Del Puerto Water District
Water Management Plan
2008 Criteria

Final – July 5, 2011

Index

Section 1: Description of the District

District Name: *Del Puerto Water District*

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A. History

DPWD was organized on March 24, 1947 to contract for and administer delivery of water supplies to landowners within its geographical boundaries as part of the Bureau of Reclamation's development of the Central Valley Project. On March 1, 1995, the District was reorganized through a formal consolidation with ten other local, similarly contracted water Districts. The District's contractual entitlement is its sole source of supply. Over the years, the use of this contractual supply has been governed by Reclamation Law, water code requirements and place-of-use restrictions associated with the Bureau of Reclamation's State-issued permit and, more recently, Reclamation Law as amended by the Reclamation Reform Act of 1982, the Central Valley Project Improvement Act, the water shortage provisions of its contract, legal and administrative rulings, the Clean Water Act and Endangered Species Act.

1. Date district formed: March 24, 1947 *Date of first Reclamation contract*: June 10, 1953
Original size (acres): 3,195 Irrigable Acres* *Current year (last complete calendar year)*: 2008
Current size (acres): 45,229 *Pre-consolidation acreage

2. Current size, population, and irrigated acres

The District currently serves 45,229 irrigable acres with agricultural water supplies, and provides Incidental M&I deliveries totaling 3AF/month (avg). No urban population is served.

	2008
Size (acres)	45,229
Population served	N/A
Irrigated acres	38,489

3. Water supplies received in current year

The Current Year (2008) Water Supplies received are as follows:

Water Source	*AF*
Federal urban water (Tbl 1)	34
Federal agricultural water (Tbl 1)	40,629
State water (Tbl 1)	
Other Wholesaler (define) (Tbl 1)	
Local surface water (Tbl 1)	
Upslope drain water (Tbl 1)	
District ground water (Tbl 2)	
Banked water (Tbl 1)	
Transferred water (Tbl 6)	26,181
Recycled water (Tbl 3)	
Other (define) (Tbl 1)	
Total	66,844

4. Annual entitlement under each right and/or contract

The District's sole source of supply is its USBR Contractual entitlement, which must be supplemented by single and multi-year transfer agreements to provide adequate supply.

	AF	*Source*	*Contract #*	*Contract Restrictions*
Reclamation Urban AF/Y	N/A	N/A	N/A	N/A
Reclamation Agriculture AF/Y	140,210	USBR	14-06-200-922-LTRI	Shortage Provisions/ Pumping Restrictions
Other AF/Y	3,017 AF to 27,152 AF	CVC Contractors	June 1, 2006	Quantity available varies with the current years' allocation, per the agreement.
Other AF/Y	2,631 AF to 5,262 AF	5 yr. Exchange Contractor Transfer	June 23, 2006	Quantity available varies with the current years' allocation, per the agreement.

5. Anticipated land-use changes

Land use charges within the District are limited to the conversion of lands from agricultural to municipal and industrial uses. Under current guidelines (Exhibit A), all lands converted to municipal use are detached from the District and relegated to the responsible annexing agency for water service. Although certain District acreage has been identified for conversion under the City of Patterson's General Plan, this transition is slow to develop and causes only minimal reductions in the District's irrigable acreage on an annual basis.

6. Cropping patterns (Agricultural only)

Note: Del Puerto's previous plan year (1998) was submitted in WY2004. This was Del Puerto's "original plan".

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

Original Plan (N/A)		*Previous Plan (1998)*		*Current Plan (2008)*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
		Almonds	11,802	Almonds	14,707
		Tomatoes	5,922	Tomatoes	3,409
		Beans	4,968	Beans	2,420
		Apricots	4,169	Apricots	2,690
		Walnuts	2,540	Oats	3,042
		Alfalfa	2,015		
Other (<5%)		*Other (<5%)*	7,150	*Other (<5%)*	12,221
Total		*Total*	38,566	*Total*	38,489

(See Planner, Chapter 2, Appendix A for list of crop names)

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

Original Plan (N/A)		*Previous Plan (1998)*		*Current Plan*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
		Furrow	14,982	Furrow	6,998
		Flood	4,482	Flood	1,215
		Sprinkler	5,873	Sprinkler	15,278
		Drip/Micro	13,229	Drip/Micro	10,144
				Multiple Methods	3,326
				Not Being Irrigated	1,528
Other		*Other*		*Other*	
Total		*Total*	38,566	*Total*	38,489

(See Planner, Chapter 2, Appendix A for list of irrigation system types)

B. Location and Facilities

All District deliveries are made "canalside" from the Delta-Mendota Canal through turnouts installed and owned by the Bureau of Reclamation, licensed for District use, and operated and maintained by the San Luis Delta-Mendota Water Authority under a service agreement with the United States Bureau of Reclamation. While the District does not currently own, operate or maintain any delivery systems, it does own and maintain the equipment used to "sub-meter" individual users at multi-user turnouts. (See Attachment a - District Map)

1. Incoming flow locations and measurement methods

Location Name	*Physical Location*	*Type of Measurement Device*	*Accuracy*
DMC	Turnouts 18.05L to 68.03L – 144 locations total	Propeller Meters	± 6%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
N/A	N/A	N/A	N/A

3. Current year Urban Distribution System

Miles AC Pipe	*Miles Steel Pipe*	*Miles Cast Iron Pipe*	*Miles - Other*
N/A	N/A	N/A	N/A

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

Name	*Type*	*Capacity (AF)*	*Distribution or Spill*
N/A	N/A	N/A	N/A

5. Outflow locations and measurement methods (Agricultural only)

See Section 2, Part F, Item No.1.

