Orland-Artois Water District
Water Management Plan
2014 Criteria

Date of 3rd draft – 08/28/2015
Date of final – 09/03/2015

Index

Section I: Description of the District

District Name: Orland-Artois Water District

Contact Name: Emil Cavagnolo

Title: General Manager

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Web Address N/A

A. History

1. Date district formed: 11/05/1954 *Date of first Reclamation contract*: 1963

Original size (acres): Unknown *Current year (last complete calendar year)*: 2014

2. Current size, population, and irrigated acres

	2014
Size (acres)	28,918
Population served (urban connections)	0
Irrigated acres	28,673

3. Water supplies received in current year

Water Source	*AF*
Federal urban water (Tbl 1)	0
Federal agricultural water (Tbl 1)	3,254
State water (Tbl 1)	0
Other Wholesaler (define) (Tbl 1)	0
Local surface water (Tbl 1)	0
Upslope drain water (Tbl 1)	0
District groundwater (Tbl 2)	5,366
Banked water (Tbl 1)	0
Transferred water (Tbl 1)	3,288
Recycled water (Tbl 3)	0
Other (define) (Tbl 1)	0
Total	12,069

4. Annual entitlement under each right and/or contract

	AF	*Source*	*Contract #*	*Availability period(s)*
Reclamation Urban AF/Y	0			
Reclamation Agriculture	53,000	CVP	14-06-200-8382A	March 01 – Feb 28

AF/Y				
Other AF/Y	0			
Other AF/Y	0			

5. Anticipated land-use changes. For Ag contractors, also include changes in irrigated acres.

NONE

6. Cropping patterns (Agricultural only)

List of current crops (crops with 5% or less of total acreage) can be combined in the 'Other' category.

Original Plan (enter date)		*Previous Plan (2008)*		*Current Plan*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
Corn	1,523	Almonds	9,045	Almonds	10,210
Rice	2,773	Olives	3,172	Olives	3,178
Alfalfa	2,777	Pasture	3,158	Pasture	2,066
Beans	1,813	Rice	2,650	Walnuts	1,737
Pasture	2,090	Alfalfa	1,761	Silage	2,085
Other (<5%)	0	*Other (<5%)*	8,887	*Other (<5%)*	9,397
Total	10,976	*Total*	28,673	*Total*	28,673

(See Planner, Chapter 3, Addendum D for list of crop names)

7. Major irrigation methods (by acreage) (Agricultural only)

Original Plan 1994		*Previous Plan (enter date)*		*Current Plan*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
Level Basin	13,651	Level Basin	6,666	Level Basin	7,549
Furrow	5,636	Furrow	6,037	Furrow	2,580
Sprinkler	4,450	Sprinkler	3,035	Sprinkler	2,934
Low-volume	1909	Low-volume	11,417	Low-volume	15,610
Multiple	0	Multiple	0	Multiple	0
Other		*Other*		*Other*	
Total	25,546	*Total*	27,155	*Total*	28,673

B. Location and Facilities

See Attachment A for maps containing the following: incoming flow locations, turnouts (internal flow), and outflow (spill) points, conveyance system, storage facilities, operational loss recovery system, district wells and lift pumps, water quality monitoring locations, and groundwater facilities.

1. Incoming flow locations and measurement methods

Location Name	*Physical Location*	*Type of Measurement Device*	*Accuracy*
336	County Road M, North of 24	Badger Meter	6%
35.2	Road 25 East of Highway 99	Son Tek Meters	6%
38.6	North of Road 28	Badger Meters	6%
41.2	Road D	Son Tek Meters	6%
44.1	Road 35	Son Tek Meters	6%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
0	0	115	0

3 Current year Urban Distribution System

Miles AC Pipe	*Miles Steel Pipe*	*Miles Cast Iron Pipe*	*Miles - Concrete*
0	0	0	0

4. Storage facilities (tanks, reservoirs, regulating reservoirs)

Name	*Type*	*Capacity (AF)*	*Distribution or Spill*
33.6	40X40 Steel Ground Tank	376,000 gal.	Distribution
38.6	40X40 Steel Ground Tank 40’ Steel Elevated Tank	376,000 gal. 250,000 gal.	Distribution Distribution
41.2	40X50 Steel Ground Tank	300,000 gal.	Distribution
44.1	30’ Steel Elevated Tank	100,000 gal.	Distribution
Deep Well 2	15’ Plastic Ground Tank	10,000 gal	Distribution

5. Description of the agricultural spill recovery system and outflow points.

The District water users operate with Recovery Sumps and Recirculation Pumps and have very little spill. The District is not involved in drainage.

6. Agricultural delivery system operation (check all that apply)

Scheduled	*Rotation*	*Other (describe)*
X		

7. Restrictions on water source(s)

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
CVP	Zero Allocation	Drought	Severely limited deliveries
2 Groundwater Wells	None		

8. Proposed changes or additions to facilities and operations for the next 5 years

We are hoping to see an end to the drought. We have entered into multiyear transfers for water with settlement Contractors. We are investing in the Sites Reservoir Project which we hope will

improve our water supply. We are also working with UC Davis on a recharge project which could improve the sustainability of local groundwater for use in drought years.

C. Topography and Soils

1. Topography of the district and its impact on water operations and management

Generally, the District lands are on the Sacramento Valley floor and these are suited to leveling for irrigation. On the westerly edge the lands served are gently sloping and require sprinkler or drip for irrigation. Regulating tanks are used to overcome changes in elevation which are higher than the elevation of the canal.

2. District soil association map (Agricultural only)

See Attachment A, District Soils Map

3. Agricultural limitations resulting from soil problems (Agricultural only)

Soil Problem	*Estimated Acres*	*Effect on Water Operations and Management*
Salinity	0	
High-water table	0	
High or low infiltration rates	0	
Other (define)		

D. Climate

1. General climate of the district service area

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Avg Precip.	4.0	3.4	2.7	1.3	.73	.37	.04	.11	.37	1.1	2.3	3.5	19.95
Avg Temp.	46	50	54	60	67	75	80	78	73	64	54	46	62.1
Max. Temp.	54	60	65	73	82	90	97	95	90	79	65	55	75.3
Min. Temp	37	40	43	46	53	59	63	60	57	50	42	37	48.8
ETo	.95	1.7	3.4	5	6.4	7.6	8.3	7.2	5.4	3.8	1.8	1.1	52.75

Weather station ID 046506 *Data period: Year* 1903 *to Year* 2014

ET Station ID 046506 *Average annual frost-free days:* 266

Frost Free Days - According to National Oceanic and Atmospheric Administration (NOAA), frost free days are days with temperatures greater than 28 degrees Fahrenheit.

2. Impact of microclimates on water management within the service area

There are no micro-climates in the District.

E. Natural and Cultural Resources

1. Natural resource areas within the service area

Name	*Estimated Acres*	*Description*
NONE		

2. Description of district management of these resources in the past or present

NONE

3. Recreational and/or cultural resources areas within the service area

Name	*Estimated Acres*	*Description*
NONE		

F. Operating Rules and Regulations

1. Operating rules and regulations
See Attachment B, District Rules and Regulations (water related)
2. Water allocation policy (Agricultural only)
See Attachment B, Page 4-55 Item 4.
Summary - The District does not give priority to certain crops and therefore the water is allocated equally to every acre that is applied for. Every acre assessed is charged the same amount.

3. Official and actual lead times necessary for water orders and shut-off (Agricultural only)
See Attachment B, Page 4-58
Summary - The District requires 24 hours' notice for turn ons, offs, and any other changes. We do try to remain as flexible as possible due to extenuating circumstances such as the weather.

4. Policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agricultural only)
Summary -
None. The District does not have measurable outflows.

5. Policies on water transfers by the district and its customers
See Attachment B, Page 4-57
Summary – In short water years the District allows its customers to transfer allocations of water based on available water to acres applied for. The water is billed in advance to get water were it is most needed. The District facilitates transfers for customers from settlement contractors and other water districts in the basin.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

Refer to BMP A.1. Information on water measurement for agricultural contractors is completed under BMP A.1 on page 4-9.

2. Urban Customers

a. *Total number of connections* 0

b. Total number of metered connections 0

c. Total number of connections not billed by quantity 0

d. Percentage of water that was measured at delivery point 0

e. Percentage of delivered water that was billed by quantity 0

f. Measurement device table

Meter Size and Type	*Number*	*Accuracy* (+/-percentage)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
6"Propeller					
8" Propeller					
10" Propeller					
12" Propeller					
14" Propeller					
16" Propeller					
10" Doppler					
Compound					
Turbo					
Other (define)					
Total					

*Documentation verifying the accuracy of measurement devices must be submitted with Plan and included as Attachment C.

3. Agricultural and Urban Rates

a. Current year agricultural and /or urban water charges - including rate structures and billing frequency

See Attachment B, Page 4-65, for current year rate ordinance

b. Annual charges collected from agricultural customers

Fixed Charges			
Charges ($ by unit)	*Charge units $/acre, etc.*	*Units billed during year acres, etc.*	*Total $ collected ($ times units)*
$24.94	Per acre	28,918	$721,214.00
$26.80	Per acre	28,878	$773,930.30

Please refer to the guidebook for information when completing the table.

Volumetric charges			
Charges ($ by unit)	*Charge units $/AF, etc.*	*Units billed during year AF, etc.*	*Total $ collected ($ times units)*
$125.00	$125.00/AF	5,793	$725,125.00
$24.00	$24.00/AF	2,793	$69,900.00

Please refer to the guidebook for information when completing the table.

Annual charges collected from urban customers

Fixed Charges			
Charges ($ by unit)	*Charge units ($/meter size)*	*Units billed during year (by meter size) etc.*	*Total $ collected ($ times units)*
NONE			

Please refer to the guidebook for information when completing the table.

Volumetric charges			
Charges ($ by unit)	*Charge units ($/HCF), etc.*	*Units billed during year HCF, Kgal, etc.*	*Total $ collected ($ times units)*
NONE			

Please refer to the guidebook for information when completing the table.
See Attachment C Page (insert page number here), District Sample Bills

c. Describe the contractor's record management system

Meters are read monthly using Laserlite scanners and then downloaded into H2O Pro program. Invoices are generated showing usage by meter. Data is imported into billing software which charges the amounts used with the proper types of water.

H. Water Shortage Allocation Policies

1. *Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated*
   See Attachment B, page 4-57, District Rules and Regulations item 16.
   See Attachment E, page 4-74, Draft water shortage plan

2. *Current year policies that address wasteful use of water and enforcement methods*
   This policy is explained in the District's Rules and Regulations.
   See Attachment B, page 4-55,

I. Evaluate Policies of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management.

Discuss possible modifications to policies and solutions for improved water management.

OAWD is a water short district; we have 28,918 acres and a contract for 53,000 acre-feet of water a year. This is only 1.8 acre-feet of water per acre and not enough to grow most crops. Our challenge is not so much stopping the wasteful use of water but getting enough water to allow our growers to raise their crops. Our growers start with excellent water management to survive. Conservation measures, such as micro and drip irrigation are used throughout the district. In recent years we have seen many acres convert from rice and row crops to orchards. Growers have had to purchase expensive filter systems in order to use surface water. The conservation measures have worked out good and bad. They have reduced the use of water but they have also reduced the amount of surface water being recharged and we have seen our groundwater levels drop to the point of becoming a problem. In dry years we do not have as much groundwater we used to have. We are now trying to encourage growers to use more surface water when it is available and we are looking at artificial recharge in order to protect and increase ground water levels for dry years. For our district we feel conjunctive use is very important.

Section II: Inventory of Water Resources

A. Surface Water Supply

1. Surface water supplies in acre feet, imported and originating within the service area, by month (Table 1).
See Chapter 5, Water Inventory Tables, Table 1

2. Amount of water delivered to the district by each of the district sources for the last 10 years
See Chapter 5, Water Inventory Tables, Table 8.

B. Groundwater Supply

1. Groundwater extracted by the district and delivered, by month (Table 2)
See Chapter 5, Water Inventory Tables, Table 2

2. Groundwater basin(s) that underlies the service area

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
Sacramento Valley	4,900	22,000,000	13,700

3. Map of district-operated wells and managed groundwater recharge areas
See Attachment A, for District Map of Groundwater Facilities
At this time the District does not have a ground water recharge area. Currently we are working with U.C. Davis on a recharge demonstration project. We have previously participated as a key partner in the Stony Creek Fan studies which performed groundwater recharge test on 2 sites within the district boundaries. For the U.C. Davis tests we have requested water from Reclamation to use in the tests. We are hoping to be able to use the earlier data and compare it to new data to see if groundwater can be replenished and stored in our area.

4. Description of conjunctive use of surface and groundwater
The District has 29,000 acres and a contract for 53,000 acre-feet of water for irrigation. This gives us 1.8 acre-feet per acre. Because this is not enough water to grow most crops our growers supplement this water supply with groundwater every year. The amount of groundwater used is dependent on the cost and availability of surface water. The District participates in surface water transfer in most years. Having more water for our growers protects the local aquifers so that the will be a better supply of groundwater for years that surface water may not be available.

At this time we are working on a Groundwater banking and Recharge Investigation Project with U.C. Davis. This project will identify recharge sites in the district and test the feasibility of recharging ground water in fields that are planted with orchards, pasture, and alfalfa.

5. Groundwater Management Plan
See Attachment F, Groundwater Management Plan

6. Groundwater Banking Plan
See Attachment G, Groundwater Banking Plan

C. Other Water Supplies

1. "Other" water used as part of the water supply – Describe supply
See Chapter 5, Water Inventory Tables, Table 1
NONE

D. Source Water Quality Monitoring Practices

1. Potable Water Quality (Urban only)
NONE
2. Agricultural water quality concerns: *Yes* X *No* _____
(If yes, describe) The water coming for the Sacramento River via the TC Canal has never been a problem and is tested by the TC Canal Authority annually. Because of the nature of a Canal we tend to be effected by the growth of aquatic weeds which cause problems for diversions and filters for drip and micro-sprinkler systems. To control aquatic weeds the Canal Authority treats the canal occasionally with Copper treatments and once or twice a year they will treat with Magnacide. We inform our water users of these treatments so they can protect livestock or organic crops from damage.

3. Description of the agricultural water quality testing program and the role of each participant, including the district, in the program.

In 2014, because of the Zero Allotment, the District had an increase in request for the use of Warren Act Contracts so that groundwater could be pumped into the Canal and used in other parts of the District for irrigation. Each of these wells are tested for water quality by Reclamation and then only allowed to be used if the wells meet Reclamation's water quality standards. Several of these wells failed to meet the standards because of slightly high EC levels or elevated levels of trace elements, mostly aluminum. Several of the Districts along the TC Canal suffered similar problems. The Districts felt that when the groundwater was mixed with the river water that the levels of contaminates would be diluted to the point that there may not pose a problem. The District's met with Reclamation and we worked out a process where the Canal would be tested at critical points every 2 weeks and if a problem was noticed the wells would be turned off. Reclamation reviewed its water quality standards and agreed to temporally increase the levels for EC and trace elements to allow the non-conforming wells to be used during a drought year. We set the plan in motion and the results at the end of the irrigation season were that we never exceeded the normal water quality standards much less the temporary elevated standards. This worked so well that Reclamation allowed the testing to be performed on a monthly schedule later in the season. We are now working to have Reclamation review its water quality standards for Warren Act Wells and possibly adjust the standards to allow this type of water to be used in non-drought years.

All testing is performed by Reclamation or the TC Canal Authority. The District provides staff time to help implement the tests by scheduling with pumpers or getting to and from wells.

3. Current water quality monitoring programs for surface water by source (Agricultural only)
See Attachment L;

Analyses Performed	*Frequency*	*Concentration Range*	*Average*

Current water quality monitoring programs for groundwater by source (Agricultural only)
See Attachment L;

Analyses Performed	*Frequency*	*Concentration Range*	*Average*

E. Water Uses within the District

1. Agricultural

See Chapter 5, Water Inventory Tables, Table 5 - Crop Water Needs

2. Types of irrigation systems used for each crop in current year

Crop name	*Total Acres*	*Level Basin - acres*	*Furrow - acres*	*Sprinkler – acres*	*Low Volume - acres*	*Multiple methods - acres*
Almonds	10210		200	1648	8362	
Olives	3178	146			3032	
Pasture	2066	1946		120		
Rice	1359	1359				
Alfalfa	213	213				
Prunes	897			78	819	
Silage	2085		2085			
Walnuts	1737	229		503	1005	
Other	2446					2446
TOTAL	24,191	3893	2285	2349	13218	2446

3. *Urban use by customer type in current year*

Customer Type	*Number of Connections*	*AF*
Single-family	0	
Multi-family	0	
Commercial	0	
Industrial	0	
Institutional	0	
Landscape irrigation	0	
Wholesale	0	
Recycled	0	
Other (specify)	0	

Customer Type	*Number of Connections*	*AF*
Other (specify)	0	
Other (specify)	0	
Unaccounted for		
Total	0	

4. Urban Wastewater Collection/Treatment Systems serving the service area

Treatment Plant	*Treatment Level (1, 2, 3)*	*AF*	*Disposal to / uses*
None			
	Total		
Total discharged to ocean and/or saline sink			

5. Groundwater recharge in current year (Table 6)

Recharge Area	*Method of Recharge*	*AF*	*Method of Retrieval*
None			
	Total		

*6a. Transfers and exchanges **into** the service area in current year – (Table 1)*

From Whom	*To Whom*	*AF*	*Use*
Jack Baber	OAWD	83	Irrigation
Conaway	OAWD	470	Irrigation
Natomas	OAWD	1,500	Irrigation
Gillaspy	OAWD	63	Irrigation
Munson	OAWD	68	Irrigation
Sycamore	OAWD	600	Irrigation
Carter Mutual	OAWD	504	irrigation
	Total	3288	

*6b. Transfers and exchanges **out** of the service area in current year – (Table 6)*

From Whom	*To Whom*	*AF*	*Use*
NONE			
	Total		

7. Wheeling, or other transactions in and out of the district boundaries – (Table 6)

From Whom	*To Whom*	*AF*	*Use*
NONE			
	Total		

8. Other uses of water

Other Uses	*AF*
NONE	

F. Outflow from the District (Agricultural only)

See Facilities Map, Attachment A, for the location of surface and subsurface outflow points, outflow measurement points, outflow water-quality testing locations

1. Surface and subsurface drain/outflow

Outflow point	*Location description*	*AF*	*Type of measurement*	*Accuracy (%)*	*% of total outflow*	*Acres drained*
NONE						

Outflow point	*Where the outflow goes (drain, river or other location)*	*Type Reuse (if known)*
NONE		

2. Description of the Outflow (surface and subsurface) water quality testing program and the role of each participant in the program

The District does not measure or track outflow from the District because it is so minimal. We do not conduct water quality tests.

3. Outflow (surface drainage & spill) Quality Testing Program

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
N/A				

Outflow (subsurface drainage) Quality Testing Program

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
N/A				

4. Provide a brief discussion of the District's involvement in Central Valley Regional Water Quality Control Board programs or requirements for remediating or monitoring any contaminants that would significantly degrade water quality in the receiving surface waters.

   The District is not involved with runoff or drainage. Most of our landowners belong to one of the Sacramento Valley Water Quality Coalition Groups which provide these services.

Districts included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," should also complete Water Inventory Table 7 and Addendum C (include in plan as Attachment J)

G. Water Accounting (Inventory)

Go To Chapter 5 for Agricultural Water Inventory Tables and Instructions.
Go To Chapter 6 for Urban Water Inventory Tables and Instructions.

Section III: Best Management Practices (BMPs) for Agricultural Contractors

A. Critical Agricultural BMPs

1. *Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6%*

   a. *Number of delivery points (turnouts and connections)* 307

   b. *Number of delivery points serving more than one farm* 23

   c. *Number of measured delivery points (meters and measurement devices)* *307*

   d. *Percentage of water delivered to the contractor that was measured at a delivery point* 95%

   e. *Total number of delivery points not billed by quantity* *0*

   f. *Delivery point measurement device table*

Measurement Type	*Number*	*Accuracy* (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter	306	+/-5%	30	60	60
Weirs					
Flumes					
Venturi					
Metered gates					
Acoustic doppler	1	+/-5%	30	48	48
Other (define)					
Total					

**Documentation verifying the accuracy of measurement devices must be submitted with Plan and included in Attachment C.*

2. *Designate a water conservation coordinator to develop and implement the Plan and develop progress reports*

Name: *Emil Cavagnolo* *Title:* Manager

Address: *P.O. Box 218 Orland, CA 95963*

Telephone: 530-865-4304 *E-mail:* oawdemil@sbcglobal.net

Provide the job description and minimum qualifications:

DEFINITION
To design, develop, evaluate, and coordinate the District's Water Conservation Program; and to perform a variety of technical tasks relative to assigned area of responsibility.

SUPERVISION RECEIVED AND EXERCISED
Exercises functional and technical supervision over technical and clerical staff.

QUALIFICATIONS:
- Operations, services and activities of a water conservation program.
- Principles and practices of program development and implementation.
- Basic procedures, methods and techniques of budget preparation and control.
- Marketing theories, principles and practices and their application to water conservation programs.
- Modern office procedures, methods and computer equipment.
- Recent developments, current literature and information related to water conservation.
- Pertinent Federal, State, and local laws, codes and safety regulations.

Experience and Training Guidelines
Any combination of experience and training that would likely provide the required knowledge and abilities are qualifying. A typical way to obtain the knowledge and abilities would be: Experience

Experience:
Three years of increasingly responsible experience providing water conservation, including one year of program coordination activities.

Environmental Conditions:
Office and field environment; work closely with the public; work with computer and office equipment.

Physical Conditions:
Essential functions may require maintaining physical condition necessary for sitting or standing for prolonged periods of time; requires some bending and lifting up to 25 pounds.

3. Provide or support the availability of water management services to water users

See Attachment H, Notices of District Education Programs and Services Available to Customers.

a. On-Farm Evaluations

In the past the District hosted on farm irrigation evaluations performed by the Cal Poly mobile lab, while the District has continued to offer information on this type of program, interest has dropped off. This may be because of the change of cropping patterns towards orchards. Almost all of the new plantings have been using drip or micro-sprinkler irrigation. I believe that growers are using private resources to evaluate their irrigation needs. In 2016 the District plans to contact Glenn County RCD and develop a plan to disseminate the on farm evaluation and performance to our growers.

1) On farm irrigation and drainage system evaluations using a mobile lab type assessment

	Total in district	*# surveyed last year*	*# surveyed in current year*	*# projected for next year*	*# projected 2nd yr in future*

Irrigated acres	0	0	0	100	200
Number of farms	0	0	0	1	2

2) Timely field and crop-specific water delivery information to the water user

Crop-specific water delivery information is available to the water user. The monthly billing statements include current month use and yearly use for each delivery. Annually growers receive a report of their monthly and yearly use by turnout, and use per acre. Most of our growers supplement district water with ground water and the District does not have private ground water use records.

b. Real-time and normal irrigation scheduling and crop ET information

The District has this information available for growers at their request. The district is sent ET information weekly during the irrigation season from the UC David Extension. Growers are told about this in the annual newsletter.

c. Surface, ground, and drainage water quantity and quality data provided to water users

Surface and groundwater quality information is available at the District office. The District will be using an annual newsletter to landowners to inform them of the availability of this information.

d. Agricultural water management educational programs and materials for farmers, staff, and the public

Program	*Co-Funders (If Any)*	*Yearly Targets*
CSU Chico Agricultural Teaching and Research Center	CSU Chico College of Agricultural	Identify new techniques for staff to better manage our water

See Attachment I for sample of provided materials and notices.

e. Other

4. Pricing structure - based at least in part on quantity delivered

Adopt a water pricing structure based on the measured quantity delivered
The District has always priced its water by acre-foot from metered deliveries.

5. Evaluate and improve efficiencies of district pumps

Describe the program to evaluate and improve the efficiencies of the contractor's pumps.

