Llano Seco Rancho.

In addition to surface water purchased from Llano Seco Rancho, the Llano Seco Unit has one deep well on the property that produces approximately 5,000 gpm. This well was primarily installed for drought protection but is used when water is needed for crop purposes during delays in water delivery and when water is unavailable from other sources. The well was installed in 1994 and has a 16-inch casing and a depth of 500 feet.

Llano Seco Rancho (USFWS)

The Llano Seco Unit was established in 1989 as part of the [North Central Valley Wildlife Management Area](#). It is part of the historic Llano Seco Rancho, the last intact Mexican land grant in California. This historic area is bounded by the Sacramento River to the west and is bisected by Angel Slough in the center and Little Chico Creek to the east. This diverse landscape includes riparian floodplains, uplands and wetland basins. The Llano Seco Unit consists of two distinct areas: Sanctuary I (967 acres) and Sanctuary II (765 acres). Managed wetlands comprise nearly half of the total acreage, and consist mostly of seasonally flooded wetlands, with some semi-permanent and permanent wetlands. The remaining acreage is comprised of grasslands, vernal pools, and irrigated pasture with some riparian forest habitats. The Unit supports large populations of wintering waterfowl, as well as other species such as: bald eagle, mountain lion, bobcat, State-listed as threatened greater sandhill cranes, Swainson's hawk, federally threatened giant garter snakes and valley elderberry longhorn beetle, federally endangered vernal pool tadpole shrimp and vernal pool fairy shrimp, and species of concern California linderiella and Ferris's milk-vetch. Sanctuary I has no public use and is an inviolate sanctuary. Sanctuary II has a non-consumptive wildlife-dependent public use including wildlife observation, photography, environmental education and interpretation.

A.10.4. M&T Subinventory Unit

M&T Subinventory Unit is in the northwest corner of the West Butte Inventory Unit and contains the M&T Chico Ranch.



M&T Chico Ranch

M&T Chico Ranch is a large agricultural land owner, with primary crops including rice, dry beans, almonds, walnuts, and prunes. It is approximately 13.5 square miles, primarily bordered by Big Chico Creek to the north, the city of Chico to the east and part of the Sacramento River to the west.

M&T receives water from both surface water sources and groundwater sources. M&T has surface water rights to the West Branch of the Feather River water in Butte Creek, and to surplus Butte Creek flows. M&T has a Sacramento River Settlement Contract with USBR that was created to address the impacts of constructing Shasta Dam. Under its contract with USBR, the total amount of water rights agreed upon is 16,980 acre-feet of Sacramento River water and a Project water supply of 976 acre-feet for a total of 17,956 acre-feet.

As part of the approval process on M&T/Llano Seco's 1996 Sacramento River pumping plant relocation, they developed an agreement with the U.S. Fish and Wildlife Service (FWS) and California Department of Fish and Wildlife (CDFW) to bypass certain flows (maximum of 40 cfs) in Butte Creek to improve the fishery. The bypassed water, also known as (b)(2) water, may amount to 20,000 acre-feet annually and will be considered a part of the habitat restoration program of the Central Valley Project Improvement Act (CVPIA). Bypass period occurs for nine months from October – June of every year. No water will be bypassed from July-September of every year. Since this will be part of the CVPIA, USBR provides a substitute supply of 20,000 acre-feet of CVP water on the condition that FWS and M&T/Llano Seco guarantee that the bypassed flows reach the Sacramento River to keep the CVP whole.

If M&T/Llano Seco leave a portion of their Butte Creek water right in Butte Creek, there may be potential groundwater impacts because the water will no longer flow down Edgar Slough to the ranches south and west of Chico. Edgar Slough is a major winter drain for the city of Chico but also conveys Butte Creek water to M&T/Llano Seco/Dayton Mutual. The slough loses approximately 20% of its flow to groundwater, so reducing flows to M&T/Llano Seco/Dayton Mutual could reduce percolation to groundwater.

A.10.5. Western Canal Subinventory Unit

The Western Canal Water District is an agricultural water district that provides surface water to an area that primarily grows rice. The District is split by Butte Creek, with approximately 24% in the West Butte Inventory Unit, 52% in the East Butte Inventory Unit, and the remaining 24% in Glenn County. The District is described in greater detail under the East Butte Subbasin.



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