6. Description of the agricultural spill recovery system

N/A – The District has no operational spills.

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

Agricultural water deliveries are accomplished through a combined "On-request" and "On-demand" system, leading to the highest level of management efficiency for both the District and the on-farm water users. By policy, all canal-side gates have locking devices maintained by the San Luis Delta-Mendota Water Authority, and all pump panel boxes are required to have an operational locking device maintained by the user. In order to have a canal-side gate unlocked, users are required to place water orders indicating the location, start time, flow rate and estimated schedule for completion. Once the District has approved the order and requested the gate be unlocked by SLDMWA personnel, a user may operate the gate himself within established parameters. Weekly flow readings taken randomly by SLDMWA personnel are compared with the posted orders, and any "mis-matched" orders are rectified with the user. Also by policy, users are required to report flow changes and shut-offs at the time of occurrence.

On-demand	*Scheduled*	*Rotation*	*Other (describe)*
			See above

8. Restrictions on water source(s)

Prior to the 2008 water year, the only restrictions experienced by the District were those related to chronic shortages of contract allocation. Now, due largely to legal restrictions placed on the pumping operations at Jones and Banks pumping plants, the District is subject to demand rationing if the pumping capabilities and San Luis Reservoir drawdown requirements cannot be combined to meet South of the Delta demand.

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
USBR	Contact Allocation Shortages	Contractual Limitation	Increased land fallowing/ increased groundwater pumping/ higher per unit delivery costs/ shift in cropping patterns/ economic hardship for users and local communities
USBR	Delivery Rationing	Restricted pumping capabilities at Jones Pumping Plant	Increased groundwater pumping/deficit irrigation/crop loss and permanent crop damage

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

The District is currently pursuing a feasibility study on the importation of recycled water for use on agricultural crops within District boundaries. As part of this potential project, pipeline and pump station facilities may be required to transport water to District users.

C. Topography and Soils

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

The District is located on the western edge of the San Joaquin Valley in San Joaquin, Stanislaus, and Merced Counties. District lands parallel both sides of the Delta Mendota Canal for approximately 50 miles, averaging 2 miles in width, from DMC milepost 18.05L in the north to milepost 68.03L in the south. The Coast Range Mountains to the west of District boundaries are comprised of alluvial fans formed by many creeks (drainages) exiting the mountains and draining toward the San Joaquin River. Some of the major surface creeks, or drainage areas, include Hospital Creek, Lonetree Creek, Kern Creek, Ingram Creek, Del Puerto Creek, Salado Creek, Orestimba Creek, Mustang Creek, Quinto Creek, and Romero Creek. District elevations range from 100 to 400 feet with gently rolling alluvial fans becoming less pronounced and sloping towards the eastern boundary of the District.

The alluvial fans are comprised of many soil types ranging from coarse sand and gravel to finer silt and clay. The soils are generally a deep, permeable, moderate to well drained, medium textured, clay loam

low in salts with good moisture holding capacity. Because District lands are located relatively high on these alluvial fans there are no known salinity, water table constraints, or high or low infiltration rates.

The principal subsurface geological feature of District lands is the 30-60 foot thick Corcoran Clay formation that underlies most of the area at a depth of 150 feet to 200 feet below sea level and divides the ground water system into two major aquifers – a confined aquifer below and an unconfined system above. Except in areas near underground streambeds, groundwater yields are relatively small and groundwater quality is often relatively high in salts.

Varied elevations and soil types throughout the District, along with persistent water shortages, have lead to installation of state-of-the-art irrigation systems designed for specific locations depending on slope, soil type and cropping patterns. These systems may include variable speed pumps, drip irrigation for trees as well as vegetable crops, micro sprinklers and various filtration equipment.

2. District soil association map (Agricultural only)

Primary District Soil Classifications (from Attachment B)

Soil Association	*Est. Acres*	*Effect on Water Operations and Management*
Vernalis Series Class I	9,634	Well drained moderately permeable, high water holding capacity.
Woo/Stanislaus series Class I	1,161	Well drained, medium to slow permeability, high water holding capacity
El Solyo Class I	1,394	Well drained, medium to slow permeability, high water holding capacity
Zacharias Series Class I	10,044	Well drained, medium to slow permeability, high water holding capacity
El Solyo Series Class I	1,394	Well drained, slow permeable, high water holding capacity
Capay Series Class II	12,674	Moderately drained, slow permeability, high water holding capacity
Damluis Series Class II	6,698	Well drained, moderate permeability, high water holding capacity

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

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

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.	2.4	2	1.6	.8	.3	.04	.01	.02	.22	.47	1.3	1.7	11.05
Avg Temp.	46	51	55	60	67	74	78	76	72	65	53	46	62
Max. Temp.	55	63	69	76	84	92	97	94	90	81	66	56	77
Min. Temp	36	40	42	45	50	55	59	58	55	49	41	36	47
ETo	1.6	2.2	3.6	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.06

Weather station ID 046168 *Data period: Year* 1948 *to Year* 2005

Average wind velocity 6 mph *Average annual frost-free days:* 270-290

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

Not applicable.