The District has used the services of a local pump company to perform efficiency tests on District pumps. We will test 2-4 pumps per year until all are tested. Our pumps are 30+ years old and we have had to overhaul 2 pumps in recent years. When a pump shows 60% or less, we schedule it for overhaul.

	Total in	*# surveyed*	*# surveyed in*	*# projected for*

	district	*last year*	*current year*	*next year*
Wells	2	0	0	0
Lift pumps	38	2	0	2

B. Exemptible BMPs for Agricultural Contractors

(See Planner, Chapter 2, Addendum B for examples of exemptible conditions)

1. Facilitate alternative land use

Drainage Characteristic	*Acreage*	*Potential Alternate Uses*
High water table (<5 feet)	NONE	
Poor drainage	NONE	
Groundwater Selenium concentration > 50 ppb	NONE	
Poor productivity	NONE	

Describe how the contractor encourages customers to participate in these programs.

2. Facilitate use of available recycled urban wastewater

No recycled urban waste water is available in the District' area at this time.

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
NONE		

3. Facilitate the financing of capital improvements for on-farm irrigation systems

Program	*Description*
NRCS EQUIP Program	The District will provide information in its annual newsletter.
NRCS AWEP Program	The District will provide information in its annual newsletter.

4. Incentive pricing

Describe incentive rate structure or other programs and purpose.

The Board sets a base water rate at the beginning of the year based on our water allocation. Any water that is transferred in or used beyond the base rate is at a higher rate. We have structured as many as 6 rates in a single year.

5. a) Line or pipe ditches and canals

6.

The District has a completely piped system. Maintenance and repairs to pipeline is performed on an as needed basis. The pipeline is functioning well and is in good repair.

Canal/Lateral (Reach)	*Type of Improvement*	*Number of Miles in Reach*	*Estimated Seepage (AF/Y)*	*Accomplished/ Planned Date*
NONE				

b) Construct/line regulatory reservoirs

The District system is completely piped and there has been no need for regulatory reservoirs.

Reservoir Name	*Location*	*Describe improved operational flexibility and AF savings*
NONE		

6. Increase flexibility in water ordering by, and delivery to, water users
See Attachment J, contractor 'agricultural water order' form

7. Construct and operate district spill and tailwater recovery systems

Distribution System Lateral	*Annual Spill (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
NONE		
Total		

Drainage System Lateral	*Annual Drainage Outflow (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
NONE		
Total		

Describe facilities that resulted in reduced spill and tailwater

The District does not have responsibility for drainage and because we have a closed system we do not spill water.

8. *Plan to measure outflow.*

Total # of outflow (surface) locations/points 0
Total # of outflow (subsurface) locations/points 0

Total # of measured outflow points 0

Percentage of total outflow (volume) measured during report year 0

Identify locations, prioritize, determine best measurement method/cost, submit funding proposal

Location & Priority	*Estimated cost (in $1,000s)*				
	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
NONE					

9. Optimize conjunctive use of surface and groundwater

Describe the potential for increasing conjunctive use of surface and groundwater.

The District owns and operated 2 deep aquifer groundwater wells. We use these wells to supplement our water supply in short water years. We can produce 2000-3000 acre-feet of water for irrigation and using a combination of our delivery system and the use of a Warren Act Contract we are able to deliver the well water throughout the district. In normal years our growers depend on ground water to supplement their water supply. In short water years our water users move groundwater to different parts of the district using the district's Warren Act Contract. We also transfer surface water into the district when it is available and when the district is short of water.

In recent years the District has become aware of declining ground water tables do to a rapid growth of new orchards in the Orland-Artois area. Many of these orchards are in non-district lands but their effect on the groundwater tables is being felt by both district and non-district landowners. Along with the Stony Creek Fan Partners, the District, has studied and tested recharge in the District area. At the time we performed the study we found that groundwater was moving in a southeasterly direction and leaving the OAWD area. Since that time, after the increase in orchards, DWR and the County of Glenn have been monitoring the groundwater in the same area and are seeing a sharp decline of the aquifers and possible movement of the groundwater in a westerly direction. If this westward movement proves true the District feels that there may be an opportunity to recharge water in the area until we see it start moving back in a southwesterly direction. We have joined up with Dr. Helen Dahlke from UC Davis to once again test recharge in our area. If successful we hope to eventually implement a recharge program which will promote conjunctive use in the Orland-Artois area.

With the passage of California Proposition 1 in 2014 Groundwater Sustainability Agencies have to be formed and a basin wide groundwater sustainability plan will have to be submitted to the State. OAWD has notified its intention to become a Groundwater Sustainability Agency (GSA). Along with other GSA's in the basin, we will be producing a plan. We are hoping that the GSA's will provide another tool to enhance conjunctive use.

10. Automate distribution and/or drainage system structures
Identify locations where automation would increase delivery flexibility and reduce spill and losses. Describe program to achieve these benefits and estimate the annual water savings.

Our system is automated with a SCADA System which is monitored and operated by the district staff. We are planning to add DW 2 into the SCADA system.

11. Facilitate or promote water customer pump testing and evaluation
See Attachment I, Notices of District Education Programs and Services Available to Customers
The District does not have the equipment, expertise, or staff to perform pump testing and evaluations for its customers. We do provide information on how to get this done. That information is available at the district office. Notice of these programs will be in the annual newsletter.

12. *Mapping*

GIS maps	*Estimated cost (in $1,000s)*				
	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Layer 1 – Distribution system	0	2000	1000	0	0
Layer 2 – Drainage system	N/A	N/A	N/A	N/A	N/A
Suggested layers:					
Layer 3 – Groundwater information	0	0	1000	500	500
Layer 4 – Soils map	0	0	0	2000	0
Layer 5 – Natural & cultural resources	N/A	N/A	N/A	N/A	N/A
Layer 6 – Problem areas	0	0	0	0	1000

C. Provide a 5-Year Budget for Implementing BMPs

1. Amount actually spent during current year.

Year 2015 or Year 1			*Actual Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$2,000*	*1500*
	2	*Conservation staff*	*$0*	*600*
	3	*On-farm evaluation /water delivery info*	*$0*	*20*
		Irrigation Scheduling	*$0*	*200*
		Water quality	*$4,000*	*100*
		Agricultural Education Program	*$0*	*50*
	4	*Quantity pricing*	*$1,000*	*20*
	5	*Contractor's pumps*	*$500*	*30*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$1,000	50
	4	*Incentive pricing*	$0	40
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	200
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	$0	0
	9	*Optimize conjunctive use*	$5,000	1000
	10	*Automate canal structures*	$15,000	100
	11	*Customer pump testing*	$1,000	50
	12	*Mapping*	$0	40
		Total	$29,500	4,000

2. Projected budget summary for the next year.

Year 2016 or Year 2			*Budgeted Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$4,000*	*1000*

	2	*Conservation staff*	*$0*	*40*
	3	*On-farm evaluations/water delivery info*	*$0*	*20*
		Irrigation Scheduling	*$0*	*200*
		Water quality	*$0*	*50*
		Agricultural Education Program	*$0*	*50*
	4	*Quantity pricing*	*$1,000*	*20*
	5	*Contractor's pumps*	*$400*	*30*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$1,000	50
	4	*Incentive pricing*	$0	40
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	100
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$500	200
	10	*Automate canal structures*	$1,000	20
	11	*Customer pump testing*	$1,000	50
	12	*Mapping*	$2000	*200*
		Total	$10,900	2,700

3. Projected budget summary for 3rd year.

Year 2017 or Year 3

BMP #		*BMP Name*	*Budgeted Expenditure (not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$4,000*	*1000*
	2	*Conservation staff*	*$0*	*40*
	3	*On-farm evaluations/water delivery info*	*$0*	*40*
		Irrigation Scheduling	*$0*	*200*
		Water quality	*$0*	*40*
		Agricultural Education Program	*$0*	*40*
	4	*Quantity pricing*	*$1,000*	*20*
	5	*Contractor's pumps*	*$400*	*30*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$1,000	50

	4	*Incentive pricing*	$0	20
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	100
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$0	100
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$1,000	50
	12	*Mapping*	$2,000	*100*
		Total	$9,400	1,830

4. Projected budget summary for 4th year.

Year 2018 or Year 4

BMP #		*BMP Name*	*Budgeted Expenditure (not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$4,000*	*1000*
	2	*Conservation staff*	*$0*	*40*
	3	*On-farm evaluations/water delivery info*	*$0*	*20*
		Irrigation Scheduling	*$0*	*40*
		Water quality	*$0*	*40*
		Agricultural Education Program	*$0*	*20*
	4	*Quantity pricing*	*$1,000*	*20*
	5	*Contractor's pumps*	*$400*	*30*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$1,000	50
	4	*Incentive pricing*	$0	20
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	100
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$1,500	500
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$1,000	50
	12	*Mapping*	$2,500	*200*
		Total	$11,400	2,130

5. Projected budget summary for 5th year.

Year 2019 or Year 5

BMP #		*BMP Name*	*Budgeted Expenditure (not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$6,000*	*1500*
	2	*Conservation staff*	*$0*	*40*
	3	*On-farm evaluations/water delivery info*	*$0*	*20*
		Irrigation Scheduling	*$0*	*60*
		Water quality	*$0*	*40*

		Agricultural Education Program	*$0*	*20*
	4	*Quantity pricing*	*$1,000*	*20*
	5	*Contractor's pumps*	*$400*	*30*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$1,000	50
	4	*Incentive pricing*	$0	20
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	100
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$1,000	100
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$1,000	50
	12	*Mapping*	$1,500	*200*
		Total	$11,900	2,250

Section IV: Best Management Practices for Urban Contractors

A. Urban BMPs

Foundational BMPs

1. Utility Operations Programs
    1.1. Operations Practices
        A.1) Conservation Coordinator
        A.2) Water waste prevention
        A.3) Wholesale agency assistance programs
    1.2. Water Loss Control
    1.3. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
    1.4. Retail Conservation Pricing

2. Education Programs
    2.1. Public Information Programs
    2.2. School Education Programs

Programmatic BMPs

3. Residential
    A.1) Residential assistance program
    A.2) Landscape water survey
    A.3) High-efficiency clothes washers (HECWs)
    A.4) WaterSense Specification (WSS) toilets
    A.5) WaterSense Specifications for residential development

4. Commercial, Industrial, and Institutional (CII)

5. Landscape

B. Provide a 5-Year Budget for Expenditures and Staff Effort for BMPs

*1. Amount actually spent during current year***.**

Year 2015 or Year 1 *Projected Expenditures*

BMP #	*BMP Name*	*(not including staff hours)*	*Staff Hours*
1.	*Utilities Operations*		

1.1 Operations Practices	*$0*	*0*
1.2 Water Loss Control	*$0*	*0*
1.3 Metering	*$0*	*0*
1.4 Retail Conservation Pricing	*$0*	*0*
2. Education Programs		
2.1 Public Information Programs	*$0*	*0*
2.2 School Education Programs	*$0*	*0*
3. Residential	*$0*	*0*
4. CII	*$0*	*0*
5. Landscape	*$0*	*0*
Total	*$0*	*0*

2. Projected budget summary for 2nd year.

Year 2016 or Year 2		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			
1.1 Operations Practices		*$0*	*0*
1.2 Water Loss Control		*$0*	*0*
1.3 Metering		*$0*	*0*
1.4 Retail Conservation Pricing		*$0*	*0*
2. Education Programs			
2.1 Public Information Programs		*$0*	*0*
2.2 School Education Programs		*$0*	*0*
3. Residential		*$0*	*0*
4. CII		*$0*	*0*
5. Landscape		*$0*	*0*
	Total	*$0*	*0*

3. Projected budget summary for 3rd year.

Year 2017 or Year 3		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			

1.1 Operations Practices	*$0*	*0*
1.2 Water Loss Control	*$0*	*0*
1.3 Metering	*$0*	*0*
1.4 Retail Conservation Pricing	*$0*	*0*
2. Education Programs		
2.1 Public Information Programs	*$0*	*0*
2.2 School Education Programs	*$0*	*0*
3. Residential	*$0*	*0*
4. CII	*$0*	*0*
5. Landscape	*$0*	*0*
Total	*$0*	*0*

4. Projected budget summary for 4th year.

Year 2018 or Year 4		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			
1.1 Operations Practices		*$0*	*0*
1.2 Water Loss Control		*$0*	*0*
1.3 Metering		*$0*	*0*
1.4 Retail Conservation Pricing		*$0*	*0*
2. Education Programs			
2.1 Public Information Programs		*$0*	*0*
2.2 School Education Programs		*$0*	*0*
3. Residential		*$0*	*0*
4. CII		*$0*	*0*
5. Landscape		*$0*	*0*
	Total	*$0*	*0*

5. Projected budget summary for 5th year.

Year 2019 or Year 5		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			

1.1 Operations Practices	*$0*	*0*
1.2 Water Loss Control	*$0*	*0*
1.3 Metering	*$0*	*0*
1.4 Retail Conservation Pricing	*$0*	*0*
2. Education Programs		
2.1 Public Information Programs	*$0*	*0*
2.2 School Education Programs	*$0*	*0*
3. Residential	*$0*	*0*
4. CII	*$0*	*0*
5. Landscape	*$0*	*0*
Total	*$0*	*0*

Year of Data 2014 **Enter data year here**

Table 1

Surface Water Supply

2014 Month	**Federal Ag Water** (acre-feet)	**Federal non-Ag Water.** (acre-feet)	**State Water** (acre-feet)	**Local Water (define)** (acre-feet)	**Other Water** (acre-feet)	**Transfers into District** (acre-feet)	**Upslope Drain Water** (acre-feet)	**Total** (acre-feet)
Method								
January	1843	0	0	0	0	0	0	1,843
February	666	0	0	0	0	0	0	666
March	182	0	0	0	0	0	0	182
April	93	0	0	0	0	0	0	93
May	96	0	0	0	0	0	0	96
June	280	0	0	0	0	292	0	572
July	84	0	0	0	0	1136	0	1,220
August	10	0	0	0	0	777	0	787
September	0	0	0	0	0	441	0	441
October	0	0	0	0	0	642	0	642
November	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0
TOTAL	3,254	0	0	0	0	3,288	0	6,542

Table 2

Ground Water Supply

2014 Month	District Groundwat (acre-feet)	Private Agric *(acre-feet)
Method		
January	199	10,239
February	97	3,618
March	103	1,241
April	162	1,192
May	530	3,115
June	947	7,619
July	1,277	12,520
August	861	8,233
September	513	4,619
October	348	4,646
November	329	1,570
December	0	0
TOTAL	5,366	58,612

*normally estimated

Table 3

Total Water Supply

2014 Month	Surface Water (acre-feet)	District Groundwat (acre-feet)	Recycled M&I (acre-feet)	Total District (acre-feet)
Method				
January	1,843	199	0	2,042
February	666	97	0	763
March	182	103	0	285
April	93	162	0	255
May	96	530	0	626
June	572	947	0	1,519
July	1,220	1,277	0	2,497
August	787	861	0	1,648
September	441	513	0	954
October	642	348	0	990
November	0	329	0	329
December	0	0	0	0
TOTAL	6,542	5,366	0	11,908

*Recycled M&I Wastewater is treated urban wastewater that is used for agriculture.

2014 Precipitation Worksheet				
	inches precip	ft precip	acres	AF/Year
Jan	0.01	0.00	0.03	0.02
Feb	1.33	0.11	0.03	0.02
Mar	1.20	0.10	0.02	0.01
Apr	0.55	0.05	0.00	0.00
May	0.17	0.01	0.00	0.00
Jun	0.00	0.00	0.00	0.00
Jul	0.00	0.00	0.00	0.00
Aug	0.20	0.02	0.00	0.00
Sept	1.06	0.09	0.00	0.00
Oct	0.10	0.01	0.00	0.00
Nov	0.50	0.04	0.00	0.00
Dec	2.52	0.21		
TOTAL	**7.64**	**0.64**		

2014 Evaporation Worksheet				
	inches evap	ft evap	acres	AF/YEAR
Jan	2.20	0.18	0.03	0.13
Feb	1.75	0.15	0.03	0.13
Mar	3.55	0.30	0.02	0.10
Apr	5.28	0.44	0.00	0.00
May	7.37	0.61	0.00	0.00
Jun	8.16	0.68	0.00	0.00
Jul	7.87	0.66	0.00	0.00
Aug	6.44	0.54	0.00	0.00
Sept	5.15	0.43	0.00	0.00
Oct	3.55	0.30	0.00	0.00
Nov	1.53	0.13	0.00	0.00
Dec	0.85	0.07		
TOTAL	**53.7**	**4.48**		

Table 4

Agricultural Distribution System

2014 Canal, Pipelir Lateral, Reserv	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitatio n (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
Tank 33.6-4	40	31	1,240	0.0	0.1	0	14	(14)
Tank 38.6-4	40	31	1,240	0.0	0.1	0	13	(13)
Tank 41.2-3	40	24	960	0.0	0.1	0	3	(3)
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
TOTAL				0.1	0.4	0	30	(30)

Table 5

Crop Water Needs

2014 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requiremen (AF/Ac)	Cultural Practices (AF/Ac)	Effective Precipitatio (AF/Ac)	Appl. Crop Water Use (acre-feet)
Alfalfa	213	3.15	0.0	0.0	0.1	650
Almonds	10,210	3.05	0.0	0.0	0.1	30,120
Corn	202	2.06	0.0	0.0	0.1	396
Grapes	1,166	2.08	0.0	0.0	0.1	2,309
Manderians	77	3.20	0.0	0.0	0.1	239
Olives	3,178	2.92	0.0	0.0	0.1	8,962
Oranges	130	3.20	0.0	0.0	0.1	403
Pasture	2,066	3.42	0.0	0.0	0.1	6,859
Pecans	60	3.05	0.0	0.0	0.1	177
Pistashios	274	3.05	0.0	0.0	0.1	808
Prunes	897	3.03	0.0	0.0	0.1	2,628
Rice	1,359	3.19	0.0	0.0	0.1	4,199
Sialege	2,085	3.42	0.0	0.0	0.1	6,922
Sunflowers	103	1.66	0.0	0.0	0.1	161
Vineseed	86	0.90	0.0	0.0	0.1	69
Walnuts	1,737	3.33	0.0	0.0	0.1	5,611
Wheat	259	0.67	0.0	0.0	0.1	148
Other	89	0.67	0.0	0.0	0.1	51
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
Crop Acres	24,191					70,710

Total Irrig. Acres 28,673 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2014 District Water Inventory

Water Supply	Table 3		11,908
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	intentional - ponds, injection	minus	0
Seepage	Table 4	minus	30
Evaporation - Precipitation	Table 4	minus	0
Spillage	Table 4	minus	0
Transfers out of District		minus	0
Water Available for sale to customers			11,878
Actual Agricultural Wate 2014	From District Sales Records		11,905
Private Groundwater	Table 2	plus	58,612
Crop Water Needs	Table 5	minus	70,710
Drainwater outflow	(tail and tile, not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		(193)
Unaccounted for Water	(calculated)		(27)

Table 7

Influence on Groundwater and Saline Sink

2014

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District	(5,336)
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	24,191
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion of percolation from agri seeping to a perched water table	0
Portion of percolation from agri seeping to a saline sink	0
Portion of On-Farm Drain water flowing to a perched water table/saline sink	0
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	0
Total (AF) flowing to a perched water table and saline sink	0

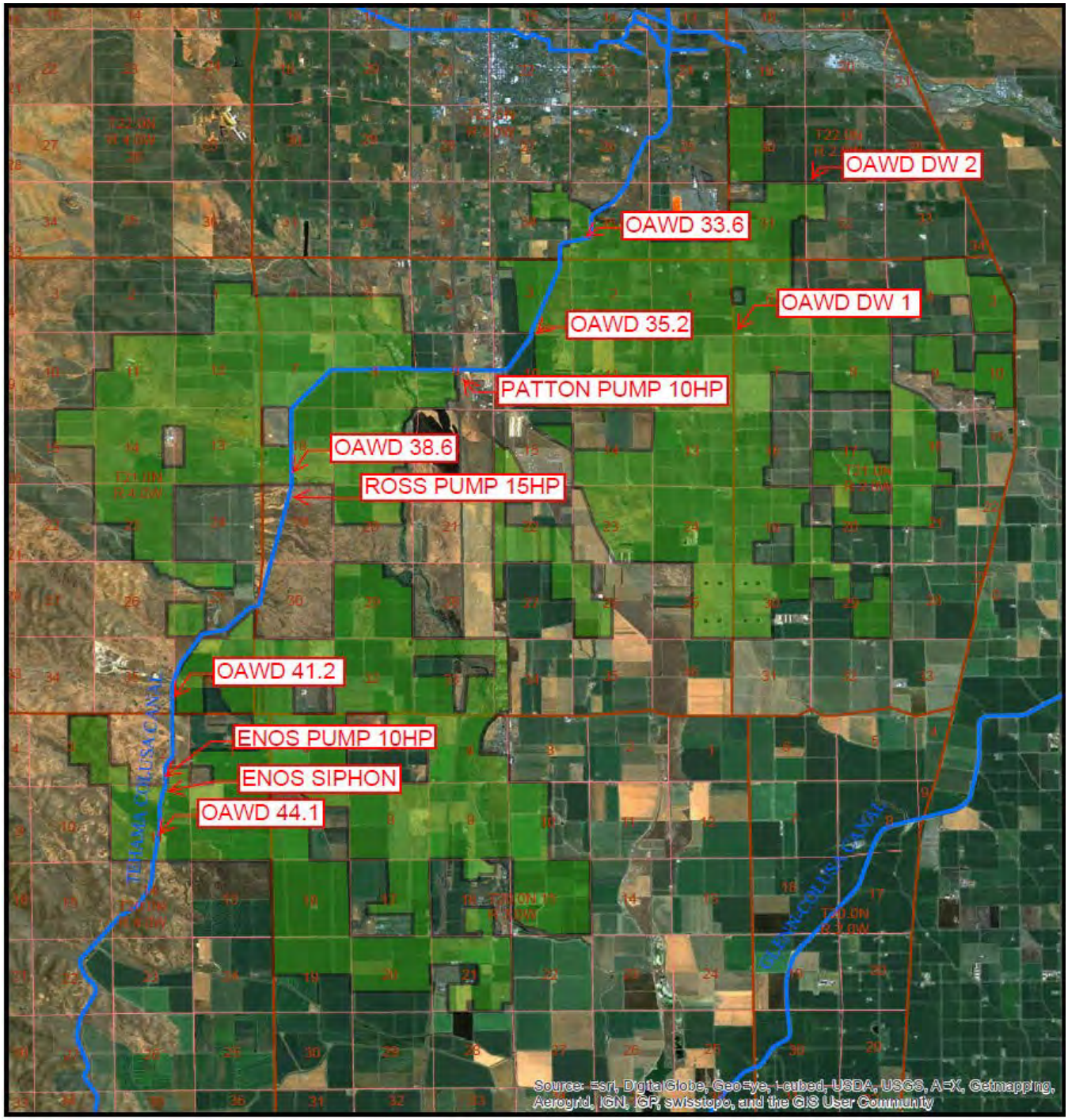
Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (define) (acre-feet)	Other Water (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
2005	42,347	74	0	0	0	0	0	42,421
2006	42,390	10	0	0	0	0	0	42,400
2007	40,673	15	0	0	0	0	0	40,688
2008	18,294	17	0	0	0	0	0	18,311
2009	15,387	4	0	0	0	0	0	15,391
2010	36,165	4	0	0	0	0	0	36,169
2011	36,790	6	0	0	0	0	0	36,796
2012	47,371	22	0	0	0	0	0	47,393
2013	34,270	20	0	0	0	0	0	34,290
2014	3,254	0	0	0	0	3,288	0	6,542
Total	316,941	172	0	0	0	3,288	0	320,401
Average	31,694	17	0	0	0	329	0	32,040