E. Natural and Cultural Resources

The few natural resources within District boundaries include ephemeral streams that flow primarily through open natural channels into neighboring water districts before entering the San Joaquin River. The State of California and purchased 450 acres of District land to protect and preserve a native California Sycamore grove that comprises approximately 50 acres. Several special-status species plants and animals protected under the State and Federal Endangered Species Acts that may occur within the District include the San Joaquin kit fox, giant garter snake, Swainson's hawk and elderberry shrubs.

1. Natural resource areas within the service area

Name	*Est. Acres*	*Description*
Lone Tree Creek	N/A	Enters District from west-Open channel into BCID Lateral
Hospital Creek	N/A	Enters District from west-Open channel to San Joaquin River
Ingram Creek	N/A	Enters District from west-Open channel into WSID
Del Puerto Creek	N/A	Enters District from west-Open channel to San Joaquin River
Salado Creek	N/A	Enters District from west-Open channel through District-Pipelined to San Joaquin River

Crow Creek	N/A	Enters District from west-Pipelined to Orestimba Creek
Orestimba Creek	N/A	Enters district from west-Open channel to San Joaquin River
Garzas Creek	N/A	Enters District from west-Drains into CCID
Quinto Creek	N/A	Enters District from west-Drains into CCID
Romero Creek	N/A	Enters District from west-Drains into CCID
California Sycamore Grove	±50 acres	Native grove located along Orestimba Creek east and west of I-5

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

Landowners adjacent to the various stream beds provide routine maintenance to protect against seasonal flooding. The Sycamore grove and adjacent lands are managed by the California Department of Water Resources and have historically been leased out for grazing purposes. While the Sycamore grove traditionally relies on natural runoff through Orestimba Creek and is not viewed as dependant on District water supplies, the District has agreed to provide water supplies on an as-needed basis, as available basis. Efforts to manage and protect special-status plants and animal species is accomplished in part by the requirement that certain repairs or modifications to District facilities, particularly those conducted on federal rights-of-way, are required to submit biological assessments for these special-status species to the Bureau of Reclamation for approval prior to commencing repairs or modifications.

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

Name	*Estimated Acres*	*Description*
Walking, biking, bird watching, painting, photography	N/A	Delta Mendota Canal/California Aqueduct
Fishing	N/A	Delta Mendota Canal/California Aqueduct
Delta Mendota Canal	N/A	50+ Years Old, National Register of Historic Places

While there are no known archaeological sites within the District of cultural significance, the Delta-Mendota Canal falls under the guidelines of the National Historic Preservation Act (NHPA) which requires the canal to be listed in the National Register of Historic Places (NRHP). The NHPA requires that any repair or modification to NHRP's be reviewed by the Bureau of Reclamation and the State Historic Preservation Office (SHPO) to identify historic or cultural effects that the proposed repair or modification could have on the facility.

Recreational activities are limited to public access that is allowed on the Delta Mendota Canal or the California Aqueduct and their rights-of-ways. This would include fishing, biking, walking, and other leisure activities.

F. Operating Rules and Regulations

1. Operating rules and regulations

See Attached Exhibit B – Del Puerto Water District Rules and Regulations for Water Service.

2. Water allocation policy (Agricultural only)

The District allocates its contract supply on an equal-share-per-irrigable-acre basis. A user may elect to reduce his/her allocation based on anticipated needs, which then establishes the final "allocation" to his/her account for the rest of the water year. Un-requested allocations are placed into a District "Bank" for remarketing purposes with the District. In the event that the available remarketable supplies exceed in-District demand, these supplies may be made available for transfer to other CVP Districts in the area. (See p. 1-2 of the District's Rules and Regulations for Water Service)

3. Official and actual lead times necessary for water orders and shut-off (Agricultural only)

Water orders placed by 11 a.m. daily (and by 11 a.m. on Fridays for Saturday and Sunday deliveries) are approved and processed for the following day. Water orders received after 11 a.m. may be delayed an additional day. Actual lead time to begin irrigation may be less if the turnout is all ready "unlocked", and certain situations utilizing automated systems or off-peak electrical service may be given permission to remain unlocked continuously as long as weekly schedules are updated with District Staff. Shut off is on demand for all users but is required to be called in to the District. (See p. 3 of the District's Rules and Regulations for Water Service)

4. Policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agricultural only)

All drainage systems are owned, operated and/or maintained by individual water users and remain their responsibility. The District, however, maintains a cooperative stance among downslope districts with regard to any problems arising from drainage leaving District boundaries and has adopted a policy that sets a standard of no greater than 900 mg/l of Total Suspended Solids for surface drain water leaving the District and entering another district's distribution system. (See attached "Supplement to Rules and Regulations for Water Service")

5. Policies on water transfers by the district and its customers

The District's Board annually reviews and adopts a surface water transfer policy for its supplies allocated under District Contract. Water management type transfers are allowed between parcels of land within the District and to parcels of land in other CVP-contracted Districts, provided that the supply being transferred is associated with lands that are within the same user's landholdings, and provided that the landholder currently receives water service in the District. User transfers to other Districts are limited to their current year's allocated supply. (See attached Exhibit C - 2008-09 Surface Water Transfer Policy)

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

The District primarily serves an agricultural customer base.