Attachment A

District Maps



Orland-Artois WD
Warren Act
Contract No. 14-WC-20-4519
Exhibit A

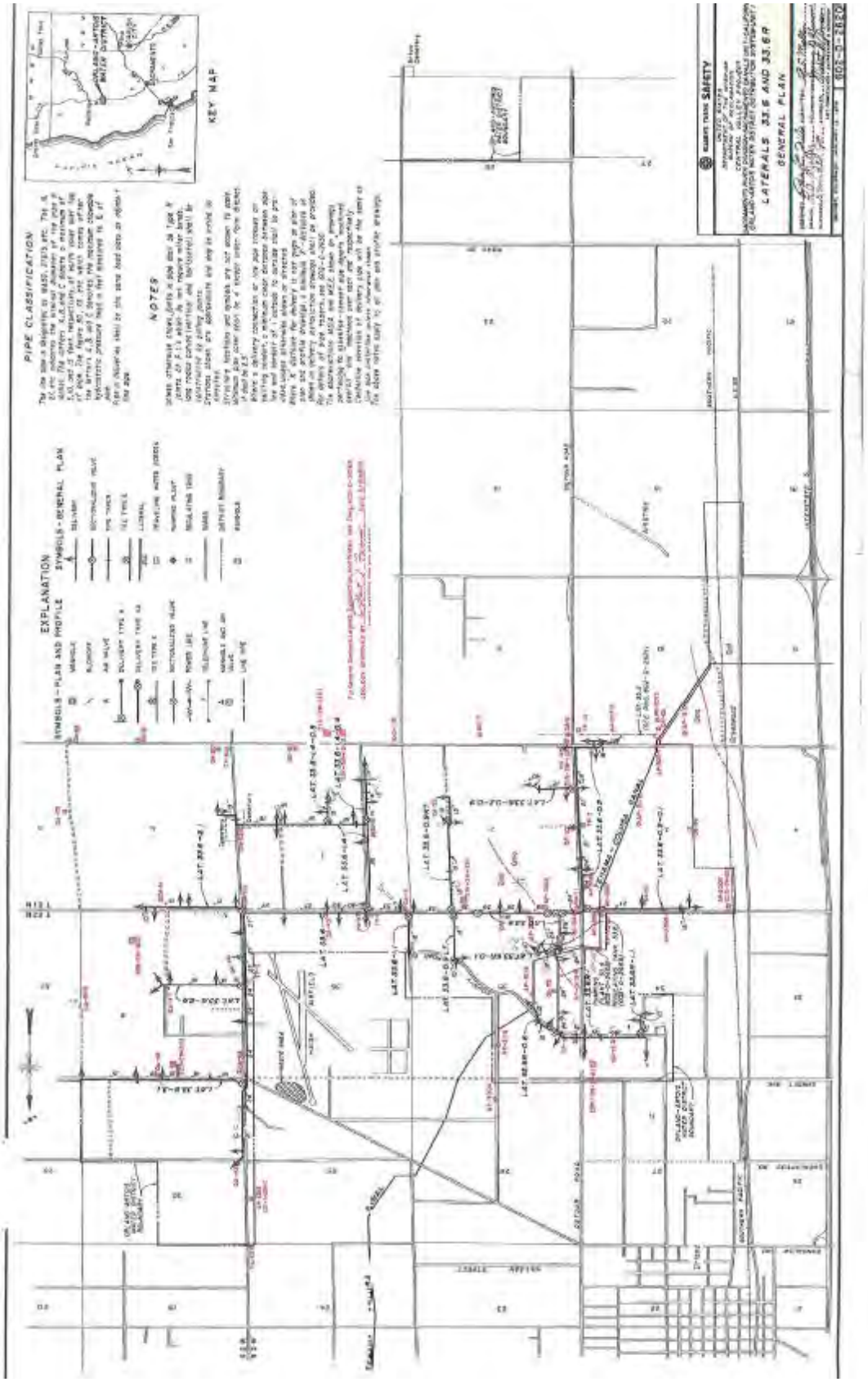
Legend

Orland-Artois WD

0 1 2 4 Miles

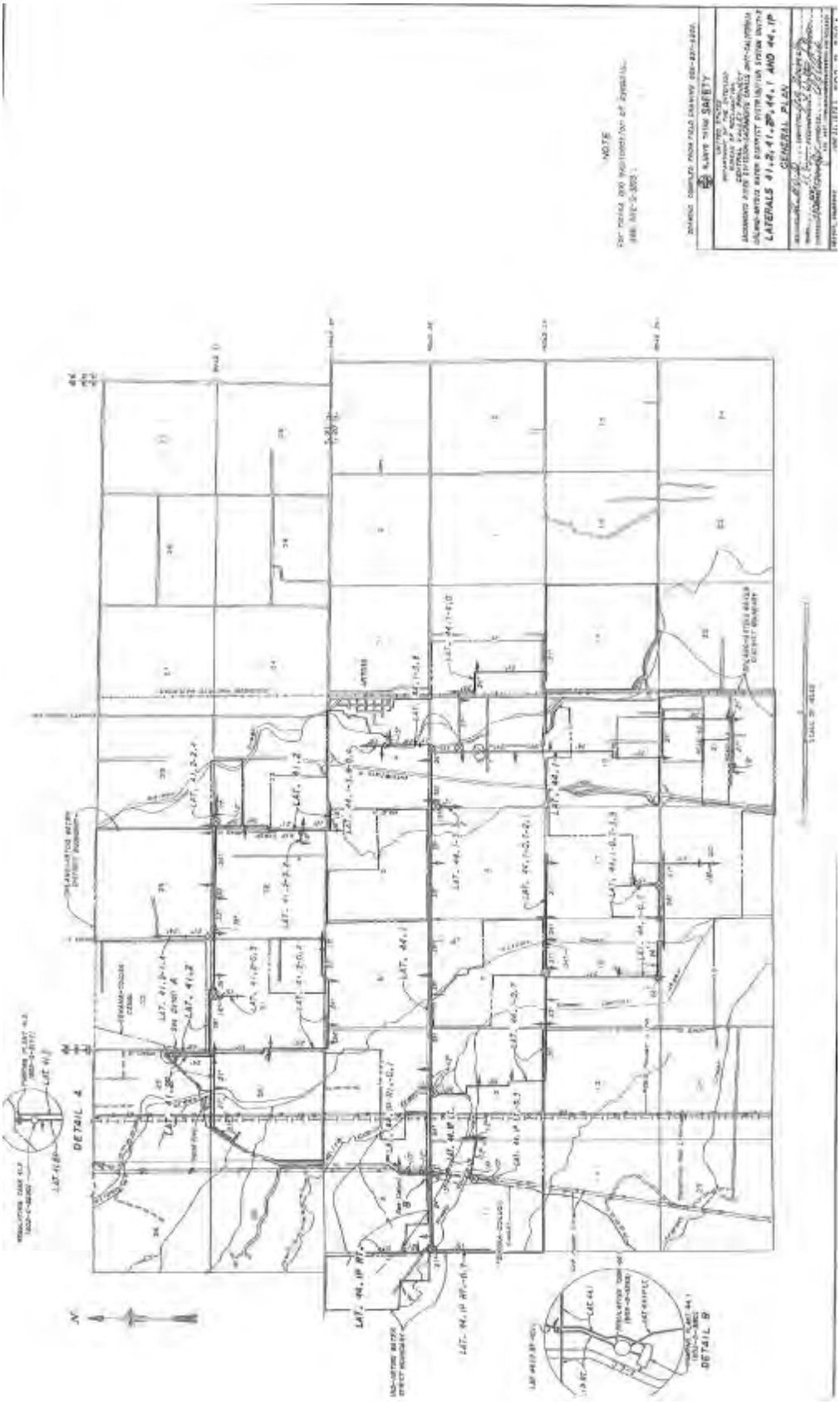
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

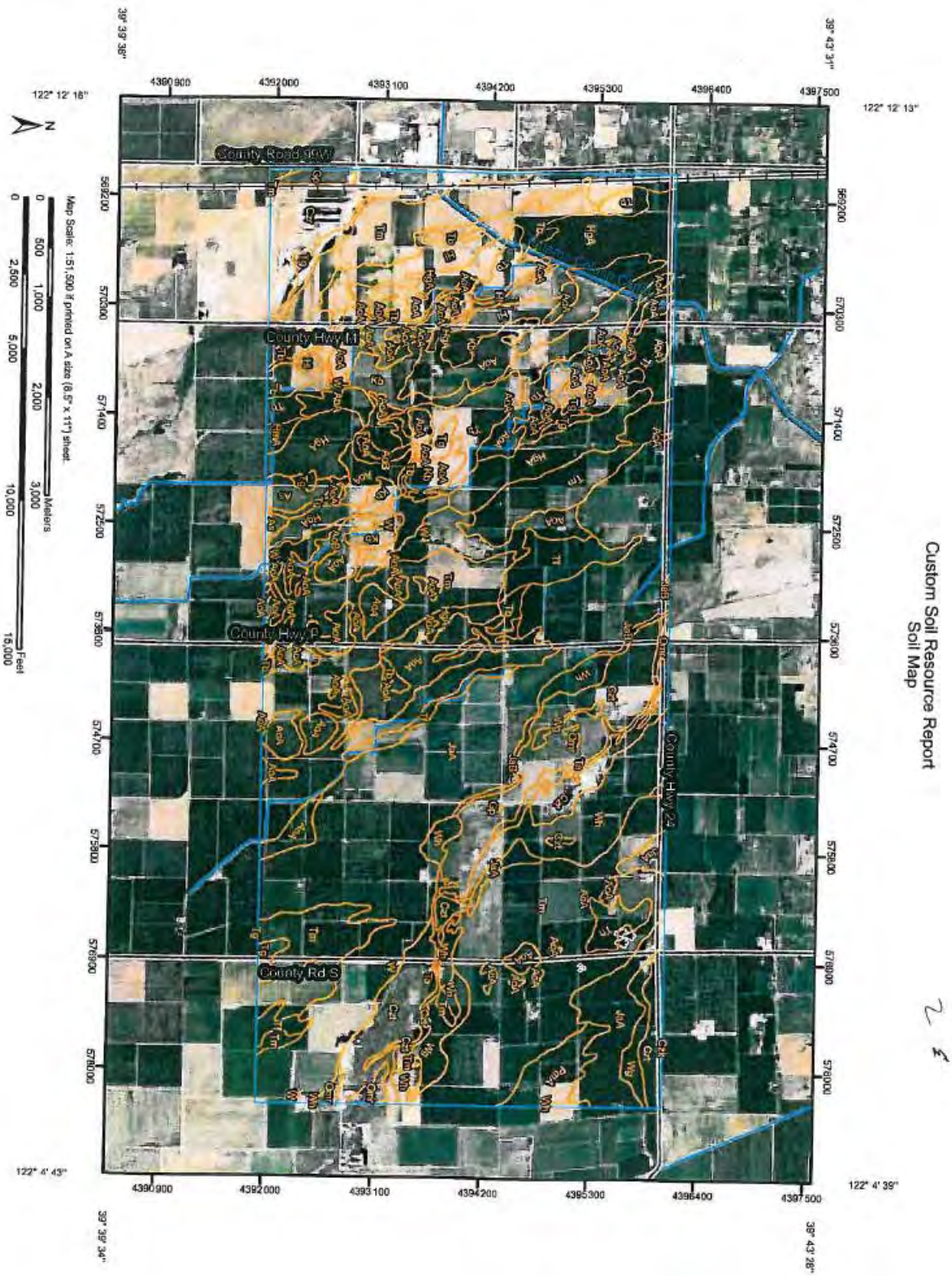
2014-01-27


KEY MAP
EXPLANATION
SYMBOLS - PLAN AND PROFILE
SYMBOLS - GENERAL PLAN
PIPE CLASSIFICATION
NOTES
LATERALS 33.6 AND 33.6R
GENERAL PLAN


EXPLANATION
SYMBOLS - PLAN AND PROFILE
SYMBOLS - GENERAL PLAN
KEY MAP
PIPE CLASSIFICATION
NOTES
LATERALS 38.8 MI. AND 38.8 L.F.
GENERAL PLAN

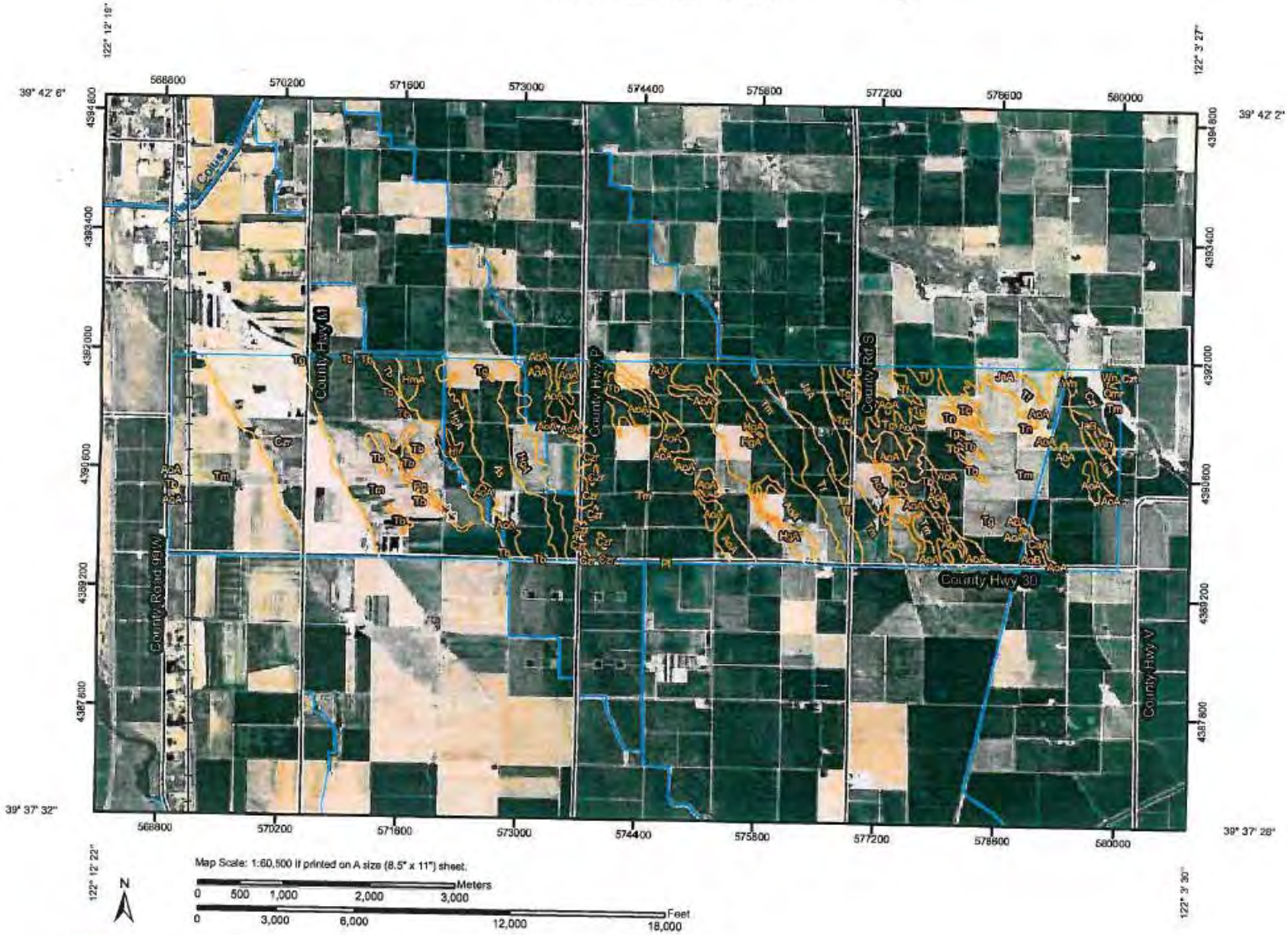

NOTE
LATERAL 35.8
GENERAL PLAN


NOTE
SAFETY
LATERALS 41-2, 41-2B, 44-1 AND 44-1B
GENERAL PLAN
DETAIL A
DETAIL B


Custom Soil Resource Report
Soil Map
County Road 99W
County Hwy 11
County Hwy P
County Hwy 24
County Rd S
Map Scale: 1:51,500 if printed on A size (8.5" x 11") sheet.
Meters
Feet
N
122° 12' 18"
122° 12' 13"
122° 4' 43"
122° 4' 39"
39° 39' 38"
39° 43' 31"
39° 39' 34"
39° 43' 26"
4390900
4392000
4393100
4394200
4395300
4396400
4397500
569200
570300
571400
572500
573600
574700
575800
576900
578000