a. The District currently serves 144 farms

b. The District currently has 144 metered turnouts along the Delta-Mendota Canal, each with Bureau owned/maintained metering devices.

c. The turnouts noted in item (b) serve to measure supplies leaving the District distribution system – in this case the Delta-Mendota canal - and many serve more than one farm distribution system(s). In the case of the latter, the multiple users are further sub-metered at each farm location with District owned/maintained metering devices. There are a total of 147 District subsidiary meters.

d. There are a total of 291 measured delivery points within the District.

e. 100% of the District's delivered water is measured at a delivery point.

f. Delivery point measurement device table (Agricultural only)

Measurement Type	*Number*	*Accuracy (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter-DMC	144	+/- 6%	15	2	12
Propeller meter-DPWD	145	+/- 6%	30	1	12
Flumes					
Venturi					
Metered gates					
Acoustic doppler	2	+/- 6%	15	2	12
Other (define)					
Total	291				

2. Urban Customers

The District does not currently serve any urban users, and delivers incidental M&I supplies to only one customer for landscape purposes.

a. *Total number of connections* 1

b. Total number of metered connections 1

c. Total number of connections not billed by quantity N/A

d. Percentage of water that was measured at delivery point 100%

e. Percentage of delivered water that was billed by quantity 100%

f. Measurement device table

Meter Size and Type	*Number*	*Accuracy (+/-percentage)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
5/8-3/4"					
1"					
1 ½"					
2"					
3"					
4"					
6" (Propeller)	1	+/- 6%	15	2	12
8"					
10"					
Compound					
Turbo					
Total	1				

3. Agriculture and Urban Customers

a. The District recovers its operating expenses through annual acreage assessments on irrigable lands within the District, which are designated as Water Availability Charges. The current rate as set by Prop 218 election in 2006 allows the District to charge up to $17.50/acre. For water year 2008, the Water Availability Charge was set by the Board at $15.00/acre. Volumetric water charges are billed monthly based on metered usage to each customer, at rates structured to recover the appropriate Bureau of Reclamation and San Luis-Delta-Mendota Water Authority Rates, as well as costs associated with self-funded, federally-owned delivery improvements. For 2008, rate types billed were as follows:

1. Current year water rates are $45/AF for non-full cost supplies, $60/AF for Ag Full cost supplies, and $62/AF for LTD Full cost supplies. (See Attached Exhibit D – 2008-09 Water Rate Sheet)
2. Deliveries of 2007 Supplies Rescheduled into 2008 were billed at 2007 Rates of $43/AF for non-full cost supplies, $53/AF for Ag Full cost supplies, and $60.00 for LTD Full cost supplies.
3. Additional Supplies delivered during 2008 were billed at rates of $163/AF, $173/AF, $200/AF and $210/AF, depending on the source cost of the supply, and the RRA eligibility status of the lands the water was delivered to i.e. non-full cost or full cost.

b. Annual charges collected from customers (current year data)

Fixed Charges			
Charges ($ unit)	*Charge units ($/acre), ($/customer) etc.*	*Units billed during year (acres, customer) etc.*	*$ collected ($ times units)*
$15.00	$/Acre	43,827 AC	$657,405.00

Volumetric charges			
Charges ($ unit)	*Charge units ($/AF), ($/HCF), etc.*	*Units billed during year (AF, HCF) etc.*	*$ collected ($ times units)*
$9.93	$/AF(Transferred In)	70	$695.10
$43.00	$/AF	11,969	$514,667.00
$45.00	$/AF	28,396	$1,277,820.00
$53.00	$/AF	1,218	$64,544.00
$55.00	$/AF	7,268	$399,740.00
$60.00	$/AF	7	$420.00
$62.00	$/AF	647	$40,114.00
$163.00	$/AF	330	$53.790.00
$173.00	$/AF	16	$2,768.00
$200.00	$/AF	6,113	$1,222,600.00
$210.00	$/AF	249	$52,290.00

(See Attached Exhibit E - District Sample Bill)

c. Water-use data accounting procedures

For delivery points at which water leaves the District facilities, meters are read weekly. Subsidiary meters are read at month-end to coincide with the month-end readings performed by the SLDMWA, or randomly as necessary. Charges to the District, based on Authority readings, are translated into customer use statements and distributed among District water users based on both SLDMWA and District subsidiary meter readings. These individual water use statements summarizing use by farm location and supply type are then used as the basis for the corresponding invoices generated for each customer detailing water charges and account balance information. The billing statements and water use statements, along with any documentation required to support the measured use at a multi-user delivery point, are mailed to customers by the 7th day of each month. While the monthly use information only summarizes the current year-to-date, customers may request and receive computerized copies of use history back to the 1995 water year within 24-hours.

H. Water Shortage Allocation Policies

1. Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated

As per the District's Rules and Regulations for Water Service, the District utilizes an "equal-share-per-irrigable-acre" allocation method to allocate its available contract supply, which effectively apportions shortages in the same manner. Due to chronic shortage conditions, the District annually develops and administers a pool of supplemental supplies, which is offered to all landowners/water users in the District and which, if necessary, is pro-rated based on an "equal-share-per-irrigable-acre" among those requesting such supplies. (See Attached Exhibit F - 2008-2009 Additional Supplies Request Form)

2. Current year policies that address wasteful use of water and enforcement methods

The District has neither seen reason for nor found it necessary to institute or implement a formal policy against "wasteful use" of water, however, Section VII of the District's Rules and Regulations for Water Service does establish that customers "….shall not use water in a wasteful manner." Such prohibition is understood and the District maintains the right to cease deliveries in the event any such unlikely instance occurs.