Plan Format

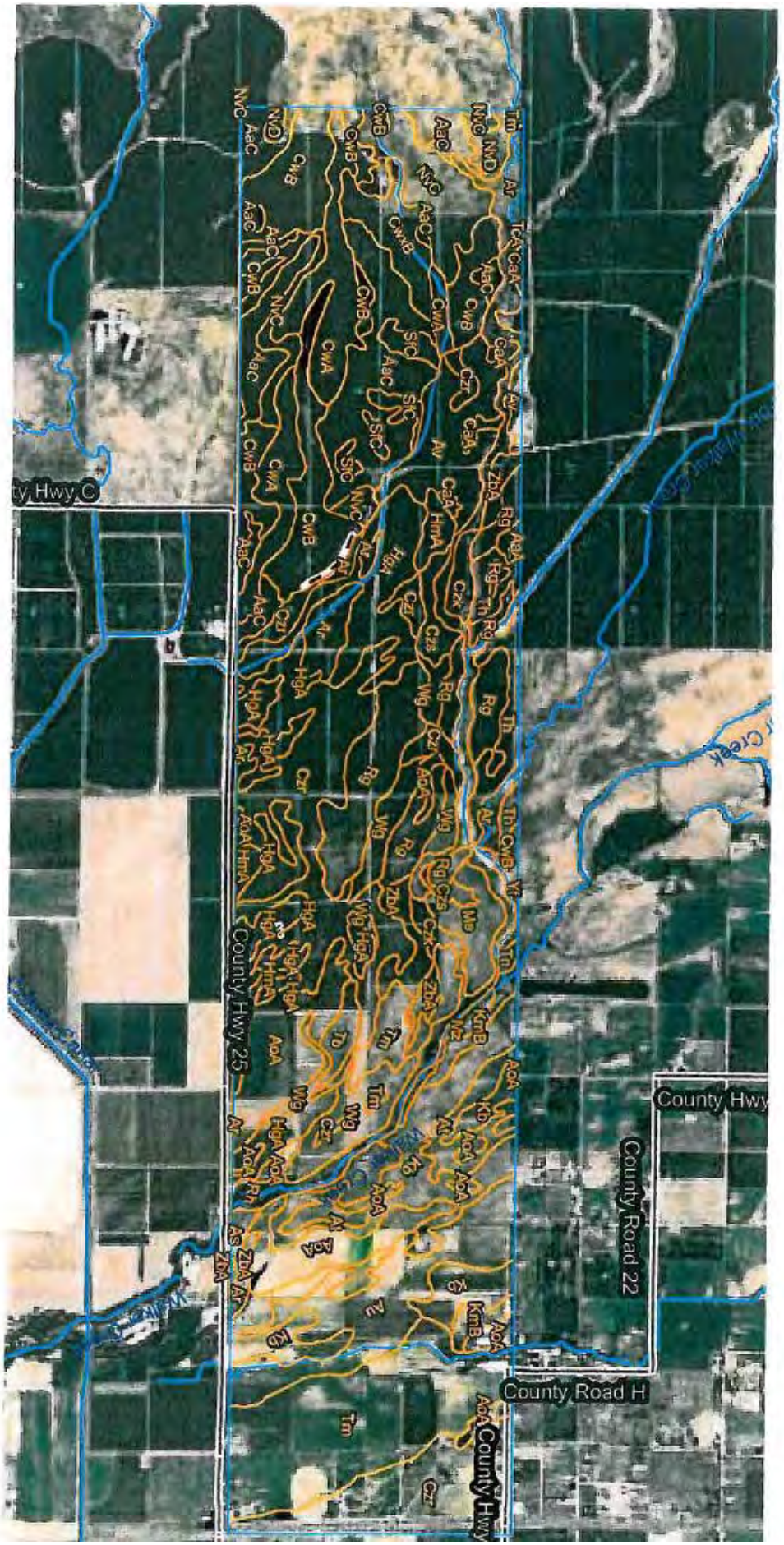
Soil Map—Glenn County, California

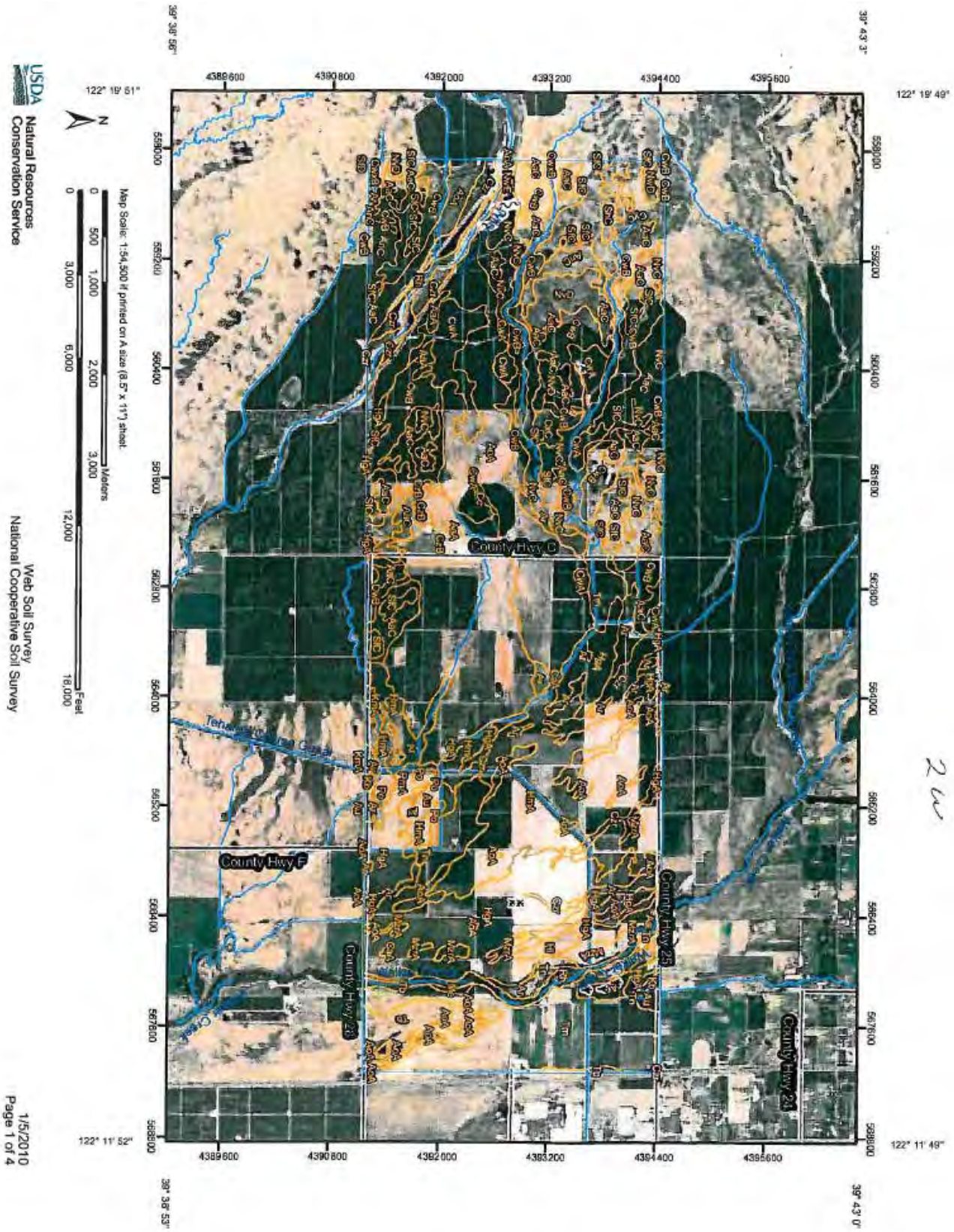


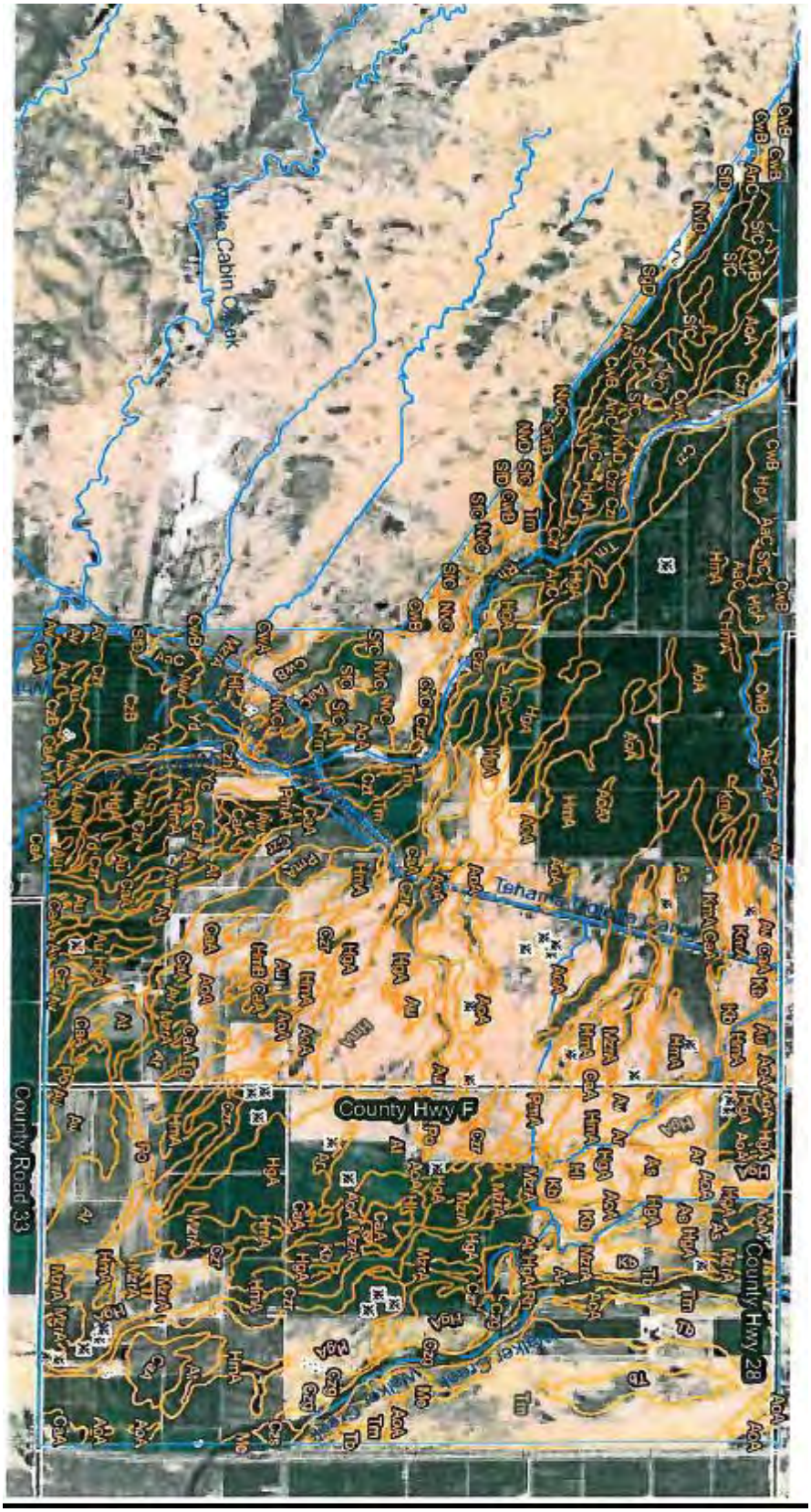

Soil Map—Glenn County, California
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
1/5/2010
Map Scale: 1:38,509 if printed on A size (8.5" x 11") sheet.
County Road 99W
County Hwy M
County Hwy 33
County Hwy P
Road R
Stony Creek
122° 12' 38"
122° 6' 59"
39° 36' 52"
39° 36' 49"
39° 39' 46"
39° 39' 43"

Soil Map—Glenn County, California


Soil Map—Glenn County, California
South of 32
USDA Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
1/5/2010
Page 1 of 3
Map Scale: 1:35,300 if printed on A size (8.5" x 11") sheet.
Meters
Feet
County Hwy D
County Road 99W
County Hwy 32
39° 32' 31"
39° 32' 28"
39° 35' 10"
39° 35' 6"
122° 15' 52"
122° 15' 50"
122° 10' 42"
122° 10' 41"
4377800
4378400
4379200
4380000
4380800
4381600
563200
564000
564800
565600
566400
567200
568000
568800
569600
570400


County Hwy 25
County Road 22
County Road H
County Hwy


Soil Map—Glenn County, California
2 of
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
1/5/2010
Page 1 of 4
Map Scale: 1:54,300 if printed on A size (8.5" x 11") sheet.
Meters
Feet
County Hwy C
County Hwy F
County Hwy 25
County Hwy 24
122° 19' 51"
122° 19' 49"
122° 11' 52"
122° 11' 49"
39° 38' 56"
39° 43' 3"
39° 38' 53"
39° 43' 0"


County Hwy F
County Road 33
County Hwy 28
Tehama-Colusa Canal
Willow Creek
Cabin Creek


County Hwy D
County Hwy 39

Attachment B

Rules and Regulations
Water Ordering Procedures
Water Transfer Policy

Attachment B

ORLAND-ARTOIS WATER DISTRICT

RULES AND REGULATIONS FOR AGRICULTURAL WATER SERVICE

Approved October 19, 2004
Amended March 18, 2014

1. The furnishing of water to and its use by, the applicant shall be subject to all regulations of the Board of Directors of the Orland-Artois Water District ("District") as the same may now or hereafter be amended or adopted.

2. Each year, on or before the application due date established by the District Board of Directors, before **any** water is delivered, every landowner must complete a District "Application for Agricultural Water" indicating each parcel of land for which he or she desires water service. If someone other than the landowner, such as a tenant, will be the water user, the water user must sign, in addition to the landowner. **The application provides that the parties signing the application are jointly and severally liable for the District's charges**. An application for water will not be accepted from any person who is delinquent for water, assessment, or other district charges, until all delinquencies are cured.

3. Any water furnished by the District is subject to the terms and conditions of the contract between the District and the United Sates (Bureau of Reclamation) under which said water is made available to the District. Landowners and water users are responsible for meeting the eligibility requirements of federal Reclamation law.

4. When the demand for water is greater than the available supply, the water shall be apportioned and distributed equitably as determined by the Board of Directors under California law, among those who have filed an application in accordance with paragraph 2 of these Rules and Regulations. In years when water is allocated, and subject to a determination of the Board that water transfers between District water users would be beneficial, District landowners and their authorized tenants may transfer their water allocations to other District water users in accordance with paragraph 16 of these Rules and Regulations. The District's water supply is subject to restriction due to natural causes and the provisions of its Reclamation contract, and so the District does not guarantee the quantity, the rates of delivery, or the time of delivery.

5. The water furnished by the District is not potable and the District does not warrant the quality of water so furnished. ***NO DISTRICT WATER IS TO BE USED FOR HUMAN CONSUMPTION.*** The applicant agrees to indemnify, defend and hold the District harmless from all damage or claims of any nature, including attorney's fees, arising from the quality of water furnished by the District.

6. Payment for water and related charges shall be at the rate set by the Board of Directors of the District in accordance with resolutions and policies that may be adopted by the Board from time to time.

7. On or before the application due date each year, each water user making application shall pay a minimum "water advance" payment equivalent to the charge for one-half acre foot, or as set by the Board, for each of that landowner's assessed acres that are recorded in the District's Assessment Roll. The **total assessed acres** will be used as a basis for calculating the advance payment. The total assessed acres may not be the same as the landowner's acres actually in production, nor the acres for which the landowner is actually applying for water that year. In the case where a landowner uses such a small amount of water that cannot be registered on the District meters, a monthly flat rate for minimum usage as determined by the Manager (as delegated by the Board) will be applied. No water shall be delivered until all of the advance payment is made. Payment for the remainder of the water ordered and delivered shall be billed monthly based on meter readings and following exhaustion of the "water advance" payment. The Board may, in its sole discretion, suspend the minimum water advance payment in any year when District water is unavailable or is allocated.

8. Monthly billings will be prepared for all water charges based on meter readings on or about the last day of each month.

9. All invoices for water, or for any other District services or charges, are due upon receipt and are delinquent when not paid within 30 days after the date of the bill. There shall be a penalty added of ***10%*** *to each invoice that is delinquent, plus a monthly interest charge of* ***1.5%****on both the principal and the penalty.*

10. Water service shall not be provided to any parcel of land for which the assessment, water charge or other District charges are delinquent. The District shall give the owner of the land and tenant, if any, notice before water service is terminated. The landowner, and tenant, if any, shall have the right to express any complaints or objections to the Manager, who has the authority to make a final determination in discontinuing water service, or recommending adjustments to the Board of Directors.

11. All accounts must remain current. Any water user who has a delinquent balance on **December 1st** of any given year will be required to post a higher water advance the following year. That rate will be calculated at **150%** of the normal advance amount set for the year. For any water user who is delinquent **on December 1st in 2 consecutive years, that user will be required to pay all of the estimated yearly water use in advance the following year**.

12. An assessment on District land may be levied each year at a rate determined by the Board of Directors. Assessments may be charged on all District irrigable acres regardless of whether or not water was used. Standby, Base Charge or other charges may also be levied if determined necessary by the Board.

13. Any and all District costs incurred for the repair of the water outlet deliveries or related works as a result of landowner negligence or carelessness is to be paid by the landowner. A minimum $50.00 charge will be levied for each occurrence, where meter tampering, outlet disfigurement or other inappropriate use is determined.

14. The District will not be liable for any damage caused by negligence or carelessness of any water user in the use of the water. In no event shall any liability accrue against the District or any of its officers,

agents or employees for any damage arising directly or indirectly from or because of miscalculations in estimating needs, deficiency in water supply, drought or other unavoidable causes. In addition, the applicant hereby assumes responsibility for and agrees to indemnify, defend and hold the District harmless from all damages or claims for damage, including attorneys' fees, which may arise from his/her use of the water after it leaves the District facilities.

15. The water ordering procedures approved by the Board on October 19, 2004 are incorporated within these Rules and Regulations.

16. In years when the District does not have adequate water supplies to meet all customer demands and must allocate water to District landowners and authorized tenants, the District may permit a landowner or authorized tenant to make an in-District transfer of that landowner's or tenant's water allocation to another District water user on the following terms and conditions:

a. The General Manager will calculate the allocation in accordance with paragraph 4 of these Rules and Regulations and provide those allocations to the Board with a recommendation whether to permit in-District transfers of water allocations among water users. The Board will consider the General Manager's recommendation and will decide in its sole discretion whether to permit such in-District transfers.

b. If the Board authorizes in-District transfers of water allocations, the General Manager will so notify District water users. Landowners and tenants may then apply in writing to the General Manager to make an in-District transfer of a water allocation. If a tenant requests to transfer an allocation, he or she must provide the General Manager with a signed consent of the landowner. Upon receipt of a transfer request, the General Manager will review it and notify the applicant whether the application is approved or denied within five days of receipt of the application. An applicant may appeal a denial of a transfer application to the Board, which will hear the appeal at its next regular meeting. The Board's decision on appeal will be final and binding.

c. If an application for transfer of a water allocation is approved, the applicant must pay all Base Charges and assessments for the current year in advance before the transfer will be authorized. If an applicant is delinquent on any base charges, assessments and/or volumetric water charges from previous years, the applicant will not be permitted to make a transfer until the applicant also pays in advance all delinquent base charges, assessments and water charges, together with all penalties and accrued interest due on the delinquent base charges, assessments and water charges.

d. The District will charge the transferee the then-existing volumetric rate for all water transferred at the time of its use. Any failure by the transferee to pay the volumetric water rates when due will result in termination of service to the transferee and the transferee's disqualification from receiving future transfer water until the transferee pays all charges, penalties and interest due for the unpaid volumetric water charges.

e. Transfers by a landowner or an authorized tenant of a water allocation from one parcel to another parcel in common ownership or leasehold are exempt from these rules and will be freely permitted upon notification to the General Manager.

ORLAND-ARTOIS WATER DISTRICT

WATER ORDERING PROCEDURES

1. Water may be ordered for land and from outlets for which an application for water and water deposit is on file with the District.

2. Orders (turn on, changes, turn off) must be placed at the District office **no later than 12:00 noon on the day before the water delivery is to start**, either in person or by telephone. Water orders left on the recorder cannot be accepted. Orders given to water tenders will also be accepted and must follow the time requirements of notification. Water orders will be accepted Monday through Saturday between the hours of 8:00 a.m. and 12:00 noon. All orders must include the following information:
   a) Water user's name
   b) Number on delivery
   c) Name of person placing order
   d) Details of order (quantity, on, off, or change)

3) Water must be ordered no later than 12:00 noon on the day before the water delivery is to start, except water orders for Mondays, which must be placed by 12:00 noon on the preceding Saturday. The office will be closed on Sundays. Orders for turn on, change and turn off can be made on a daily basis (except Sunday) until 12:00 noon of each day.

4) On the day and at the time the water order is to be put into effect, the water user will adjust water flow as ordered. Any changes or adjustments to the amount originally ordered must be reordered in advance through the normal office procedures. Turn off notification must also be no later than 12:00 noon on the day before water delivery is to cease. Requests for cancellation of orders on less than the required notice will be honored only under emergency conditions. In no case shall anyone but the water user, his representative or an authorized agent of the District turn water on, change water or turn water off from the District's distribution system.

3. After water has been turned on, it shall run continuously day and night until ordered off. When distribution system laterals are operating at or near maximum flows, reductions in flow rates may be necessary as determined by District representatives. The water user shall stay at the revised flow rate until the District determines further increases can be accommodated.

6) All water outlet deliveries are to be checked daily to conform to the amount ordered, or more often as may be necessary. Delivery regulation to the amounts ordered is the responsibility of the landowner, his tenant or their representatives.

7) Water users failing to follow proper District water ordering procedures as set forth herein jeopardize their privilege to operate the District's distribution system. Repeated violations of proper water ordering procedures will result in total District operation of the delivery as determined by the Manager and the Board of Directors of the District.

WATER ORDERING TELEPHONE NUMBERS AFTER HOUR EMERGENCY

OFFICE.....(530)865-4304 Chris Drouillard...(530) 518-9374 Cell#
Justin Rolfs……...(530) 519-5906 Cell#

J. MARK ATLAS
PROST, BIRL & ATLAS
134 WEST SYCAMORE STREET WILLOWS, CALIFORNIA 95988
TELEPHONE (530) 934-5416 FACSIMILE (530) 934-3528
E-MAIL JMATLAS@SUNSET.NET

ORLAND-ARTOIS WATER DISTRICT

WATER TRANSFER POLICY

Adopted January 15, 2002

This is the policy of Orland-Artois Water District ("District") concerning transfer of water entitlements under its Central Valley Project ("CVP") water service contract and use of District facilities to convey non-Project water. This policy implements the transfer provisions of Title 34 of P.L. 102-575, the Central Valley Project Improvement Act ("CVPIA"), and is intended to be in compliance with the CVPIA as well as any applicable regulations or guidelines of the Bureau of Reclamation ("Reclamation"). This policy shall also be implemented as a supplement to and consistent with the District's other rules and regulations.

1. LANDOWNER INITIATED TRANSFERS WITHIN THE DISTRICT:

A landowner's Project water entitlement may be transferred for use on any land within the District, provided that:

a. the landowner is in compliance with District regulations,

b. prior written notice on the approved form has been provided to the District Manager, and the Manager has approved in writing, the provisions for delivering the Project water,

c. all necessary agreements between the affected landowners, tenants or other water users, if any, and the District have been fully executed and delivered to the Manager, and

d. the landowner has reimbursed all District costs in processing the request.

2. TRANSFERS CARRIED OUT BY THE DISTRICT WITHIN THE T-C SERVICE AREA:

It is the intent of the District to cooperate with landowners within the District who request transfers of all or a portion of their Project water entitlement as a District transfer within the service area of the Tehama-Colusa or Corning Canals (the "T-C Service area"). The District will evaluate such requests on a case-by-case basis, subject to all Reclamation guidelines and regulations, and the District's Rules and Regulations and policies in effect. A landowner's Project water entitlement may be transferred for use on land within the T-C service area provided that:

a. the landowner is in compliance with District regulations,

b. the transferor, if a tenant, has written approval of the landowner whose Project water entitlement is to be transferred;

c. the transferor and the transferee are the same person or entity,

d. prior written notice on the approved form has been provided to the District Manager, and the Manager has approved in writing the provisions and costs for delivering the Project water;

e. all necessary agreements between the affected landowners, tenants or other water users, if any, and the Districts have been fully executed and delivered to the Manager, and,

f. the landowner has reimbursed all District costs in processing the request.

3. TRANSFERS AUTHORIZED UNDER THE CVPIA:

a. LANDOWNER INITIATED TRANSFERS OUTSIDE OF THE DISTRICT:

i. Compliance with Laws and Regulations. All transfers shall be carried out in full compliance with Federal and State law, guidelines and regulations implementing Reclamation law, and District regulations. Such provisions shall prevail over any inconsistent provision of this policy

ii. Who May Transfer: Only a District landowner who is in compliance with District regulations may transfer water.

iii. Quantity That May Be Transferred: Transfers will be limited to the lesser of

(1) the average amount of CVP water actually delivered to the landowner during the three years of normal water delivery prior to October 30, 1992; or

(2) the amount of Project water that would have been consumptively used by the landowner or irretrievably lost to beneficial use during the year or years of the transfer; and

(3) a reduced allocation resulting from reductions imposed upon the District by Reclamation in the year of the proposed transfer.

Project water "consumptively used" shall mean that portion of the water delivered to the landowner that would have been evapo-transpired by the crops, and does not include transportation losses, return flows, or deep percolation to usable groundwater basins. Consumptive use values are

developed by the University of California for the applicable region and crop.

iv. Application Procedure: The landowner shall prepare a transfer application and all other documents and information as required by the Secretary of the Interior. The landowner shall provide the District a copy of the application and all supporting correspondence and documents.

v. Limitation on Amount of Water Transferred: The CVPIA provides that transfers involving more than 20% of the supply available in a particular year to the District under its CVP contract shall be subject to the District's review and approval. If applications for transfers submitted before the deadline for district water applications exceed the 20% cumulative limitation, the District will pro-rate those applications based upon the ratio that the amount of water to be transferred under an application bears to the total amount of water to be transferred under all the applications filed before that water application deadline date. For purposes of determining the 20% cumulative limitation, the District will consider applications for transfers submitted after the deadline date for annual applications for water service in the order in which they are applied for, in determining whether a particular transfer will exceed the 20% cumulative limitation.

vi. Conditions to protect others:

The District shall review the application to determine whether it is equitable and otherwise consistent with the District's authority, powers and purposes. Without limiting the foregoing, the District will consider whether the proposed transfer will have unreasonable impacts on the water supply, operations or financial condition of the District and its water users, including, but not limited to, the impact of the proposed transfer, if any, on the District's groundwater conjunctive use project.

vii. Public Notice Requirement: In accordance with the CVPIA, the District is required to provide public notice in connection with its review of water transfers that involve transfer of more than 20% of the District's Project water supply. The District shall publish notice of such a proposed transfer one time in a newspaper of general circulation no less than 60 days before a public hearing to consider the transfer. At that time, members of the public will have an opportunity to comment orally and in writing on the transfer proposal.

viii. Compliance with CEQA: At the time of filing a transfer application, the landowner shall notify the District whether it requests the District to be the lead agency for purposes of compliance with the California Environmental Quality Act in connection with any transfer proposal to which CEQA will apply.

ix. Reimbursement of District Costs: The landowner making application to transfer water shall be responsible for all costs associated with processing the transfer application, including reimbursement of the District's lost revenue on the water to be transferred, and the cost of water the District must acquire, if any, in order to carry out its groundwater conjunctive use project. In addition, the landowner must reimburse the District for the District's actual costs, and consultant fees incurred, in reviewing and processing the transfer application. The District shall estimate the amount of such costs and shall require the landowner to deposit with the District an amount sufficient to reimburse the District's estimated cost in advance of the District considering the transfer proposal. The District may from time to time revise the estimate of costs, and require an additional deposit.

x. Long-Term Transfers: The District reserves the right annually to review all long-term transfers to ensure that the transfer is being carried out in accordance with this policy, to confirm the amount of water available for transfer under the proposal and to re-evaluate any conditions imposed by the District on the transfer to avoid the impacts set forth in Article 3.a.vi

b. TRANSFERS CARRIED OUT BY THE DISTRICT: The CVPIA authorizes a transfer between CVP contractors within counties, watersheds or other areas of origin, as those terms are used under California law. Such transfers carried out by the District are not limited to (a) the three prior year average quantity of water actually delivered by the District, or (b) the amount of water that would have been consumptively used or irretrievably lost in the absence of the transfer. The District will cooperate with landowners within the District who request the District to transfer their Project water entitlement as a District transfer under these provisions, instead of as a landowner transfer under Section 3.a of this policy, to better maximize the amount of water available for transfer by the landowners. The District will evaluate such requests on a case-by-case basis to determine whether it is equitable and otherwise consistent with the District's authority, powers and purposes, and

whether it otherwise meets the criteria of Article 3.a.vi. Generally, the District will require that it receive up to 50% of the revenue received from such a transfer, or a fee representing 50% of the value of the transferred water, in addition to being reimbursed for all of its costs in connection with processing the transfer proposal.

4. USE OF DISTRICT FACILITIES TO TRANSFER NON-PROJECT WATER:

The District will consider on a case-by-case basis requests to use District facilities to transfer non-Project water. Such transfers shall be approved in writing in advance by the District, subject to appropriate conditions determined by the District as necessary to protect its facilities and the rights of other water users to District water service. The use of District facilities for this purpose may also be subject to conditions that the Bureau of Reclamation may impose under the terms of the District's contracts with the United States.

5. AMENDMENT OF POLICY: This policy shall be administered by the District Manager, and shall be subject to revision from time to time by the Board of Directors.

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ORLAND-ARTOIS WATER DISTRICT
2014 WATER OUTLOOK AND CHARGES

February 2014

Northern California is experiencing the driest period ever recorded. At this time the Shasta Reservoir is holding about 1.7 million acre-feet of water which is 37% of its capacity. This is 53% of average for this time of year. There are many regulations and demands on the River that have been implemented in recent years and they are significantly impacting the water available for agriculture. The carryover storage number for Shasta has increased, meaning that the Reclamation needs to hold more water in the Dam for cold water requirements for the fish, and there are many new regulations for water in the Delta. The Bureau of Reclamation typically makes an early announcement at the end of January, but they are waiting until the end of February to see if conditions change during that time period. They have, however, painted a very bleak picture and we are expecting a "zero" supply announcement for the 2014 water year.

If our supply is cut back to "zero" this year, it will also mean that there will be little water from other Districts for transfer, if any. What water might be available will be very costly. While most of our growers have wells, there are a few with permanent crops whom do not. Our Board is looking at every available alternative to try and supplement your water supply. We have the two deep wells, but that will not give us much of a supply in this type of year. We have been working on ways to deliver well water to the entire District, but this will be a small amount of water being available on a rotating schedule. We have two multiyear contracts with settlement contractors, but this water may not be available until after April 15th. Reclamation has announced a 40% allotment for the settlement contractors and this reduces our available water from these sources to about 1900 acre-feet.

Another option would be for growers with private wells near the T-C Canal to pump directly into the canal and then use the water in the District. This requires a Warren Act Contract which the District has in place. We currently have one grower doing this and two others working their way through the process. This process includes being added to the current contract, having the well tested by Reclamation, installing discharge facility into the canal, and a permit to install the facility. There are fees and deposits that need to be paid to Reclamation. If you are interested in Warren Act Water, contact the District office.

We are currently working with the TC Canal Authority on the environmental documents which will allow us to purchase water from Settlement Contractors who idle their land. In essence we would be paying growers to not plant crops and sell their water to us. This would be very helpful but expensive ($300-$400/AF). If you are interested in this type of water please contact the District Office and let us know how much you will need. If this water becomes available it will have to be purchased quickly and we will need to know who to contact. You will need to pay for this type of water in advance and it will be yours, there will be no refunds.

Currently the District has water available for irrigation until February 28th, the end of the water year. After that date we will be in the new water year and will be subject to new allocations. As it looks today, that will mean the only water we will have for at least 6 weeks will be the Deep Wells. Together they can produce about 6 to 7 CFS and will need to be carefully scheduled. I am urging water users to make good use of the water we now have to help them get through these tough times. We will all have to work together, so please communicate with the District staff your irrigation needs.

2014 WATER RATES

At the February 18th Board meeting the Directors set our Base irrigation water rate for 2014 to $125.00 per acre-foot. For those using M&I water, and Full Cost water, the rate is not yet available, please call the District office after March 1st (The water Rates are strictly a "pass through" cost of what the District is paying for the water).

Our new water year will begin on March 1st and all of the necessary paperwork, including the water advance and first installment of the Base Charge, will need to be completed before any water can be used. This includes any water used for frost protection. The final deadline for water applications is April 30th. After April 30th, if it is a 100% year and water is available, we will take late applications but the rate will be increased by 5%.

If you do not purchase transferred water you will need to watch your usage very closely so that you will not incur the $200/AF penalty above the cost of water used in excess of allocation. When you have used your allotment your outlet will be locked for your protection since in the past we've had some random acts of outlets being turned on, particularly those close to a road.

2014 WATER APPLICATIONS

Enclosed with this newsletter you will find your 2014 water application. We are not asking for an advance at this time. We are asking everyone who will be using water to complete and sign the application. Be sure to include the acres, crops, and the amount of water you will need. This will help us when we are looking for water to purchase. Also we will be using the acres applied for as a guide in figuring allocations for any water we do have. For anyone who will want to sell their allocation or purchase someone else's allocation please call the office.

If all of the acreage in the District is applied for and the two wells produce 1000 acre-feet each for the season, the approximate allocation will be .07AF per acre. As we move through the season we will be trying to find more water to increase the allocation and we will let you know as that happens.

Finally, if we have a "zero" allocation from the Bureau the District will not be able to provide animal and spray water. In order to prevent problems, we will be shutting off and locking up deliveries that are not being used.

If you have any questions, please give me a call at the District office.

Emil Cavagnolo

Manager
530-865-4304

Attachment C

Meter Accuracy

CERTIFIED TEST REPORT

CUSTOMER: KIRKPATRICK ASSOCIATES
MODEL NO: MWC14
METER SERIAL NO: 13-06648

CONFIGURATION

METER INSIDE DIAMETER: 13.5
METER OUTSIDE DIAMETER: 14
TEST DATE: 7/19/2013
TEST FACILITY: Volumetric
IDEAL TEST CONSTANT: 1336

CALIBRATION DATA

	Tested TC	GPM	Accuracy
1	1340	3843	100.3

CERTIFIED BY: Paul Hobbs **DATE:** 8/5/2013

This calibration was performed on a gravimetric or volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are: Gravimetric +/- 0.15% Volumetric +/- 0.5%

McCROMETER
3255 WEST STETSON AVENUE
HEMET, CA 92545 USA
PHONE (951) 652-6811 / FAX (951) 652-3078
WEB SITE: http://www.mccrometer.com E-MAIL: info@mccrometer.com


13-06648

8/5/2013 8:55:18 PM
Version 1.2 (4/16/2007)

Propeller Meter

CERTIFIED TEST REPORT

CUSTOMER: KIRKPATRICK ASSOCIATES

MODEL NO: MWC14

METER SERIAL NO: 13-06647

CONFIGURATION

METER INSIDE DIAMETER: 13.5

METER OUTSIDE DIAMETER: 14

TEST DATE: 7/19/2013

TEST FACILITY: Volumetric

IDEAL TEST CONSTANT: 1336

CALIBRATION DATA

	Tested TC	GPM	Accuracy
1	1335	3091	99.9

CERTIFIED BY: Paul Hobbs **DATE:** 8/5/2013

This calibration was performed on a gravimetric or volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are: Gravimetric +/- 0.15% Volumetric +/- 0.5%

McCROMETER
3255 WEST STETSON AVENUE
HEMET, CA 92545 USA
PHONE (951) 652-6811 / FAX (951) 652-3078
WEB SITE: http://www.mccrometer.com E-MAIL: info@mccrometer.com

13-06647

8/5/2013 8:58:31 PM
Version 1.2 (4/18/2007)

Installed 7-22-13

McCROMETER

The Flow Specialists for 50 Years

Serial Number: MI13-0369
Model Number: MCAG10
Description:
Sold To: MCCROMETER Hemet C
Calibration Date: 7/17/2013
Report Date: 7/17/2013

KA: 1.72
KL's used?: Yes

	Actual Rate GPM	Meter Rate GPM	Velocity FPS	Acc. %
1	2881.78	2893.05	11.51	0.39

Approved By: RG
Calibration Fluid: WATER
Tested By: RG

Certification Date: 7/17/2013
Record Filename/Test Number:
MI13-0369 071713.csv

This Calibration was performed on a gravimetric flow stand, traceable to the National Institute of Standards and Technology, USA. The flow measurement uncertainty of the facility is estimated to be +/-0.15% of reading based on the cumulative uncertainties of time, weight and temperature measurements combined with other systematic uncertainties.

McCrometer, Inc.
3255 W. Stetson Avenue, Hemet, CA 92545-7799
Phone: (951) 652-6811 Fax: (951) 652-3078
e-mail: info@mccrometer.com Web site: http://www.mccrometer.com
Hours: 8 a.m. – 4:30 p.m. PST, Monday-Friday

Attachment D

District Sample Bills
Water Rates

Monthly Usage Summary
By Tenant (non-financial)
Billing Period: Jul 2014

Water District: *Orland-Artois Water District*
PO Box 218, Orland
CA, 95963-

Tenant: JOE & ERMELINDA SILVERIA
. 6259 ROAD 25
ORLAND, CA95963-

Meter	Order Amount	Previous Reading	Recorded	Latest Reading	Recorded	Current Usage Meter Usage	Cumulative Usage Meter Usage
C-18	1,338.60	205.44	6/30/2014	205.66	7/31/2014	0.22	0.81
C-30	5,354.40	3,035.42	6/30/2014	3,065.76	7/31/2014	30.34	77.08
C-41	5,599.81	451.61	6/30/2014	452.47	7/30/2014	0.86	2.06
					Total:	31.42	79.95

Base Water	14.72
Warren Act	16.70
Total	31.42

ORLAND-ARTOIS WATER DISTRICT
P.O. BOX 218
ORLAND, CA 95963
(530)865-4304

2014 Water Usage
JULY Water
DUE UPON RECEIPT
DELINQUENT 09/10/2014

JOE SILVERIA
6259 ROAD 25
ORLAND, CA 95963

CUSTOMER: SILVJ

OUTLET #	TYPE	USAGE	RATE	TOTAL
C-41	BASE	14.72 AF	$125.00	$1840.00
C-41	WARREN	16.70 AF	$24.00	$400.80

PREVIOUS BALANCE	$1480.47
PAYMENT RECEIVED	-$1480.47
CHARGES FOR CURRENT MONTH	$2240.80
CURRENT INVOICE AMOUNT	$2240.80

Cut here and return lower portion with payment

Return To:

ORLAND-ARTOIS WATER DISTRICT
P.O. BOX 218
ORLAND, CA 95963
(530)865-4304

2014 Water Usage
JULY Water
DUE UPON RECEIPT
DELINQUENT 09/10/2014

CUSTOM: SILVJ

AMOUNT DUE: $2240.80

ORLAND-ARTOIS WATER DISTRICT

2014 RATES

BASE IRRIGATION WATER	**$125.00**	**PER ACRE-FOOT**
FULL COST WATER	**$160.00**	**PER ACRE-FOOT**
M & I WATER	**$140.00**	**PER ACRE-FOOT**
BASE CHARGE	**$26.80**	**PER ACRE**
ASSESSMENT	**$24.94**	**PER ACRE**

Attachment E

District Water Shortage Plan

ORLAND-ARTOIS WATER DISTRICT DRAFT SHORT WATER YEAR PLAN

OAWD holds a USBR Water Service Contract for 53,000 acre-feet of water for irrigation per year when it is available. This amounts to 1.8 AF/Acre of irrigation water for the 29,000 acres of District lands. In a 100% year we do not have enough water to irrigate the entire District. For differing reasons some OAWD landowners do not use District water. These reasons include water quality problems, irrigation scheduling conflicts, the cost of District water compared to ground water, and the amount of water the District is allocated by Reclamation. The District has worked hard to solve these problems but is limited by the quality of water we divert from the TC Canal, the hydraulic make up of our delivery system, the cost of obtaining and delivering water, and reduced allocations by Reclamation. The District has pursued multi-year contracts with settlement contracts and other water Districts for water transfers. These transfers allow the District to have enough water for our landowners needs at a reasonable cost.

For years the District receives less than 100% allocation the District pursues more water transfers and has to pay market prices, which can be quite expensive. This added expense increases the District water rates to our landowners. When the price becomes higher than the cost of pumping groundwater, landowners use their wells where and when they are able. In years of 75% or more allocation the District has been able to provide water to its landowners at a reasonable rate in sufficient quantities. In years that the allocation is less than 75% the District must take more sever action. After the 2014 0% allocation the District decided it must do the following:

1. Pre-sell all water provided by the District.
    a. Water provided by the District wells and multi-year transfer contracts will be allocated to landowners who commit, in writing, to purchase an amount of water according to the acres they are assessed. This water will be paid for in full in advance and if not used by a date determined by the District, it will be lost.
    b. The District will pursue transfers for landowners at market prices. The amount of water from these transfers will be determined by a written agreement between the District and the landowner. The landowner will be responsible for all costs the District incurs in obtaining and executing these transfers. This water will be paid for in advance and if not use by a date determined by the District, it will be lost.
2. Allow landowners to transfer District water to other landowners.
    a. Landowners will be permitted to allow other landowners to use their assessed acres in order to increase this allocation of District supplied water.
    b. The landowners are allowed to charge the cost of their District assessment and Base Charge for their District lands on which they will not be using District water.
    c. Landowners who use their assessed acres to transfer water must have the current year's assessment and base charge paid in full in advance of the transfer.
    d. Landowners who purchase more water than they need can transfer the extra water to another landowner. The cost of this water cannot be higher than its original cost.
    e. Water will not be delivered to or from lands that are delinquent.
    f. Landowners/water users will be subject to all of the terms and conditions of the District's rules and regulations

3. The District will facilitate the use of Warren Act water where possible.
    a. Landowners that can make use of Warren Act water will be charged as they use their Warren Act water. The price will be determined by the District.
    b. Landowners using Warren Act Water will be required to be on the District Warren Act Contract.
    c. Landowners using Warren Act Water will be responsible for all expenses incurred by the District in obtaining Warren Act contracts and permits.
    d. Landowners using Warren Act Water will be subject to all of the rules and regulations of the USBR.

Attachment F

Groundwater Management Plan

Orland-Artois Water District Groundwater Management Plan

Prepared pursuant to the Groundwater Management Act (AB 3030)

Prepared by
Davids Engineering, Inc.
Davis, CA

Table of Contents

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I. INTRODUCTION

A. Groundwater Management Act

Groundwater is used extensively to meet water supply requirements in many areas throughout California. For these reasons, the California State Legislature has declared groundwater a valuable natural resource, and has determined that groundwater should be managed to ensure both its safe production and its quality. The Groundwater Management Act (AB 3030) was passed by the State Legislature in 1992 and became law January 1, 1993. The act is codified as Sections 10750 *et seq.* of the California Water Code.

This groundwater management plan, prepared by Orland-Artois Water District (OAWD or the District), has been developed pursuant to the provisions of AB 3030. The District overlies the Sacramento Valley Groundwater Basin, as defined by the State Department of Water Resources in Bulletin 118-80, Groundwater Basins in California (DWR 1980).

B. Plan Components

According to California Water Code Section 10753.7, a groundwater management plan may include components relating to any or all of the following:

- Control of saline water intrusion
- Identification and management of wellhead protection areas and recharge areas
- Regulation of the migration of contaminated groundwater
- Administration of a well abandonment and well destruction program
- Mitigation of conditions of overdraft
- Replenishment of groundwater extracted by water producers
- Monitoring of groundwater levels and storage
- Facilitating conjunctive use operations
- Identification of well construction policies
- Construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects
- Development of relationships with state and federal regulatory agencies
- Review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination

OAWD has selected the following seven components for its groundwater management plan. They are to:

1. Monitor Groundwater Levels and Quality
2. Facilitate Conjunctive Use Operations
3. Implement Aquifer Storage and Recovery
4. Construct Groundwater Management Facilities
5. Support County Wellhead Protection Program
6. Promote Water Conservation
7. Comply with Glenn County's Basin Management Objectives Program

Each of these is described in Section V.

C. Agency Authorization

California Water Code Section 10753 (a) authorizes any local agency, whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not already subject to groundwater management, to adopt and implement a groundwater management plan. Section 10752 (e) defines a groundwater management plan as "a document that describes the activities intended to be included in a groundwater management program." A groundwater management program is defined by Section 10752 (d) as "a coordinated and ongoing activity undertaken for the benefit of a groundwater basin, or a portion of a groundwater basin, pursuant to a groundwater management plan adopted pursuant to this part.

"Local agency" is defined as any local public agency that provides water service to all or a portion of its service area (Section 10752 (g)). The definition also includes a local public agency that provides flood control, groundwater management, or groundwater replenishment, or a local agency formed pursuant to the Water Code for the principal purpose of providing water service that has not yet provided that service (Section 10753 (b)). These local agencies may exercise the authority of this part, and are authorized by Section 10752 (g) to form Joint Powers Authorities in order to work cooperatively in establishing a groundwater management program.

According to Water Code Section 10754, for purposes of groundwater management, a local agency that adopts a groundwater management plan has the authority of a water replenishment district pursuant to Part 4 (commencing with Section 60220) of Division 18 and may fix and collect fees and assessments for groundwater management in accordance with Part 6 (commencing with Section 60300) of Division 18, subject to the approval of voters within the agency's boundaries.

D. Eligible Groundwater Basins

The act applies to all groundwater basins in the state of California, except those already subject to groundwater management by a local agency or watermaster pursuant to other provisions of law or a court order, judgment or decree, unless the local agency or watermaster agrees to the applications of the act. The Sacramento Valley Groundwater Basin is eligible for groundwater management under AB 3030.

E. Objective of Plan

OAWD values the importance of groundwater in the state of California as well as locally. It recognizes that proper management of groundwater basins is necessary to sustain the environmental, social and economic conditions that prevail in today's society. More importantly, the well being of future societies is dependent on the effectiveness of current groundwater resources planning, development and management. For these reasons, the District elected to prepare a Groundwater Management Plan to protect the groundwater in its area and the Sacramento Valley Groundwater Basin.

The objective of this groundwater management plan is to identify and implement a Program of effective groundwater management practices that will maintain the long-term availability of groundwater, protect groundwater quality and prevent land subsidence within the District.

F. Relationship to Glenn County

Glenn County has adopted an ordinance to govern the management of groundwater county-wide. The philosophy expressed in the draft ordinance is for the County "to work cooperatively with interested local agencies to further develop and implement joint groundwater management practices". The District regards itself as an interested local agency, and expresses its intent to work cooperatively with the County toward mutually agreeable groundwater management objectives. However, by development and adoption of this Plan, the District asserts that it holds sole legal authority for management of the District's groundwater resources.

II. Sacramento Valley Groundwater Basin

A. Boundaries

The Sacramento Valley Groundwater Basin encompasses approximately 4900 square miles including all of Sutter County, and parts of Yuba, Tehama, Glenn, Butte, Colusa, Yolo, Solano, Placer and Sacramento Counties. Its usable storage capacity has been estimated at approximately 40 million acre-feet (CALFED, 2000), making it one of California's largest groundwater basins.

The Sacramento Valley Groundwater Basin has been partitioned by the California Department of Water Resources into groundwater sub-basins based on natural hydrologic boundaries. The largest sub-basin in the Sacramento Valley Groundwater Basin is the Colusa Sub-Basin.

The Colusa Sub-Basin lies on the West Side of the Sacramento Valley Groundwater Basin (Figure 1). The northern boundary of the basin runs easterly from Black Butte Reservoir, along Stony Creek. The southern boundary runs along Cache Creek. The Coast Range in the West and the Sacramento River in the East bound the basin. The Orland-Artois Water District lies over the northern portion of the Sub-Basin, just south of Stony Creek.

B. Agencies Within The Colusa Sub-Basin

In addition to the Orland-Artois Water District, there are five Irrigation Districts, 11 Water Districts, six other Districts, and five private pumper areas that lie completely or partially within the Colusa Sub-Basin (Table 1). Lands within the boundaries of these districts, as well as unorganized lands within the Sub-Basin, are excluded from this plan.

Table 1. Irrigation Districts, Water Districts, Other Districts and Private Pumper Areas Within the Colusa Sub-Basin

IRRIGATION DISTRICTS	WATER DISTRICTS	OTHER DISTRICTS	PRIVATE PUMPER AREAS
Glenn - Colusa	Orland-Artois	Orland Unit W.U.A.	East Corning Basin Private Pumpers
Provident	Glide	Willow Creek M.W.C.	West Corning Basin Private Pumpers
Princeton-Cordora-Glenn	Kanawha	Maxwell P.U.D.	BOS District 5 Private Pumpers
Maxwell	Holthouse	Colusa Drain W.U.A.	BOS District 3 Private Pumpers
La Grande	4-M	Myers Marsh M.W.C.	West Colusa Basin Private Pumpers
	Glenn Valley	Reclamation District 108	
	La Grande		
	Davis		
	Westside		
	Cortina		
	Colusa County		
	Dunnigan		

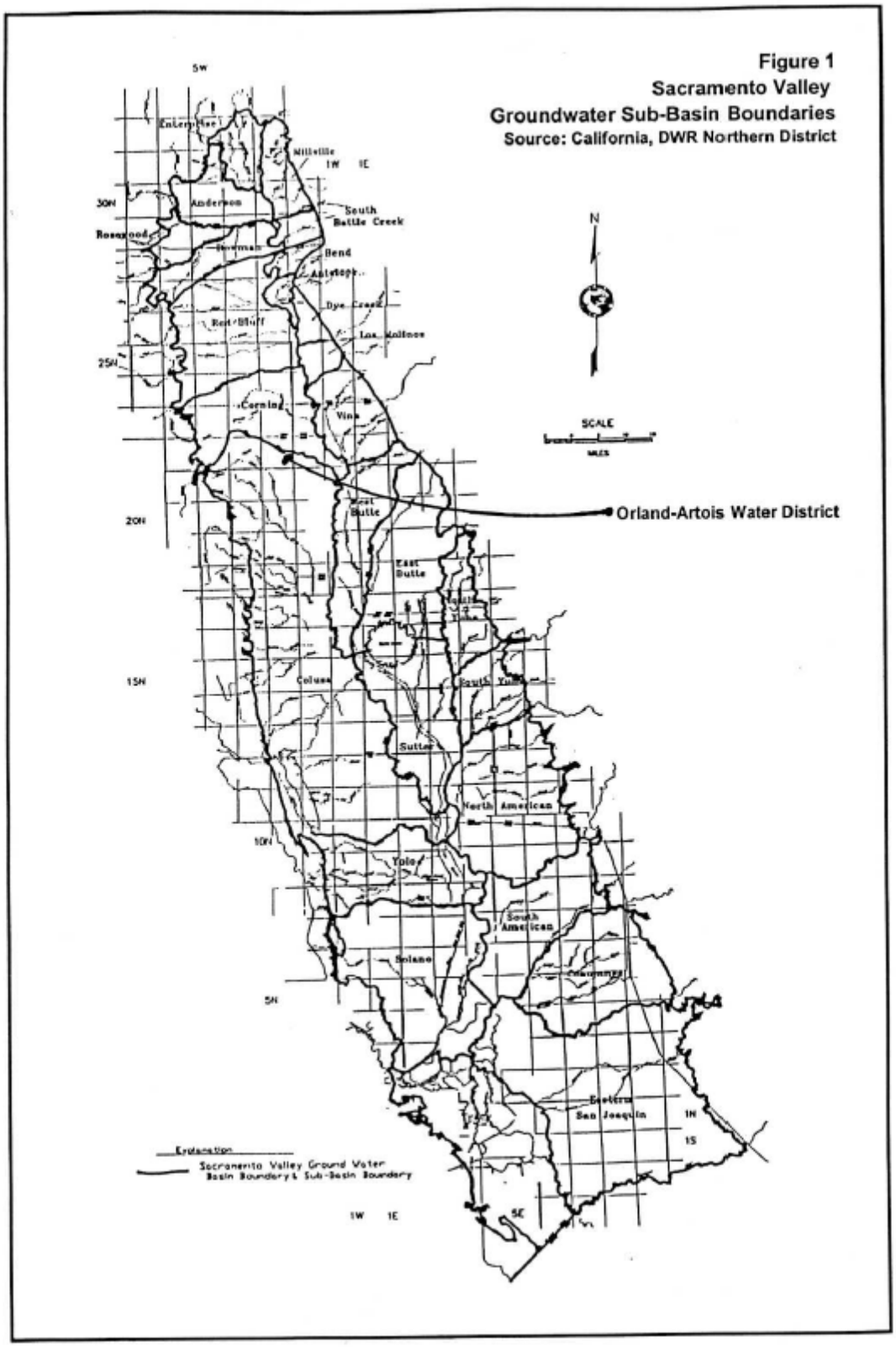


Figure 1
Sacramento Valley
Groundwater Sub-Basin Boundaries
Source: California, DWR Northern District
N
SCALE
Orland-Artois Water District
Explanation
Sacramento Valley Ground Water Basin Boundary & Sub-Basin Boundary
5W
1W
1E
30N
25N
20N
15N
10N
5N
1N
1S
5E
Millville
Anderson
South Battle Creek
Bend
Red Bluff
Dye Creek
Los Molinos
Corning
Vina
East Butte
Colusa
South Yuba
Sutter
North American
Yolo
South American
Solano
Eastern San Joaquin

C. Subsurface Geology

The stratigraphy of the Colusa Sub-Basin area includes a non-water-bearing complex and various water bearing sediments on top of the basement complex. The basement complex consists of granitic and metamorphic rocks, which do not yield water freely to wells. The basement complex is overlain by continental deposits of late Tertiary and Quaternary age. Deposits from the Quaternary age include alluvial, flood basin and deposits from the Modesto, Riverbank and Red Bluff Formations. Deposits from the Tertiary age consist of the Tehama and Tuscan Formations.

The principle water-bearing complex of the Colusa Sub-Basin aquifer system is comprised of late tertiary age deposits from the Tehama Formation. The Tehama Formation consists of thick deposits of silt and clay interbedded with thin layers of lenticular sand and gravel. Permeability varies throughout the formation. In the northern part of the Sub Basin, there is a higher percentage of gravel that was deposited from the ancestral Stony Creek. This area can produce a significant quantity of water to wells. Outside the Stony Creek member of the Tehama formation, permeability is low to moderate due to a higher percentage of fine-grained sediments and the presence of hardpan layers.

The Tuscan Formation is a water-bearing complex located in the Northeast section of the Sub-Basin. It consists of interbedded volcanic lava flow, mudflow, conglomerate and tuff. Permeability is found to be higher in this formation than the Tehama Formation, although the Tuscan Formation is less utilized.