Section 2: Inventory of Water Resources

A. Surface Water Supply

1. Acre-foot amounts of surface water delivered to the water purveyor by each of the purveyor's sources

See 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 Water Inventory Tables, Table 8

B. Ground Water Supply

1. Acre-foot amounts of ground water pumped and delivered by the district

The District has no wells.

2. Ground water basin(s) that underlies the service area

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
San Joaquin Basin	13,500	80,000,000	unknown

California DWR Bulletin 118 has identified that the District is in two sub-basins of the San Joaquin Valley Groundwater Basin. These are the Tracy Subbasin and the Delta-Mendota Subbasin. The Tracy Subbasin has a surface area of 1,170 sq. mi. with no published groundwater values. The Delta-Mendota Subbasin has a surface area of 1,120 sq. mi. with an estimated storage capacity of 30,400,000 AF to a depth of 300 feet.

3. District Facilities

There are no District operated wells or recharge areas.

4. Conjunctive Use

Groundwater is used when and where surface water is unable to meet demands (as available). Non-project water from private wells is introduced into the DMC under the auspices of the District's Warren Act Contract and redelivered to lands commonly held by the individuals that pump the supply. However, groundwater is spotty in many areas of the District and/or lacks the quality requirements for cropping.

5. Ground Water Management Plan

A groundwater management plan to provide compliance with the Groundwater Management Act AB3030 was developed and implemented in 1997 was updated in 2007 to comply with California SB 1938. The District is currently coordinating with other local agencies participating in the plan to bring it into compliance with recently adopted SB 6 water code requirements. (See Attachment C - Groundwater Management Plan)

6. Groundwater Banking

There is no groundwater banking available within the District, and there are no known banking facilities in our area. The geology of our basis is not suitable because groundwater is spotty and in some cases lacks the quality required for cropping.

C. Other Water Supplies

1. "Other" water used as part of the water supply

None.

D. Source Water Quality Monitoring Practices

1. Potable water quality concerns: *Yes* _____ *No* X

The District delivers an incidental amount (2-3 AF/mo.) of non-potable water for landscape use as mandated by a previous Stanislaus County LAFCO order. No urban water quality reporting is required.

2. Agricultural water quality concerns: *Yes* X *No* _____

In years when surface supplies delivered through the Delta-Mendota Canal are not adequate, water users will use groundwater wells that have elevated levels of salinity and boron. In order to minimize the crop risk when using these wells, it is sometimes necessary to blend this water with the surface water supply available from the Delta-Mendota Canal.

3. Water quality testing program and participant roles

The District is a member of the Westside-San Joaquin River Watershed Coalition, which provides waste discharge coverage under the Irrigated Lands Program administered by the Regional Water Quality Control Board. Surface water delivered into the District by the Delta-Mendota Canal is tested monthly by the Coalition at locations centrally located within the District. The water quality analyses' performed include EC, TDS and pH. The District also reviews monthly water quality reports on TDS and EC that are available on the Bureau of Reclamations Central Valley Operations web site. (See Attachment D)

Groundwater has been tested throughout the District per quality standards set by the Bureau of Reclamation (BoR) which, if met, allow non-project water to be pumped into the Delta Mendota Canal for credit and/or transport. Analysis' performed include Total Dissolved Solids (TDS), Boron, Selenium, Mercury, and Arsenic. The frequency of the tests performed depends on BoR requirements or the well owners' interest.

4. *Current water quality monitoring programs for surface water by source (Agricultural only)*

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
Total Dissolved Solids (TDS)	Monthly	100-500 mg/L	250 mg/L
Electrical Conductivity (EC)	Monthly	200-800	400 ug/cm
pH	Monthly	7.0-8.0	7.8

Current water quality monitoring programs for groundwater by source (Agricultural only)

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
TDS	Varies	500-2500 mg/L	1200 mg/L
Boron	Varies	200-1,000 ug/L	500 ug/L
Selenium	Varies	0-30 ug/L	5 ug/L
Mercury	Varies	0-2 ug/L	None detected
Arsenic	Varies	0-10 ug/L	2.0 ug/L

E. Water Uses within the District

1. Agricultural
See 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*
Alfalfa Hay	1,651	512	594	545		
Almonds	14,707			9,094	5,613	
Apples	53				53	
Apricots	2,690			1,587	1,103	
Barley	391	83	80			
Beans	2,420		1,732			688
Broccoli	596			445	151	
Corn (Silage)	560	40	505	15		
Cotton: Lint	64		64			
Grapefruit	46			10	36	
Grapes, Wine	368				368	
Greens	277		149	128		
Irrigated Pasture	378	378				
Lemons & Limes	31			31		
Melons	815		815			815
Oats	3,042		1,300			442
Olives	22				22	
Oranges/Citrus	350			111	239	
Other (Cherries, Persimmons, Pluots)	595	10		280	305	
Other (beets, etc)	305			75	63	167
Other Hay	298	41	257			
Peaches	727			610	117	
Pistachios	24				24	
Plums	10			10		
Squash	240			89	151	
Strawberries	1		1			
Tomatoes	3,409				1,639	1,770
Total Nursery	132			132		
Walnuts	1,727			1,500		227
Wheat	1,675		1,254	421		
Misc Crops	885	151	247	195	260	32
Total	***38,489***					

3. Urban use by customer type in current year

Customer Type	*Number of Connections*	*AF*
Single-family	N/A	
Multi-family	N/A	
Commercial	N/A	
Industrial	N/A	
Institutional	N/A	

Customer Type	*Number of Connections*	*AF*
Landscape irrigation	1	19
Wholesale	N/A	
Recycled	N/A	
Other (dust control @ landfill)	N/A	15
Other (specify)	N/A	
Other (specify)	N/A	
Unaccounted for	N/A	
Total	1	34

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

N/A

5. Ground water recharge/management in current year (Table 6)

N/A

6. Transfers and exchanges into or out of the service area in current year (Table 6)
These transfers are also listed below in Item No. 7, however they are categorized in this table

From Whom	*To Whom*	*AF*	*Use*
District Landowners	Self in Other Districts	7,312	Ag Operations
DPWD – Pool	WWD	2,800	Supplemental Supplies Pool Management
DPWD – Pool	SLWD	400	Supplemental Supplies Pool Management

7. Trades, wheeling, wet/dry year exchanges, banking or other transactions in current year (Table 6)

A portion of the water supply in Table 6 is comprised of 13,495 AF of Rescheduled Water from the 2007-08 water year. Rescheduling is a very valuable water management tool utilized by the District to the maximum extent possible to ameliorate the disparity between the timing of crop demands and allocation notifications, as well as to provide a constant supplement to the likelihood of a shortage in a future water year. Transfers are also utilized as a water management tool, however, all of the District transfers are of the agriculture-to-agriculture type and primarily serve to supplement chronic contract allocation shortages. In 2008, the District transferred "in" a total of 26,181 AF and transferred 10,512 AF "out" to other federally-served districts as part of its water operations.

From Whom	*To Whom*	*AF*	*Use*
SJRECWA	Del Puerto Water District	4,623	Ag
SJRECWA / Merced ID / VAMP Exch.	Del Puerto Water District	668	Ag
Byron Bethany ID	Del Puerto Water District	70	Ag

CVC –Lower Tule / Pixley ID's	Del Puerto Water District	17,962	Ag
Yuba County Water Agency	Del Puerto Water District	2,858	Ag
Del Puerto Water District	San Luis Water District	3,320	Ag
Del Puerto Water District	Westlands Water District	6,926	Ag
Del Puerto Water District	Byron Bethany ID	266	Ag

8. Other uses of water in current year

Other Uses	*AF*
N/A	

F. Outflow from the District (Agricultural only)

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 Appendix B (include in plan as Attachment L)

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 in current year

The District has neither subsurface drainage nor operational spills. The District does have the ability to discharge outflows into the numerous creeks listed in the natural resource section, as well as to down-slope water districts and county storm drains, all of which eventually drain into the San Joaquin River. Due to the installation of high efficiency irrigation systems throughout the District, however, there is little or no outflow from a majority of District lands.

The outflow points represent furrow irrigated vegetable crops such as tomatoes, beans, and broccoli. With the use of proper water management techniques it is estimated that 50% of irrigation water runoff can be eliminated. Practices such as the use of gated pipe, sprinklers, land leveling, shortening furrow runs, and PAM greatly control how water is applied to vegetable crops and how it moves down the furrow.

The District has no measurement devices at the outflow points listed below. Using an average vegetable crop ET of 2.3 acre feet per acre with an irrigation efficiency of 80% estimated per acre outflow would be .48 acre feet per acre of outflow. This is reflected in the chart below:

Outflow point	*Location description*	*AF*	*Type of measurement*	*Accuracy (%)*	*% of total outflow*	*Acres drained*
Marshall Road Drain	Intersection of Hwy 33 and Marshall Road	971	Estimate		25%	2,023
Crow	One Mile South of Hwy 33	904	Estimate		23%	1,885

Creek	on Eastin Road, drains into Orestimba Creek					
Delta Mendota Canal (DMC)	Land Upslope of the Canal, Field drains entering DMC	717	Estimate		18%	1,494
Spanish Land Grant	Intersection of Ike Crow Road and Hwy 33, Drains to San Joaquin River	488	Estimate		16%	1,017
Downslope Water Districts	Fields that drain into Central California Irrigation District and West Stanislaus Irrigation District	718	Estimate		18%	1,496

Outflow point	*Where the outflow goes (drain, river or other location)*	*Type Reuse (if known)*
Marshall Road Drain	San Joaquin River and Marshall Road Drain Reuse Reservoir	Agriculture and San Joaquin River beneficial uses
Field Drains	Downstream/slope water districts & water users	Agriculture
Crow Creek Drain	Orestimba Creek to the San Joaquin River	San Joaquin River beneficial uses

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

Del Puerto Water District participates in the Westside San Joaquin River Watershed Coalition (Coalition), which was formed under the umbrella of the San Joaquin Valley Drainage Authority (SJVDA) to participate as a coalition group in the Regional Boards' Irrigated Lands Waiver Program. The Coalition provides data collection, report preparation and communication with the Regional Board. Decision-making, such as setting of budgets and policy direction, is accomplished through regular public meetings of an appointed SJVDA Steering Committee. District staff currently chairs this committee. (See Attachment D – Water Quality Monitoring Report)

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

Analysis performed and water quality findings for surface drainage are summarized in Attachment D. The District has no subsurface drainage.