The older alluvium deposits overlie the low plain found in the western portion of the Colusa Sub-Basin. They are interspersed with deposits from the Tehama formation. The older alluvium consists of gravel, sand, silt and clay.

The younger alluvium consists of Basin deposits and alluvium. Basin deposits consist of fine-grained silt and clay and are found in the flood basin area adjacent to streams. Permeability is low through these deposits. Younger alluvium deposits are found along the Sacramento River. These deposits consist of unconsolidated, unweathered gravel, sand, silt and clay. Permeability is moderate to high due to a higher percentage of gravel and sand as opposed to Flood Basin deposits.

Natural groundwater recharge to the Colusa Sub-Basin is in the form of surface water recharge from Cache Creek, Stony Creek, and the Sacramento River, infiltration from precipitation, and groundwater baseflow from the western and eastern parts of the sub-basin. Most recharge to the area is in the form of deep percolation of applied irrigation water.

Groundwater Basin information was provided by the Northern District, California Department of Water Resources as part of the Sacramento River Basin-Wide Management Plan; Groundwater Hydrology Technical Memorandum.

D. Groundwater Conditions In The Orland-Artois Water District

Based on spring 1997 groundwater elevations (Figure 2), it appears that Stony Creek serves as a source of recharge to the Sub-basin and that groundwater flow is in the northwest to southeast direction. The United States Bureau of Reclamation (USBR, 1988) reported that groundwater recharge within the District is primarily from deep percolation of applied irrigation water. Other sources of groundwater recharge to the District included surface stream recharge and deep percolation of precipitation.

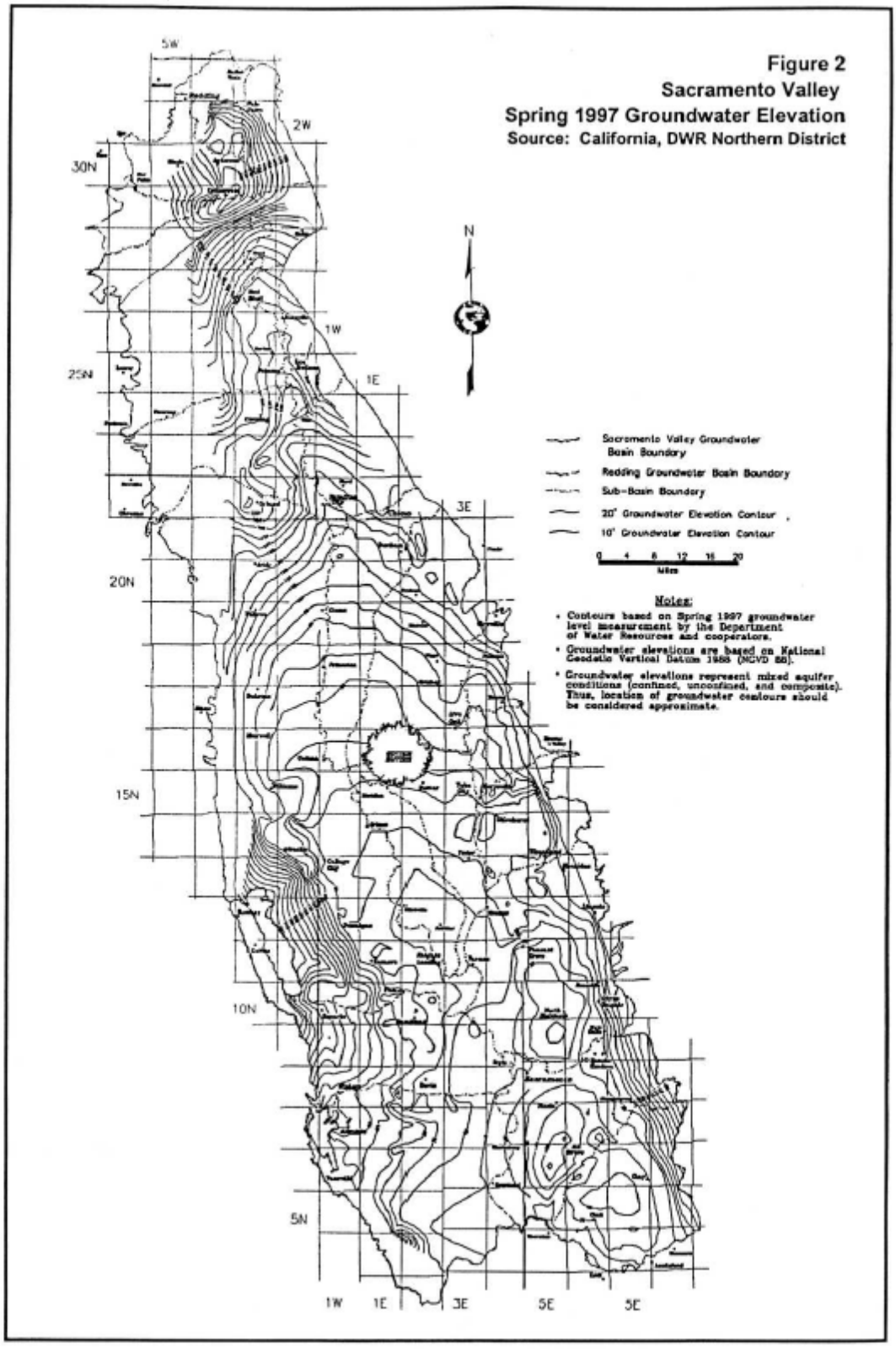


Figure 2
Sacramento Valley
Spring 1997 Groundwater Elevation
Source: California, DWR Northern District
5W
2W
30N
1W
25N
1E
3E
20N
15N
10N
5N
1W
1E
3E
5E
5E
N
Sacramento Valley Groundwater Basin Boundary
Redding Groundwater Basin Boundary
Sub-Basin Boundary
20' Groundwater Elevation Contour
10' Groundwater Elevation Contour
0 4 8 12 16 20
Miles
Notes:
• Contours based on Spring 1997 groundwater level measurement by the Department of Water Resources and cooperators.
• Groundwater elevations are based on National Geodetic Vertical Datum 1988 (NGVD 88).
• Groundwater elevations represent mixed aquifer conditions (confined, unconfined, and composite). Thus, location of groundwater contours should be considered approximate.

III. EXISTING CONDITIONS IN THE DISTRICT

A. District History

The District is located generally between the towns of Orland and Artois, in the northwest portion of the Sacramento Valley (Figure 3). The District is comprised of 30,290 acres of land interspersed with non-district lands in a checkerboard-like pattern. The District's assessed (irrigable) area is 28,988 acres.

The District was formed in 1954 for the purpose of contracting with the Bureau of Reclamation for a supplemental surface water supply. Contract 14-06-200-8283A was entered into between the District and the Bureau in 1963, and water deliveries began in 1976, with completion of the District's distribution facilities. The contract had a 53,000 acre-foot annual contract amount. Since the expiration of that contract in 1995, the District has continued to receive Central Valley Project (CVP) water under a series of two-year interim contracts with Reclamation, each with the same contract amount as the original contract (53,000 acre-feet). Along with other historical CVP water contractors, the District is currently negotiating a new long-term water supply contract.

B. District Facilities

OAWD owns and operates a buried pipeline distribution system that conveys CVP water from the Tehama-Colusa Canal to District lands. There is a total of 100 miles of pipeline with diameters ranging from 8 to 96 inches. Water deliveries to farms are measured with totalizing flow meters. The combined delivery capacity through the 5 permanent and 3 temporary turnouts from the Tehama-Colusa Canal is 427 cubic feet per second. Deliveries to lands lying down gradient (generally east) of the Tehama-Colusa Canal are made by gravity while up-gradient deliveries are made by canal side pumping plants.

C. Cropping Patterns and Irrigation Systems

Historically, the trend in irrigated agriculture within the District area (Figure 4) is that acreage in permanent crops (almonds, vineyards, and subtropical and deciduous orchards) has been increasing. Based on predictions of future cropping patterns made by the BOR in the Water Needs Assessment (2000), this trend will continue with an intensification of acreage cultivated with almonds. Reclamation also foresees that District irrigated acreage will increase by an additional 9000 acres in the year 2025 based on recent trends of double cropping. This is reflected by the dramatic increase in acreage that will be cultivated with winter wheat and field corn. Other prominent crops grown in the District are alfalfa, rice and irrigated pasture. Land planted with these crops will essentially remain at the current level.

Figure 3
Orland-Artois Water District

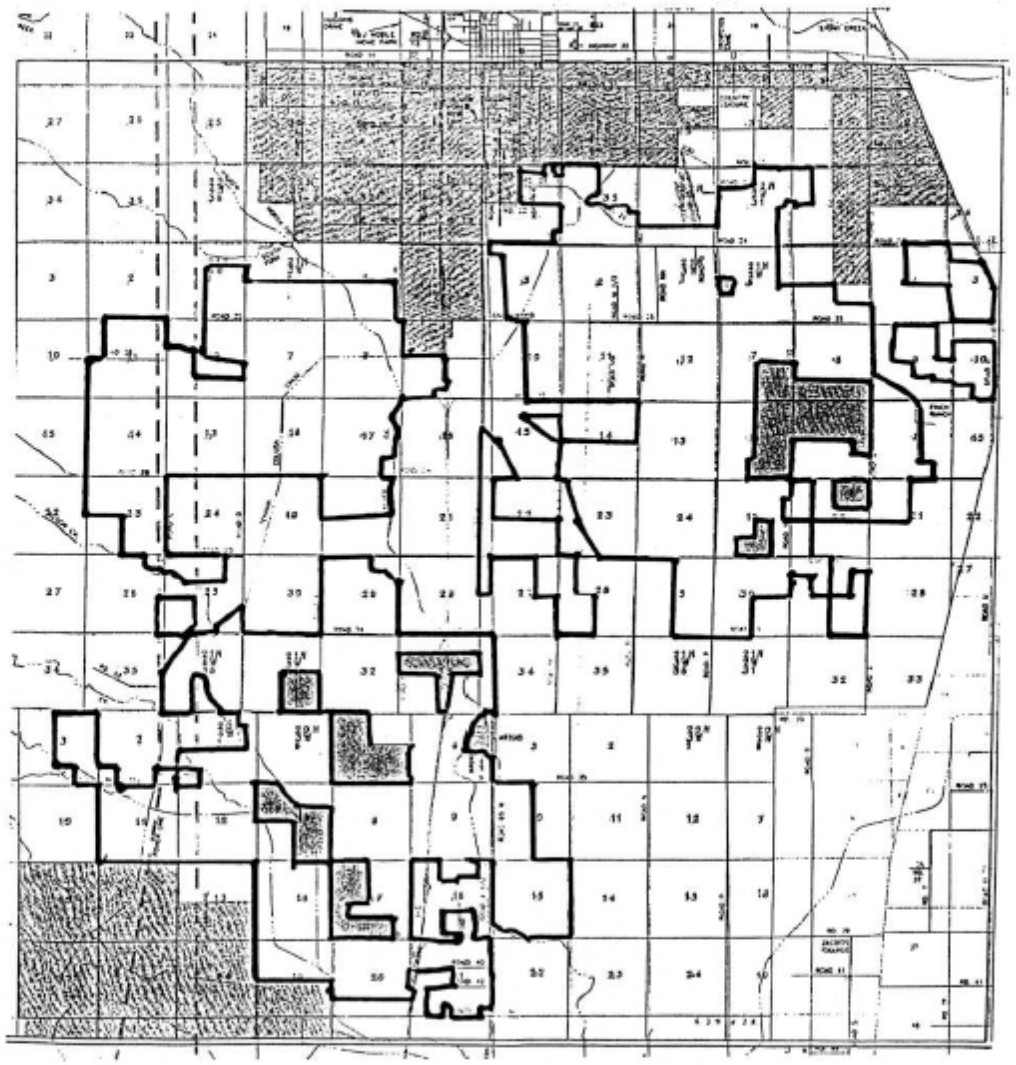
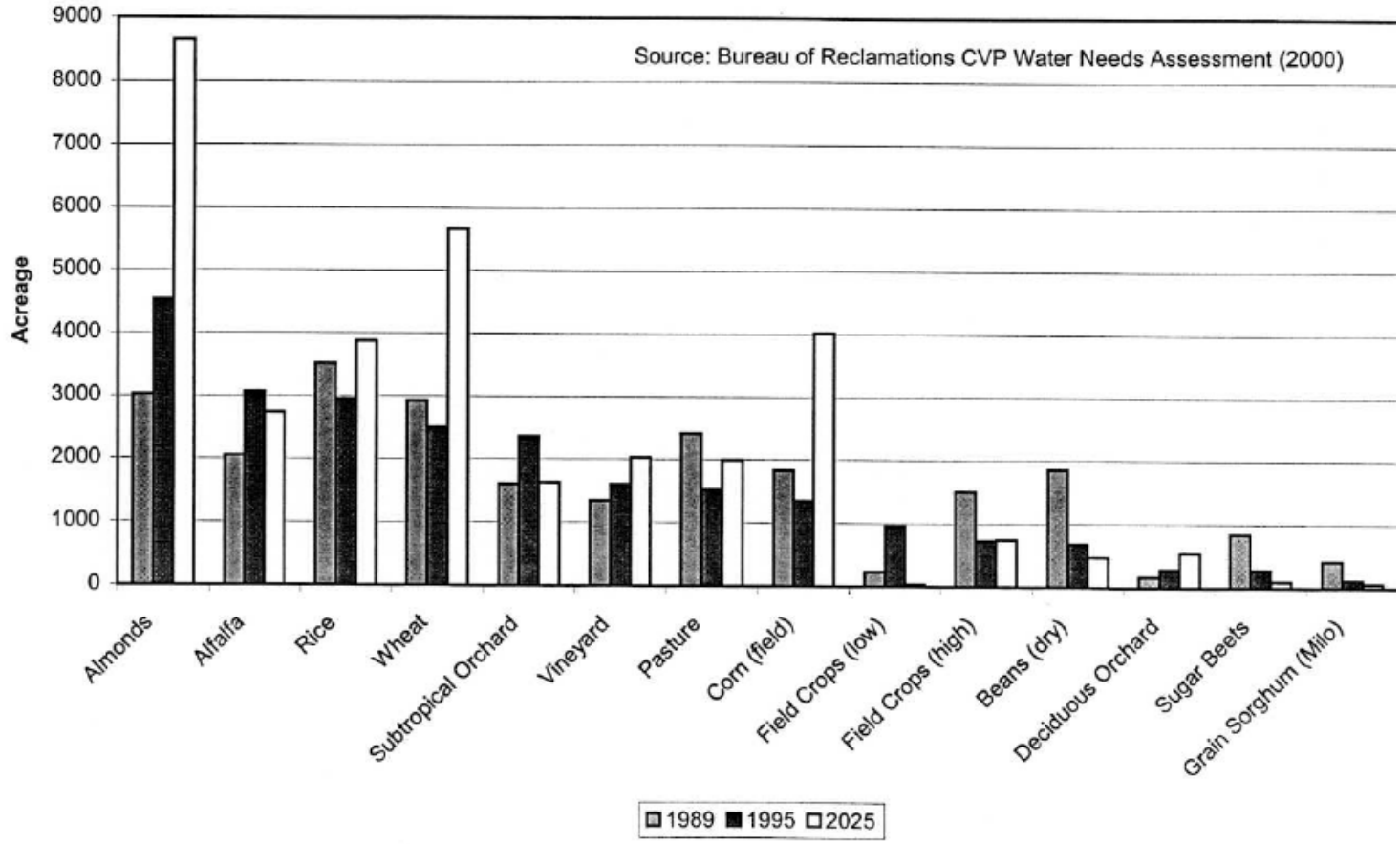


Figure 4
Orland-Artois Water District
Historical and Future Land Usage



Davids Engineering, Inc.
jng>c:\1059\Crop Pattern.xls

Orland-Artois Water District
Groundwater Management Plan

Approximately 75% of the total irrigated acreage in 1999 was surface irrigated, 12% was sprinkler irrigated and 13% was drip irrigated. Growers in the district have gradually shifted to sprinkle and drip irrigation methods, dependant on the crop.

D. Climate and Precipitation

The District climate is characterized by hot dry summers and mild winters accompanied by moderate precipitation. Average annual precipitation at Orland, located immediately north of the District, is about 21 inches for the period 1948 to 2000 (Western Regional Climate Center, 2000). On average, 72 percent of the annual precipitation occurs in the 7-month period from October to April.

The dry climate is well suited for irrigated agriculture. The long, warm-to-hot dry summers allow ripening of crops without the threat of mildew. The summers are typically without precipitation, permitting the attainment of high irrigation efficiencies. Winter precipitation provides some water for winter crops and contributes to groundwater recharge and leaching of salts from the root zone.

IV. DISTRICT WATER DEMANDS AND SUPPLIES

A. Water Demand

The demand for irrigation water in the District is determined primarily by the crops grown on District lands, climatic factors, and on-farm irrigation systems and management. Reclamation has recently completed a water needs analysis for the District as part of the CVP long-term contract renewal process. The analysis shows that under recent historical conditions, the District has had an average farm delivery requirement of 3.31 acre-feet per acre, resulting in a total demand of about 79,000 acre-feet on the District's approximately 23,700 presently-irrigated acres (including double-cropped lands). This computation is based on an assumed aggregate district efficiency of 75 percent and reflects the contribution of precipitation toward meeting crop water requirements.

Based on recent trends toward increased double cropping in the District, Reclamation's water needs analysis assumes that District irrigated acreage will increase to nearly 32,600 acres by 2025. This will result in a total demand of nearly 101,000 acre-feet, and an average farm delivery requirement of 3.10 acre-feet per acre. This demand, based on an aggregate district efficiency of 80 percent, represents a 28 percent increase in irrigation water demand relative to existing conditions.

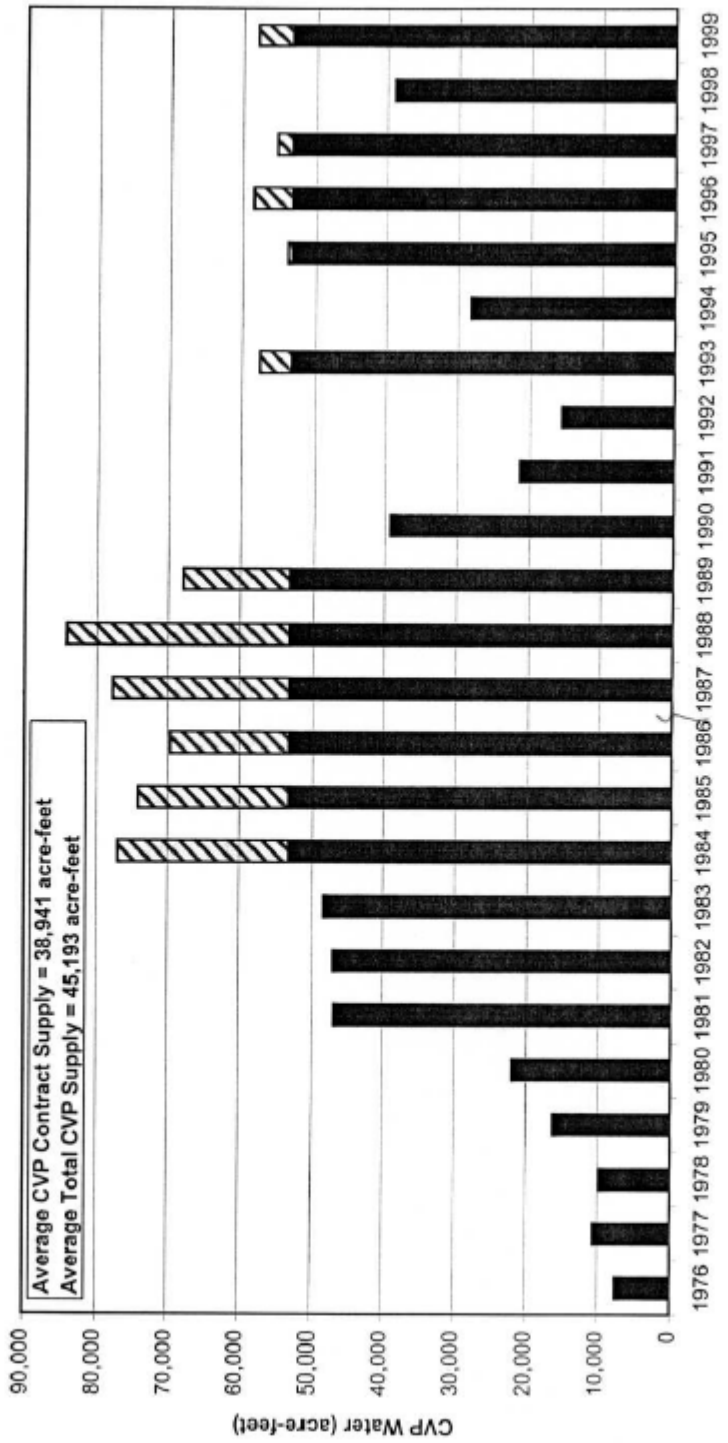
B. Water Supplies

The District has two principal sources of irrigation water, including groundwater and supplemental surface water from the CVP. Since the start of District operations in 1976, CVP contract deliveries have ranged from a low of 7,612 acre-feet in 1976, up to the contract maximum of 53,000 acre-feet in 11 of the years between 1976 and 1999 (Figure 5). The average CVP contract supply has been 38,941 acre-feet over the same period.

In addition to water received under its federal contract, the District has been able to acquire CVP water through water transfers from other CVP water contractors. Water transfers have occurred in 11 of the 25 years between 1976 and 1999 (Figure 5), yielding the most water during the period from 1984 through 1989. In recent years, transfers have yielded significantly less water, due substantially to the effects on Project operations of the Central Valley Project Improvement Act, which came into effect in 1992.

Apparent in the graph is the variability in surface water supplies from year to year. When water was abundant during the wet years of the mid-1980's, surface water supplies, from the annual contract and water transfers, were at a maximum level. During the drought years in the early 1990's water deliveries declined.

Figure 5
Orland-Artois Water District
Total Annual CVP Water Supply



Davids Engineering, Inc.
jng>c:\1059\Water Delivery.xls

Orland-Artois Water District
Groundwater Management Plan

April 2001

The District does not own or operate groundwater production wells; however, some private landowners have constructed wells that they used in conjunction with District-provided CVP water to meet irrigation demands. The District does not maintain records of private well construction or groundwater production. However, each year since 1990, the District has prepared an estimate of private groundwater pumping based on estimates of average farm delivery requirements and records of District surface water sales. When viewed in conjunction with surface water sales, it is evident that private groundwater pumping is used to supplement available CVP surface water, with groundwater pumping rising in dry years and falling in wet years (Figure 6). Over the period 1990 through 1999, groundwater pumping has averaged 25,278 acre-feet and the combined surface water and groundwater supply has averaged 66,165 acre-feet.

Groundwater levels in wells[1] are monitored Statewide by the Department of Water Resources, including several wells in the OAWD. For purposes of developing this Plan, four wells with long-term records were chosen to represent groundwater levels within the District, each generally representing one quadrant of the District (Figure 7). Two of the wells (and possibly others), those in the southwest and northeast quadrants, have continuous records dating from the 1940s. It appears from those records that groundwater levels, while variable from year to year, were generally stable into the mid-1970s. Pronounced water level declines are evident in both wells in 1972 and in 1976.

Between the mid-1970s and mid-1980s, water levels in all four wells rose, most likely reflecting a response to high surface water use and relaxed groundwater pumping during that period. Since the mid-1980s, water levels in all wells have varied, but there are no apparent long-term upward or downward trends evident in any of the wells. This would suggest that current levels of groundwater production are sustainable. However, expected increases in future water demands, coupled with possible reduced reliability of CVP water supplies, may well lead to increased reliance on groundwater supplies and the possibility of declining water levels.

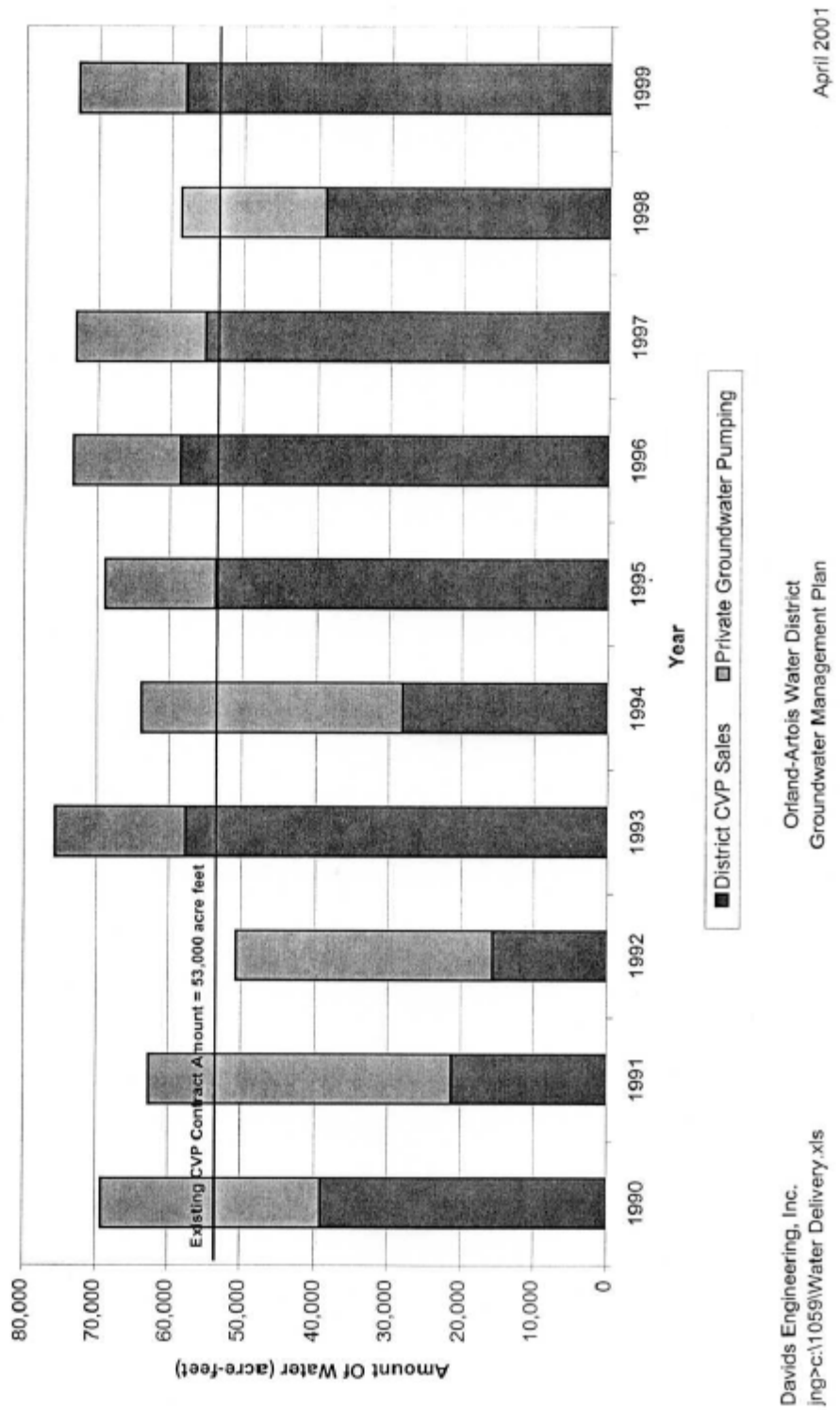
The four wells selected for development of this Plan (see preceding paragraphs) may or may not be used for future groundwater monitoring purposes.

C. Groundwater Quality

The District has not conducted water quality testing, but groundwater is considered to be good for irrigation purposes. District farmers report that cropping choices are not restricted with respect to water quality. However, two groundwater quality problems have been identified in the city of Orland just north of the District.

[1] DWR monitors levels in both production and monitoring wells; production wells may or may not be in active use.

Figure 6
Orland-Artois Water District
Surface Water and Groundwater Supplies
(From 1990 To 1999)



Davids Engineering, Inc.
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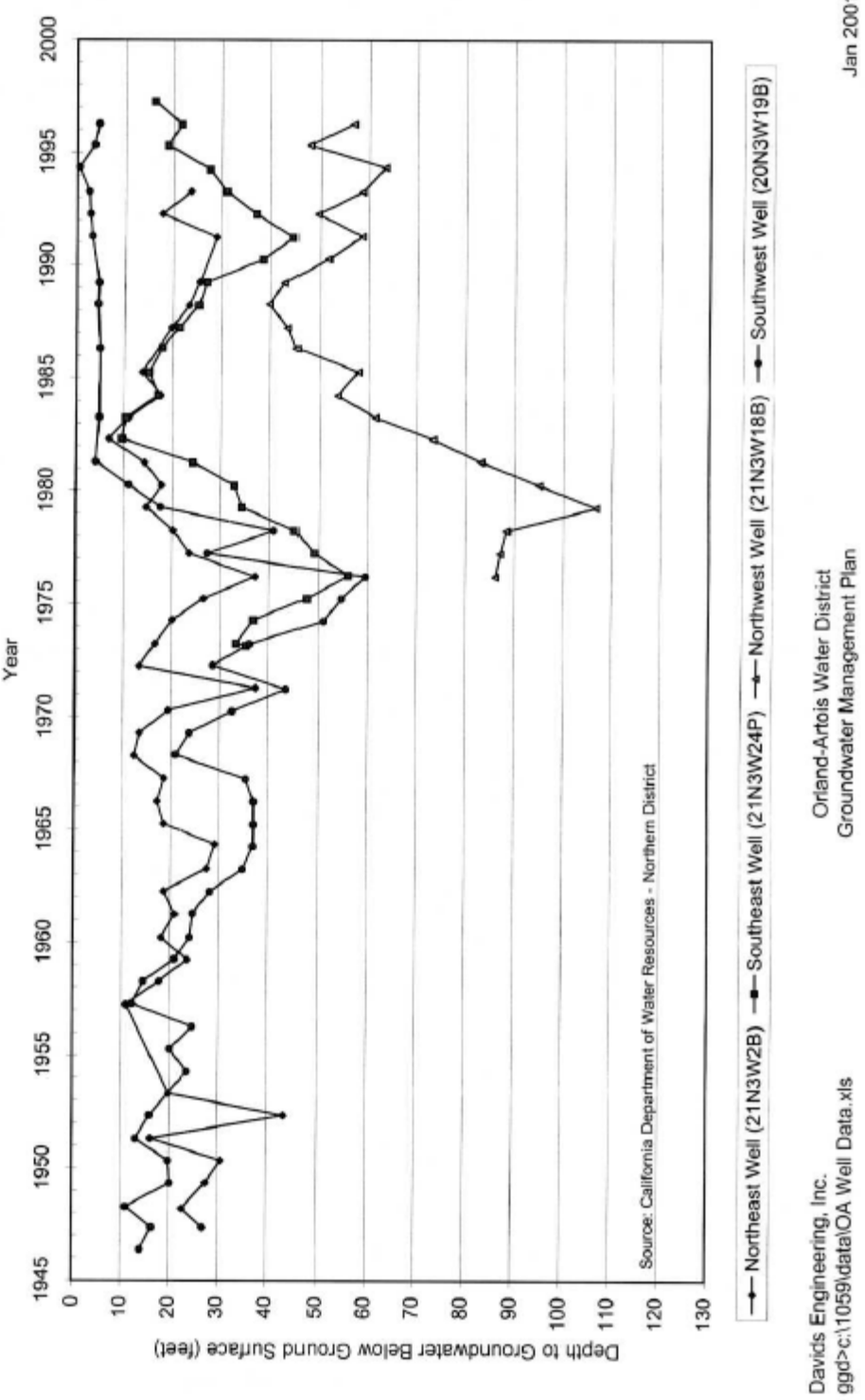
Orland-Artois Water District
Groundwater Management Plan

April 2001

Figure 7
Orland-Artois Water District
Spring Depths to Groundwater in Selected Wells



Davids Engineering, Inc.
ggd>c:\1059\data\OA Well Data.xls

Orland-Artois Water District
Groundwater Management Plan

Jan 2001

V. GROUNDWATER MANAGEMENT PROGRAM

The elements comprising the District's Groundwater Management Program are described in the following sections.

A. Monitor Groundwater Levels and Quality

The District will initiate groundwater level and water quality monitoring activities to provide data that, in combination with other available sources of information, is adequate to track temporal and spatial trends in groundwater behavior. The wells to be monitored and frequency of observation will be determined by the District, with the input of DWR, consultants or others whom the District may engage for technical support. Historical groundwater elevation records published by DWR will be reviewed to identify those wells that should be included in the monitoring program, to preserve and extend available historical records, where possible. Additional wells may be identified and included in the program.

The District will cooperate with DWR and possibly other agencies to identify and implement monitoring protocols and procedures that are consistent with current accepted practice. This cooperation will include providing training to District staff in the use of identified procedures.

Initially, the District will rely on access to existing groundwater wells for monitoring purposes, but may elect to install additional wells or other facilities deemed necessary for carrying out an effective monitoring program. Access to existing wells will be gained through cooperation with District and possibly non-District landowners.

With respect to water quality monitoring, the District intends to deploy District staff to collect water samples from selected wells. Samples will be submitted to reputable commercial laboratories for analysis, following prescribed sampling and handling procedures. Water quality analyses will concentrate on the suitability of water for agricultural uses, but may be expanded to address other concerns that could arise.

The District will implement a simple, computer-based data management program to store, analyze and report groundwater data. Initially, this will be accomplished through the use of spreadsheet or database software programs already in use by the District.

B. Facilitate Conjunctive Use Operations

The District realizes that the reliability and sustainability of the water supply available to District landowners depends on the managed conjunctive use of available surface water and groundwater resources. In view of the possibility of future water supply shortages, the District intends to develop means to expand and enhance its conjunctive use operations. Activities that the District may pursue in this regard include: acquisition of additional surface water supplies to be used directly (thereby relaxing groundwater pumping) or for artificial recharge; acquisition of land and construction of groundwater recharge facilities; strategic pricing of surface water supplies to induce desired groundwater pumping patterns; and construction of groundwater extraction facilities. The District's principal role is to take actions to assure sufficient, affordable supplemental surface water supplies are available to

District water users. In particular, the District will protect and maintain its CVP water supply contract with the United States.

C. Implement Aquifer Storage and Recovery

The District has participated in studies that indicate that CVP water, above the District's CVP contract supply, may be available under certain hydrologic conditions, when CVP releases are surplus to those needed to maintain Delta water quality objectives. Additionally, CVP contract supplies available to T-C contractors (including OAWD and others), are not fully utilized in all years. These intermittent water supplies could be converted to firm, usable supplies if they could be stored and produced on demand.

The District has purchased a 20-acre site located immediately south of Stony Creek and adjacent to the T-C Canal for the purpose of underground storage and recovery of intermittent surface water supplies like, but not necessarily limited to, those described above. As part of this Program, the District intends to determine the feasibility of developing the site for this purpose. This will involve completion of operations analyses to provide initial estimates of the yield of an aquifer storage (recharge) and recovery system on the 20-acre site, based on certain assumptions regarding infiltration and recovery rates, as well as availability of water and conveyance capacity in the T-C Canal. If the system appears feasible, then the District may elect to proceed with physical on-site testing to validate the assumptions.

Based on the outcome of these investigations, the District may elect to develop the site for aquifer storage and recovery. The District may consider other sites, both within and outside of the District boundaries, for implementation of aquifer storage and recovery facilities. The District may pursue these facilities alone or in cooperation with other entities.

D. Construct Groundwater Management Facilities

As outlined above, the District intends to ensure reliable water supplies to its users, primarily through conjunctive use operations. Facilities that may be constructed to enhance conjunctive use include groundwater recharge basins, extraction wells and expanded surface water distribution systems.

E. Support County Wellhead Protection Program

Serious groundwater problems can result if wellhead areas are contaminated or if groundwater wells are not properly constructed and abandoned. In these situations, wells can become conduits for contaminants, pollutants, and degraded waters to flow into otherwise usable groundwater aquifers.

The Glenn County Countywide Service Area under its Wellhead Protection Program currently administers all matters pertaining to well construction and abandonment, wellhead protection and contamination. The District acknowledges the County's jurisdiction in this regard and will cooperate with the County through provision of any relevant, available information to which the District may have access.

F. Promote Water Conservation

The District recognizes that good management of available surface and groundwater supplies begins with water conservation, defined here as seeking to minimize the amount of water extracted to accomplish the intended beneficial use. Toward this objective, the District will continue to promote voluntary adoption of on-farm water management practices that are appropriate and cost effective under District conditions.

G. Cooperate with Glenn County Groundwater Management Efforts

Glenn County has adopted an ordinance governing the management of groundwater county-wide. The thrust of the County's efforts will be to establish safe yield of the County aquifers by the Basin Management Objective (BMO) method and then conduct monitoring to assure that the specified water level, water quality and land subsidence criteria comprising the safe yield are observed. The County has formed a Water Advisory Committee and the District has one chair on the Committee. As previously explained, the ordinance expresses the County's intent to cooperate with interested local agencies.

The District has taken an active role in development of Glenn County's Groundwater Management Ordinance and intends to support the County's efforts to implement the ordinance as an element of its own Groundwater Management Program. In particular, the District intends to cooperate with the County in establishing the safe yield of the aquifers underlying the District and in monitoring of groundwater conditions.

VI. PLAN IMPLEMENTATION

A. Rules and Regulations

According to Water Code Section 10753.8 (a), a local agency shall adopt rules and regulations to implement and enforce an adopted groundwater management plan. The local agency is not authorized to make a binding determination of the water rights of any person or entity (Section 10753.8 (b)). The local agency is also not authorized to limit or suspend extractions unless the local agency has determined through study and investigation that groundwater replenishment programs or other alternative sources of water supply have proved insufficient or infeasible to lessen the demand for groundwater (Section 10753.8 (c)).

In adopting rules and regulations, the local agency shall consider the potential impact of those rules and regulations on business activities, including agricultural operations, and to the extent practicable and consistent with the protection of the groundwater resources, minimize any adverse impacts on those business activities (Section 10753.9).

B. Program Management

This Groundwater Management Program will be implemented and managed according to the policy and guidance of the Board of Directors of Orland-Artois Water District. At least annually at one of its regular meetings, the Board will review available information pertaining to groundwater conditions and consider taking appropriate actions consistent with the Program.

C. Plan Revisions and Updates

This Groundwater Management Plan may revised or updated from time to time, as deemed appropriate by the Board of Directors of the Orland-Artois Water District.

References

CALFED. Final Programmatic EIS/EIR July 2000.

Glenn County AB3030 Groundwater Management Plan.

Northern District, California Department of Water Resources. Sacramento River Basin-Wide Management Plan. Groundwater Hydrology Technical Memorandum.

State of California, Department of Water Resources. "Groundwater Basins in California, Bulletin 118-80." January 1980.

U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. Technical working paper No. 2 Water Contracting Environmental Impact Statement.

U.S. Department of the Interior, Bureau of Reclamation. Water Needs Assessment, 2000.

Western Regional Climate Center, 2000.

Attachment G

Groundwater Banking Plan

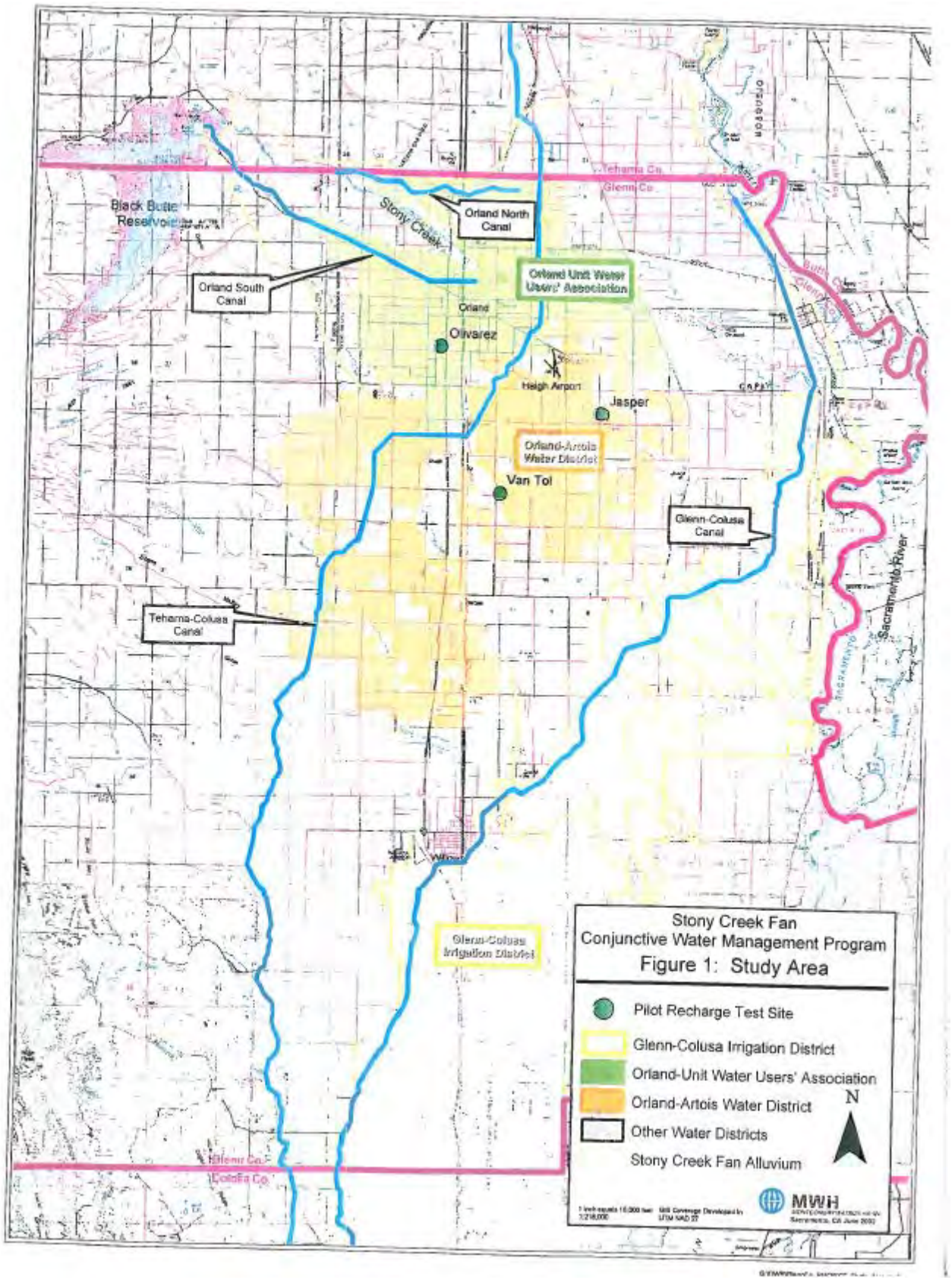

Black Butte Reservoir
Stony Creek
Orland North Canal
Orland South Canal
Orland Unit Water Users' Association
Orland
Olivarez
High Airport
Jasper
Orland-Artois Water District
Van Tol
Glenn-Colusa Canal
Tehama-Colusa Canal
Sacramento River
Glenn-Colusa Irrigation District
Tehama Co.
Glenn Co.
Colusa Co.
Stony Creek Fan
Conjunctive Water Management Program
Figure 1: Study Area
Pilot Recharge Test Site
Glenn-Colusa Irrigation District
Orland-Unit Water Users' Association
Orland-Artois Water District
Other Water Districts
Stony Creek Fan Alluvium
N
MWH

Table B-1
Summary of District Groundwater Pumping

District	Approximate Number of Groundwater Wells	Range of Historical Annual Groundwater Pumping (1000 AF/Yr)	Approximate In-lieu Capability (1000 AF/Yr)
GCID	200	4 to 17	17
OAWD	400	5 to 55	55
OUWUA	50	3 to 13	13
Total	**650**	**12 to 85**	**85**

The other method of artificial recharge represented on the flowchart is direct recharge. Following the direct recharge path of the flowchart the first question asks whether or not the recharge district has surplus surface supplies with which to recharge. If the answer is no direct recharge is not possible. A review of surface water supplies that could be used for direct recharge included unused Base Supply, unappropriated Stony Creek water and water available from re-operating East Park and Stony Gorge Reservoirs.

The next question to answer on the direct recharge path is whether favorable infiltration rates exist. If the answer were "No" then direct recharge would not be viable. For instance, soils consisting of fine sand to silty clay conditions are typically unsuitable for artificial recharge due to relatively low infiltration rates.

A field investigation of the Stony Creek Fan area was completed to determine infiltration characteristics within the Project Area and to help asses the feasibility of recharging the groundwater basin using constructed direct recharge basins. Candidate sites were identified throughout the area and were evaluated based on specific site selection criteria[2]. Three sites were ultimately chosen for pilot recharge testing[3]. The three sites are considered to be representative of areas favorable for groundwater recharge throughout the Project Area.

The pilot recharge tests were conducted over a several week period under varied conditions. Infiltration rates varied from several feet per day to ten's of feet per day. The range of infiltration rates are summarized in **Table B-2**. These infiltration rates are considered highly favorable for direct recharge operations.

[2] The Pilot Recharge Test Site Selection Criteria are: soils and geologic conditions; groundwater conditions; land availability; water availability; site access; environmental issues; geographic variability. For a complete description refer to Stony Creek Pilot Test Site Selection Criteria Memorandum, MWH, October 2001.
[3] See Technical Memorandum 2:Pilot Recharge Test Designs and Monitoring Program, MWH, August 2002

Table B-2
Pilot Recharge Test Infiltration Rates

Site	Long Term Infiltration Rate (ft/d)	
	Spreading Basin	Flooded Field
Van Tol	22	2
Jasper	45	6
Olivarez	10	0.5

1 Spreading basins are shallow ponds excavated to relatively shallow depths (2 to 6 feet) through low permeability soils and/or through shallow hardpan.
2 A flooded field refers to the groundwater recharge technique of applying shallow water to a bermed field (approximate berm height, 2 feet).

With the finding that favorable infiltration rates exist in the Project Area, the next logical question along the "Direct Recharge" path is "Does recharge water reach the target aquifer?" If the answer is "yes' then proceed to the next step. If the answer is "No", then direct recharge may not be effective. The SCF investigation found that the recharge water, under the existing state of the basin, might not be reaching the target aquifer, the Tehama formation.[4] Instead the recharge water appears to enter the Stony Creek Fan alluvium, where it may only reside in storage for a relatively short period - weeks or months as opposed to several months to several years – before being discharged from the area. It is postulated that the high conductivities associated with the alluvial materials result in lateral movement and lateral spreading of the recharge water, and little downward migration (see TM 3 for a detailed discussion of this finding). This finding is in stark contrast to the previously accepted theory that the Stony Creek Fan aquifer consisted of sand and gravel layers associated with the younger alluvial materials interbedded and interconnected with the silts and clays that are characteristic of the older alluvium, or Tehama formation.

The results of the field work described above suggests that in-lieu recharge may be a more effective than direct recharge in managing the long-term health of groundwater resources in the Project Area. Assuming the artificial recharge water reaches the target aquifer, the next question on the flowchart is "Does the recharge water appear to positively impact the storage of the basin?" In other words, does the recharge water improve basin conditions (e.g. groundwater elevations) or does the recharge water appear to run-off? If the answer to this question is "Yes" then artificial recharge appears viable. If the answer to the question is "No" then recharge water is being rejected possibly because the basin is already "full."