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
See Attachment D				

Outflow (subsurface drainage) Quality Testing Program

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

4. *Discussion of 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 participates fully in the Regional Board's Irrigated Lands Program through the Westside San Joaquin River Watershed Coalition, is actively involved in the monitoring of contaminants of concern and promotes implementation by its landowners and water users of those Best Management Practices identified to help improve the quality of its drain waters.

G. Water Accounting (Inventory)

1. Water Supplies Quantified

- *a. Surface water supplies, imported and originating within the service area, by month (Table 1)*
- *b. Ground water extracted by the district, by month (Table 2)*
- *c. Effective precipitation by crop (Table 5)* **NOTE: For purposes of this report, effective precipitation is interpreted as annual rainfall during the growing season (March-October). Average rainfall during this time in 2008 was 3.46 inches, or .28 AF/acre.**
- *d. Estimated annual ground water extracted by non-district parties (Table 2)*
- *e. Recycled urban wastewater, by month (Table 3)*
- *f. Other supplies, by month (Table 1)*

2. Water Used Quantified

- *a. Agricultural conveyance losses, including seepage, evaporation, and operational spills in canal systems (Table 4) or*
  Urban leaks, breaks and flushing/fire uses in piped systems (Table 4)
- *b. Consumptive use by riparian vegetation or environmental use (Table 6)*
- *c. Applied irrigation water - crop ET, water used for leaching/cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5)* **NOTE: Salt buildup is not a problem within the District due to high quality surface water deliveries and well-drained soils, thus there are no culturally practiced leaching requirements at this time. Increased use of groundwater sources with higher EC's could eventually lead to salt buildup and requirements for leaching as a practice.**
- *d. Urban water use (Table 6)*
- *e. Ground water recharge (Table 6)*
- *f. Water exchanges and transfers and out-of-district banking (Table 6)*

g. Estimated deep percolation within the service area (Table 6)
h. Flows to perched water table or saline sink (Table 7)
i. Outflow water leaving the district (Table 6)
j. Other

3. Overall Water Inventory
a. Table 6

H. Assess Quantifiable Objectives:

Identify the Quantifiable Objectives that apply to the District (Planner, chapter 10) and provide a short narrative describing past, present and future plans that address the CALFED Water Use Efficiency Program goals identified for the District.

QO #	*QO Description*	*Past, Present & Future Plans*
87	Decrease flows to salt sinks to increase the water supply for beneficial uses/All affected lands	NA
74	Provide flow to improve ecosystem conditions/Delta	
75	Provide flow to improve ecosystem conditions/Sacramento River below Keswick	NA
90	Provide long-term diversion flexibility to increase the water supply for beneficial uses/Salt affected soils	NA
91	Provide short-term diversion flexibility to make water available to EWA in a timely manner/All suitable lands	NA
77	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water./Delta	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return systems.
93	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water./San Joaquin River	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program
78	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water./Delta	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return

		systems A
95	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water./Grassland Marshes	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return systems.
96	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water./Mud & Salt Slough	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return systems
79	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water./San Joaquin River	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return systems
81	Reduce nutrients to enhance and maintain beneficial uses of water/Delta	Reduction of irrigation drainwater flows into grassland and marshes, through the use of high efficiency irrigation systems, tailwater ponds and tailwater return systems
97	Reduce pesticides to enhance and maintain beneficial uses of water/Mud Slough	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows.
100	Reduce pesticides to enhance and maintain beneficial uses of water/Orestimba Creek	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
83	Reduce pesticides to enhance and maintain beneficial uses of water/Sacramento Slough	NA
99	Reduce pesticides to enhance and maintain beneficial uses of water/Salt Slough	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
82	Reduce pesticides to enhance and maintain beneficial uses of water/San Joaquin River	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
84	Reduce pesticides to enhance and maintain beneficial uses of water/Delta	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
102	Reduce pesticides to enhance and maintain beneficial uses of water/Grassland Marshes	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
103	Reduce pesticides to enhance and maintain beneficial uses of water/Mud & Salt Slough	Participation in the Westside San Joaquin River Watershed Coalition complying with

		RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
104	Reduce pesticides to enhance and maintain beneficial uses of water/San Joaquin River	Participation in the Westside San Joaquin River Watershed Coalition complying with RWQCB Irrigated Lands Program and reduction of irrigation drainwater flows
86	Reduce temperatures to enhance and maintain aquatic species populations./Delta	NA

Section 3: 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%*

Number of turnouts that are unmeasured or do not meet the standards listed above: 0

Number of measurement devices installed last year: 4*

Number of measurement devices installed this year: 4*

Number of measurement devices to be installed next year: 5+*

*All turnouts use propeller meters that totalize in acre feet and measure real-time flow in cubic feet per second (cfs) or gallons per minute (gpm). There are sub-metering requirements that need to be met on an annual basis depending on parcel splits and ownership/water user changes.