The term "full", as used here, is referring to groundwater conditions that are relatively stable, or in balance. Under these conditions water leaving the basin is approximately equal to water entering the basin on a long-term average annual basis. For instance, groundwater storage conditions in the Project Area have varied over the course of the last 30 years due to varied hydrologic and water supply conditions, however, the cumulative

[4] The Tehama Formation typically includes confined (or semi-confined) water-bearing layers occuring at multiple depths, which are believed to be the source of groundwater pumped by most irrigation wells in the Study Area.

change in storage conditions has been minimal. This is supported by the following information:

- A water balance completed for the Project Area shows a net recharge on average of approximately 1.1 acre-feet per acre per year; and
- Review of groundwater level hydrographs throughout the region indicate groundwater levels typically return to pre-pumping conditions the following spring.

Based on the above findings, it was concluded that average annual natural recharge to the basin has generally exceeded average annual extractions from the basin, and artificial recharge at this time would not provide any additional direct benefit.

Assessment of Recovery

The recovery cycle, shown in **Figure B-4**, begins by asking "Transfer dry-year water?" If the answer to the question is no then the pumped groundwater would be used to meet local demand. Note that both legs of the flow chart could be followed and some water could be used to meet local demand while some could be reserved for transfer. If the answer to the transfer question is 'Yes' then a series of questions must be answered.

The first question is, does the groundwater pumping entity have access to dry year surface water supply to transfer. If there is no dry-year supply then a transfer is not possible. If the answer to the question is yes then the question is, "Is there conveyance for the transfer?" For example, both GCID and OAWD have relatively efficient conveyance for transfer water. Both districts would leave water in the Sacramento River. OUWUA is relatively more challenged for conveyance. The Stony Creek is believed to be a losing creek for much of the stretch between OUWUA and the Sacramento River.[5] Therefore transfers down Stony Creek may be jeopardized by high losses. Potential transfers of OUWUA water may require involving exchanges with TC contractors.

If there is both dry-year surface water and conveyance ability the next question to answer is "is the transfer possible per the water code?" In general, groundwater substitution transfers have little trouble with a legal review. The legal 'transfer-ability' of source water available to the SCF partners, other than groundwater substitution water, is not as clear.

The components necessary to a groundwater substitution transfer are summarized in **Table B-3.** The three components are 1) dry year water supply 2) groundwater pumping capacity and 3) conveyance. The OAWD is limited in their dry-year surface supply but possess the other two attributes. The OUWUA has limited groundwater pumping capacity and potentially limited conveyance capacity but possess dry year surface water. GCID posses all three components. In addition, field investigations have confirmed the presence of a potentially high-producing confined aquifer, the Lower Tuscan formation: Hydrogeologic investigations underway by DWR-Northern District have documented the presence of this formation in the vicinity of the Project Area. Evaluation of well logs

[5] Personal conversations with Toccey Dudley of DWR.

supported by recently developed wells support the notion that this groundwater source could potentially provide new supplies to the Partners.[6]

Table B-3
Components of a Dry-year Groundwater Substitution Transfer

Partner	Groundwater Substitution Transfer Component		
	Dry Year Surface Supply	Groundwater Pumping Capacity	Conveyance of dry-year surface water
OAWD	Limited *(Junior CVP entitlement)*	Not limited	Not limited *(Forebear diversion into TC canal from Sacramento River)*
OUWUA	Not limited *(Adjudicated Pre-1914 storage and direct diversion rights)*	Limited	Limited *(Forbear diversions from Stony Creek – either travel down Stony Creek (high loss factor, or move water from South Canal to TC canal and ultimately Sac River at the drain).*
GCID	Not limited *(Base supply and supplemental CVP supply)*	Not Limited	Not limited *(Forbear diversions into the GCID from the Sacramento River)*

Summary of Physical Factors Influencing Alternatives Formulation

In summary, the field investigations and modeling analysis narrowed the set of alternative components. Initially the set of alternative components was believed to include variations of artificial direct recharge, in-lieu recharge, supply sources, extraction volumes, and yield destinations. However, as a result of the field investigations and subsequent modeling, artificial direct recharge was determined to offer less opportunity than originally thought. Furthermore, examination of historical water level data supported by modeling analysis indicates that the basin is more resilient than previously thought and is capable of supporting additional production. In addition, greater understanding of the hydrogeology has revealed new sources of potential groundwater supplies. These findings combined have lead too more focused alternative formulation focused on development of groundwater production through the SCF Partnership.

[6] It is noted that development of the Lower Tuscan formation as a source of new supply poses risks not yet fully identified or understood. For example, there remains limited understanding of the potential range of well's yields, the potential physical effects of long-term pumping, and the potential political ramifications of landowners predisposed to using private landowner wells rather than district-owned wells. These unquantified risks will be addressed through future efforts to compare and analyze SCF project alternatives.

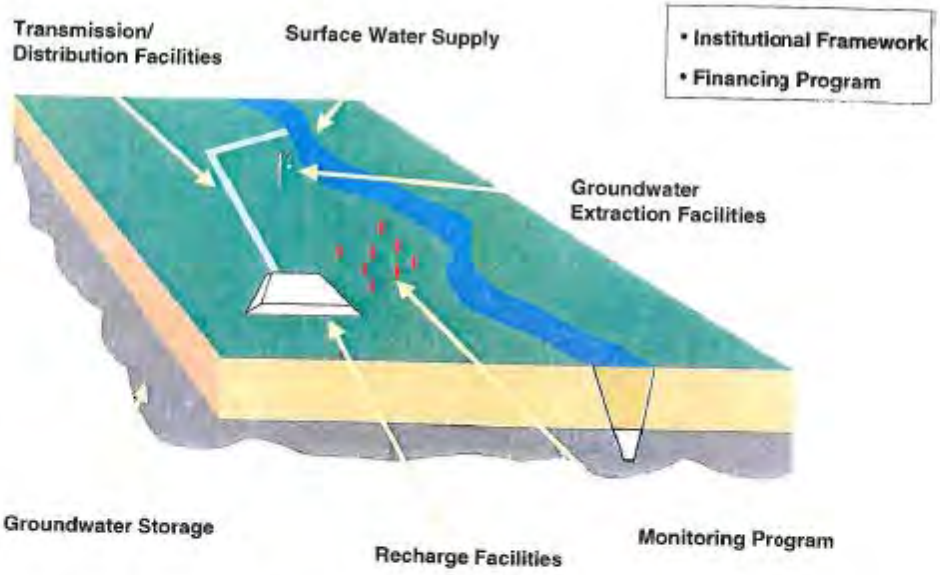


Figure B-1. Typical Components Required for a Conjunctive Use Program

Determine Feasibility of Artificial Recharge: If the basin assessment (described above) results in the need to artificial recharge the basin the feasibility various recharge options would be evaluated.

The Stony Creek Fan Feasibility Investigation analyzed how best to achieve conjunctive use in the Study Area. Water sources potentially available to the partners and an improved understanding of the groundwater basin was analyzed. This analysis process is described in the following paragraphs.

Figures B-3 and B-4 describe the particular questions that were answered to assess the SCF recharge and recovery, respectively. The following sections use these flowcharts to describe the process and findings associated with the Stony Creek Fan Feasibility Investigation.

Assessment of Artificial Recharge

Figure B-3 describes the steps that were followed to assess artificial recharge in the SCF Feasibility Investigation. Two primary paths were followed. One path evaluated in-lieu recharge and the other path evaluated direct recharge.

The in-lieu leg of the flowchart begins with the question "Does the recharge district have access to surplus surface water on an agricultural demand pattern?" If the answer is no in-lieu recharge is not possible. A review of surface water supplies that could be used in-lieu of pumping groundwater revealed two possible sources: unused Base Supply; and unappropriated Stony Creek water.

The next question on the in-lieu path is "Does the recharge district have a history of groundwater pumping?" If the answer is no, in-lieu recharge is not possible because there is no pumping to stop in order to achieve the in-lieu recharge. If the answer to the question is yes, then an assessment of the volume of surface water available for use as a substitute during the in-lieu recharge period is required. Finally, the assessment of surface water would be combined with the estimates of historical pumping volumes in order to estimate the size of the in-lieu potential.

The SCF investigation initially estimated the historical volume of groundwater extracted by each district as an initial assessment of the feasibility of in-lieu recharge. **Table B-1** summarizes these findings. The results of this initial review suggested that in-lieu recharge may be possible given the amount of historical pumping.

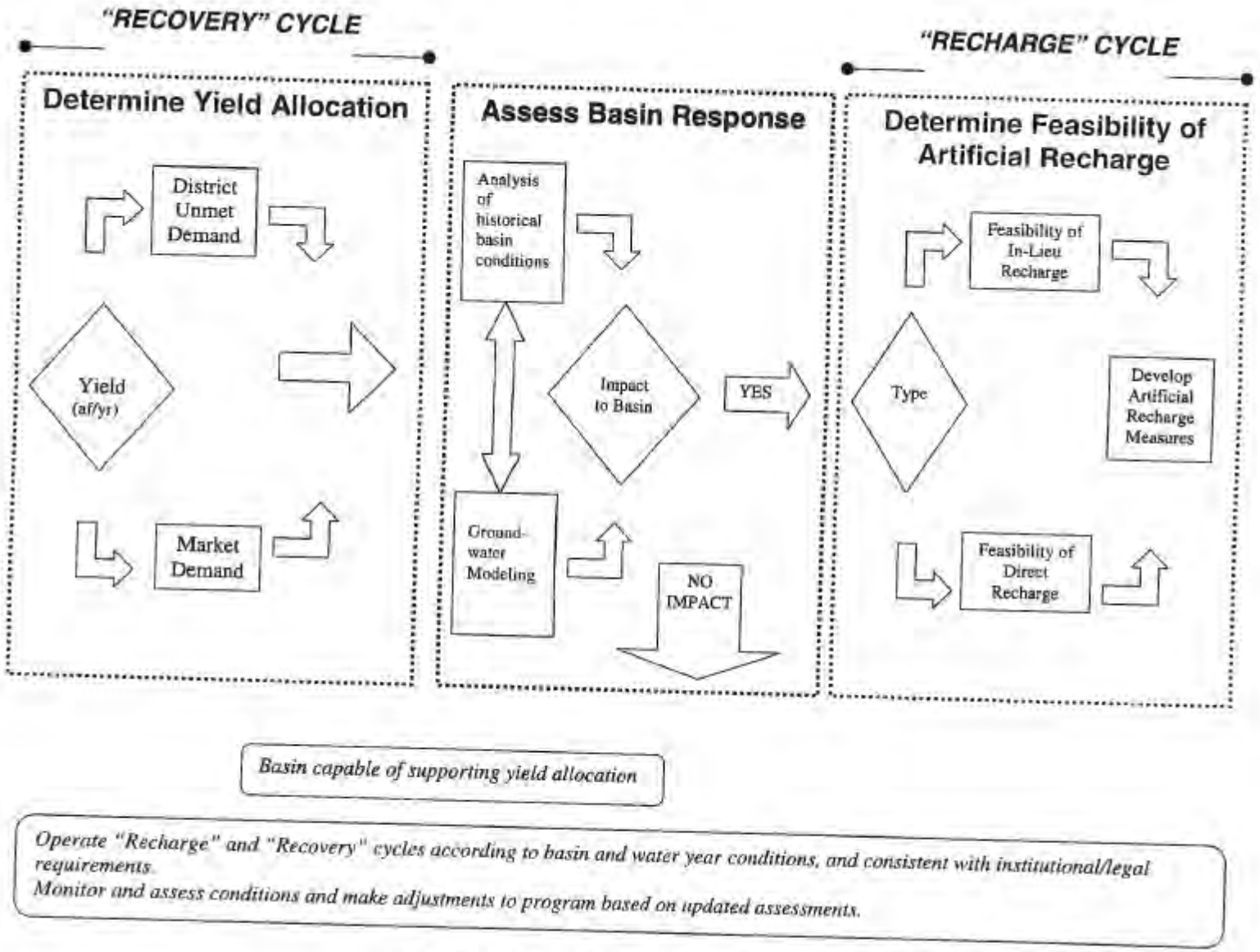


Figure B-2. Formulation and Analysis of Conjunctive Use

Attachment I

Notices of District Education Programs and Services Available to Customers

AGRICULTURE AND IRRIGATION
FACT SHEET

Energy Management for Your Business

PG&E's Energy Solutions for Agriculture and Irrigation

Energy is a key resource for farmers. Smart energy management can be a powerful tool in addressing stricter regulatory standards and rising energy costs. This fact sheet provides an overview of Pacific Gas and Electric Company's (PG&E) services to improve energy management for agriculture and irrigation.

PG&E paid more than $5,559,000 in energy-efficiency incentives to California agriculture and irrigation operations in 2012.

Our account representatives are available to help eligible customers receive incentives for smart energy management.

1. Contact us to find out about your eligibility for PG&E programs
2. Schedule a site visit with PG&E and ask about an energy audit
3. Develop your energy management project with PG&E's wide range of resources and services

Talk with your PG&E account representative or call the Agricultural Customer Service Center at 1-877 311-FARM (3276).

The success of your operations depends on reliable energy and managing costs. Our team of energy specialists is available to assist you in taking advantage of PG&E's energy-efficiency and money-saving services. PG&E can help you realize a quicker return on your investments, increase the capacity of your existing systems and improve the reliability of California's electrical grid.

Energy Management Services for Agriculture and Irrigation

Service	Description	Result
Rate Plan	Agricultural rates change, so have a rate analysis done annually	Can reduce your energy bill
Advanced Pumping Efficiency Program (APEP)	Have your pumps tested every two years	Can receive rebates to offset repair costs for inefficient pumps
New Construction	Speak to PG&E early in the design phase. Our Savings By Design program provides incentives and will help make your new building more energy efficient	Increases operational efficiency and reduces energy costs
Retrofits	Earn incentives for replacing equipment and systems to achieve greater energy efficiency	Reduces energy costs
Retrocommissioning	Tune up your existing equipment to optimize efficiencies	Maximizes existing infrastructure

Energy Solutions for Agriculture and Irrigation

PG&E provides generous rebates for equipment upgrades, and there are many rebates available for business customers. Listed below are some of the most popular technologies available for agriculture and irrigation that can save money and energy. Your PG&E account representative or authorized PG&E partner can help you choose the best solutions for your business.

Energy-efficiency Rebates and Incentives

Solution	Benefit
Drip Irrigation and Low-pressure Sprinkler Nozzles	Crop yields can be improved by replacing flood and high-pressure systems with a micro-irrigation system of drip and low-pressure nozzles. When water use is optimized, less pumping is required. Other benefits include increased production and yields, increased quality and uniformity of crop production, accelerated crop maturity, increased ability to farm marginal land and substantial water savings.
Variable Frequency Drives (VFDs)	VFDs can reduce energy use by matching the flow of a pump to load requirements. If programmed correctly, these motors can also help reduce mechanical maintenance costs by ramping up slowly to meet system demand.
Premium-efficiency Motors (PEMs)	Qualified premium-efficiency motors offer significant energy savings as well as lower vibration and increased reliability, especially in equipment with long operating hours.
Advanced Pumping Efficiency Program (APEP)	Administered by California State University, Fresno's Center for Irrigation Technology, APEP subsidizes over 2,400 pump tests per year and provides cash incentives for pump retrofit projects. With their mobile simulation trailer they are able to bring a pump workshop to your community. Contact them at **1-800-845-6038** or via the web at **www.pumpefficiency.org**.

Your Next Steps with PG&E

For more information on how PG&E can help your business manage energy consumption and reduce costs, contact your PG&E account representative, call the PG&E **Agricultural Customer Service Center** at 1-877-311-FARM (3276) or visit www.pge.com/ag.

Whats New?

- Home
- Site Map
- Español

[Click here to read about CIT's Diesel Pumping Efficiency Program]

Pacific Gas and Electric Company

"IMPORTANT! As part of PG&E's response to customers who are highly impacted by the current drought ***PG&E will temporarily increase the incentive rate available for pump retrofits to $0.12/kWh from the current $0.09/kWh.*** The incentives are offered via the Advanced Pumping Efficiency Program (APEP) and are applicable to retrofit projects that involve retrofit or repair of the pump bowl and/or impeller only. The increase is effective as of 5/15/2014.
To qualify for this promotional incentive rate, projects must meet the following requirement in addition to all other Advanced Pumping Efficiency Program guidelines:
The application for the retrofit incentive must be signed between 5/15/2014 and 12/31/2015. "

Pacific Gas and Electric Company (PG&E) is funding the Advanced Pumping Efficiency Program (APEP) through 2015 using Public Purpose Programs Funds under the auspices of the California Public Utilities Commission.

Eligibility extends to all owners or users of a non-residential, PG&E electric or natural gas account that is primarily used for pumping water for the following: Production agriculture; landscape or turf irrigation; municipal purposes, including potable and tertiary-treated (reclaimed) water but excluding pumps used for industrial processes, raw sewage, or secondary-treated sewage.

Customers must pay the Public Purpose Programs Charge on their utility bill. Customers should call APEP for questions concerning program eligibility.
APEP has four program components:

1. Educational Seminars (free of charge)

2. Technical Assistance (free of charge but APEP does not provide site-specific engineering)

3. Subsidized Pump Efficiency Tests - APEP maintains a list of approved Participating Pump Test Companies. Subsidized tests are only available through them. The APEP subsidy may or may not pay for the entire cost of test. The pump operator may have to provide some of these costs. The pump test subsidy is now $200/test if the pump hasn't been tested in the last 4 year and $100/test if it hasn't been tested in the last 2 years. APEP will continue to provide only one subsidized test in any 2 year period (other restrictions may apply).

"IMPORTANT! Program eligibility and requirements have changed as of June 10, 2013.

1. To receive an incentive for a pump retrofit APEP requires pump efficiency tests both before and after the project. These tests cannot be more than 3 years apart.

2. An application package for the incentive must be complete within 2 years after the after-project pump efficiency test.

Yuba City- Sutter County Far...
Yuba City- Yuba/ Sutter Farm...
Fresno State at CIT- Water U...
Lakeport- Lake County Fairgr...

The Center for Irrigation Technology
California State University, Fresno
5370 North Chestnut Ave. - MS/OF 18
Fresno, CA. 93740-8021
(559) 278-8662
(805) 619-7505

3. Only one incentive will be provided for any one pump in a six-year period.
Click here to read the entire revised Policies and Procedures."
This program effort will provide for:

- 2,700 subsidized pump efficiency tests per year. Click here to learn more about pump tests and how you could obtain one.
- Cash incentives for 300 pump retrofit projects per year. Click here to learn more about eligibility and how you can apply for a retrofit Incentive
- 10 educational seminars/year (refer to the events calendar to the right for notice of seminars coming to your area) - also, click here to view all of the APEP's educational materials. Click here to transfer to the WATERIGHT web site, a site dedicated to agricultural and turf water conservation.

PG&E offers many other energy efficiency programs in all markets, residential, commercial, industrial, and agricultural and for both retrofit and new-construction projects. Click here to learn more about these programs.

The Advanced Pumping Efficiency Program (APEP or the "Program") is a continuing effort by the Center for Irrigation Technology. It is intended as a multi-level program addressing the following important resource management problems in California:

- Energy Conservation
- Water Conservation
- Water Quality
- Air Quality

The twin goals of APEP are:

- Get highly efficient hardware in the field, including pumping plants, irrigation systems, and water distribution systems.
- Ensure that this hardware is managed correctly

APEP has operated with funding from a variety of sources including the California Energy Commission, the California Public Utilities Commission, and the Federal Environmental Protection Agency. It works with agriculturalists and municipal and private water companies.

From 2001 through 2003 CIT implemented the Agricultural Peak Load Reduction Program on behalf of the California Energy Commission. This program provided the following to California during the "energy crisis":

- 9.3 megaWatts of reduced peak load (power use during the time period 12:00 noon through 6:00 PM in the summer months)
- 88.6 gigaWatt-hours conserved annually
- $7.4 million in distributed grants

From 2002 through 2012 CIT has operated APEP with funding from the CPUC and provided California water pumpers with:

- 1750 pump retrofit / repair rebates
- $6,900,000 in incentive rebates for those projects
- 108,000,000 kilowatt-hours saved annually as a result of those projects
- 373,000 therms saved annually as a result of those projects
- 27,600 subsidized pump efficiency tests
- $4,560,000 in pump test subsidies
- 180 educational seminars

Diesel Pumping Efficiency Program

In addition to the APEP activities funded by PG&E, CIT also implemented a pilot program in the area of diesel-powered pumping plants on behalf of the Federal EPA and the Valley CAN group. This effort resulted in 69 pump efficiency tests, 11 pump retrofit projects, and preparation of a diesel pump testers kit including computer software to database and perform calculations regarding the test, instructions for assembling equipment necessary to measure fuel flows, and guidance on performance in interpreting the test results. The background thesis paper regarding this effort can be read here.

Although the main objective of the diesel-oriented program is improving air quality through reductions in emissions from the diesel-powered pumping plants, we also emphasize sound water management.

See our Case Studies for examples of the kinds of savings California farmers have realized

through CITs efforts. Please visit the Educational section of this site as all of our written materials can be downloaded.

IMPORTANT! Three important resources for those interested in the Diesel Pumping Efficiency Program, diesel-powered pumping plants, pump efficiency testing of diesel-powered pumps, and air quality in general are now available:

1. Click here to view the final report to the EPA for the pilot-level Diesel Pumping Efficiency Program.

2. Click here to view the Diesel Pump Tester's Resource Manual developed for the follow-on project funded by the Valley CAN group.

3. Click here to view the PowerPoint presentation summarizing the Diesel Pumping Efficiency Program. This file includes extensive notes for each slide. You may want to download the file (about 3.2 MB) and view with the notes visible.

Design & Development by

Attachment J

District Agricultural Water Order Form

ORLAND-ARTOIS WATER DISTRICT WATER ORDERS

WATER USER:_____

DATE: _____

LATERAL DELIVERY: _____

AMOUNT ORDERED: _____

ON_____

OFF: _____

CHANGE: _____

ORDER RECEIVED BY: _____ POSTED:_____

Attachment L

Water Quality Reports

Date		Pool 1	Pool 13	Pool 21	Pool 22	Pool 23	Pool 24	Pool 25	Pool 26
2/10/2015	Speciific Conductance	144	125	126	190	146	199	380	392
3/9/2015	Speciific Conductance	146	156	281	238	501	206	329	403
4/6/2015	Speciific Conductance	140	174	415	441	582	669	440	444
5/5/2015	Speciific Conductance	126	139	205	572	591	578	648	620
6/2/2015	Speciific Conductance	129	129	153	285	363	453	580	577
7/6/2015	Speciific Conductance	120	143	134	191	231	285	350	355

		Pool 1	Pool 13	Pool 21	Pool 22	Pool 23	Pool 24	Pool 25	Pool 26
2/10/2015	Aluminum	139	481	178	43.7	116	202	1130	177
3/9/2015	Aluminum	1290	43.8	105	10.8	59.8	94.5	236	249
4/6/2015	Aluminum	57.4	266	38.5	39.3	43.1	20.1	1090	712
5/5/2015	Aluminum	69	63.3	137	60.2	25.4	38.6	191	267
6/2/2015	Aluminum	37	23.2	132	64	51.7	51.7	243	475
7/6/2015	Aluminum	43.1	16.4	192	259	143	100	136	153

	Pool 1	Pool 13	Pool 21	Pool 22	Pool 23	Pool 24	Pool 25	Pool 26
2/10/2015 Boron	44.4	46.6	49	66.6	51	70.7	245	204
3/9/2015 Boron	43.2	31.5	75.1	77.3	348	144	220	220
4/6/2015 Boron	57.5	67.2	121	125	503	822	446	348
5/5/2015 Boron	42.8	49.2	68.9	159	182	508	822	748
6/2/2015 Boron	44.2	44.8	50.8	88	158	329	682	638
7/6/2015 Boron	39.9	44.3	44.2	62.8	93.3	146	272	276

Thresholds

Constituent	Normal	Drought
Aliminum	5000 ppm	5000 ppm
Boron	700 ppm	2000 ppm
EC	700 ppm	3000 ppm