Types of Measurement Devices Being Installed	*Accuracy*	*Total Installed During Current Year*
Propeller meters	+/- 6%	2+
Doppler meters	+/- 6%	3+

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

Name: Anthea Hansen *Title:* Assistant Manager

Address: P.O. Box 1596 Patterson, CA 95363

Telephone: (209)892-4470 *E-mail:* ahansen@delpuertowd.org

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

a. On-Farm Evaluations

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

The District works in conjunction with the San Luis Delta-Mendota Water Authority to sponsor/promote mobile lab services for on-farm irrigation and drainage evaluations. In addition, the District promotes the availability of drainage pond-sizing calculation worksheets and implementation funding available through the Westside San Joaquin Watershed Coalition. Users are made aware of these services through newsletters and mailers.

	Total in district	*# surveyed last year*	*# surveyed in current year*	*# projected for next year*	*# projected 2nd yr in future*
Irrigated acres	36,869	180	0	320	320
Number of farms	145	2	0	4	4

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

The District provides customers with documented monthly water use statements detailing water use by turnout within ten (10) days after the end of the month following delivery. Throughout the year, meters are read weekly by the SLDMWA and flow timings are performed on those running at the time of reading, thereby making the latest water use information available to users upon request. While the vast majority of these meters measure field specific crop water use, data from meters measuring water to more than one crop can be combined with water order information (if provided by crop) to closely estimate crop-specific water use.

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

Real-time and normal irrigation scheduling is accomplished using CIMIS data, crop ET information and soil moisture content readings from field instruments used in field. The West Stanislaus Resource Conservation operates a CIMIS station in Patterson which is central to the District. This station is designed to provide District users with precise weather and crop ET information.

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

Data on surface water delivered through the Delta Mendota Canal is available through the State Department of Water Resources (DWR), Bureau of Reclamation (BOR) and the San Luis Delta-Mendota Water Authority (SLDMWA).

The District operates no groundwater pumping facilities. Data on the quantity and quality of wells participating in the District-administered program that allows for the storage of privately developed groundwater supplies in federal facilities is provided to the participants and maintained in District files for archival and general information purposes. The District also obtains some information regarding the quantity of groundwater supplies being utilized by District users through a request for information regarding the crop acres have been irrigated or supplemented with ground water contained in their required annual crop report to the District.

In 1996, the District adopted and became part of a regional AB3030 Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County. The plan is coordinated through the SLDMWA by way of a Program Activity Agreement. The program has identified various wells throughout the region and measures groundwater levels twice a year at identified wells. From this database a monitoring network is being developed to provide information on sustainable wells.

The District does not measure drain water quantity leaving its lands and should be noted that there has been a significant reduction in acreage with drain water due to drip and micro irrigation systems installed in fields. Drain water leaving District lands upslope form the Delta-Mendota Canal is returned to the canal for downstream agricultural reuse.

The District participates in the Westside San Joaquin River Watershed Coalition to comply with the Conditional Waiver of Waste Discharge regulations. Monthly water samples are tested for general physical, metals, pesticides, and toxicity. The results are reported to the Regional Water Quality Control Board semi-annually and to landowners via a Quarterly Coalition Newsletter.

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

The District maintains an extensive library of water management materials and videos which are available to water users, staff and the public upon request.

The District also publishes a quarterly newsletter that is mailed to all water users in the District. It is intended to provide information both of general interest and regarding District water conservation and management programs. (See Attached Exhibit G - “Del Puerto Digest”)

The District holds an annual water users' meeting to inform users of District activities and programs as well as the technical assistance offered by local, state and federal agencies such as the U.S.D.A., the University of California Cooperative Extension and the West Stanislaus Resource Conservation District.

The General Manager maintains an active schedule of public speaking and involvement throughout the community.

Program	*Co-Funders (If Any)*	*Yearly Targets*
Quarterly Newsletter	None	Information Source
Conservation & Management Library	USBR	Information Source
Annual Water Users' Meeting	None	Information Dissemination
Public Outreach	None	Information Dissemination

See Exhibit H for samples of provided materials and notices

e. other

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

The District has historically billed all delivered water by quantity delivered, with supplemental supplies delivered at much higher rates to reflect the costs of the active transfer market.

5. Evaluate and describe the need for changes in policies of the institutions to which the district is subject

On behalf of its customers, the District supports all efforts aimed at improving water supply reliability and enhancing water management opportunities. Many of these efforts are coordinated through the San Luis & Delta-Mendota Water Authority, the Central Valley Project Water Association, the Association of California Water Agencies, the Delta-Mendota Canal Contractor's Authority and the Westside San Joaquin River Watershed Coalition. Through these agencies and on its own, the District is significantly involved in a wide range of policy discussions ranging from local land use planning to State-wide water supply planning. Of particular interest are policy level discussions with the Bureau of Reclamation regarding rate-setting, financial and water accounting, transfer and rescheduling guidelines, Warren Act Contracting, and water supply operations and allocation procedures among others.

6. Evaluate and improve efficiencies of district pumps

N/A – The District has no pumps

B. Exemptible BMPs for Agricultural Contractors

(See Planner, Chapter 2, Appendix C for examples of exemptible conditions)

1. Facilitate alternative land use

Drainage Characteristic	*Acreage*	*Potential Alternate Uses*
High water table (<5 feet)		
Poor drainage		
Ground water Selenium concentration > 50 ppb		
Poor productivity	±4000	Dry-land farming, grazing and/or habitat

In response to ongoing water supply allocation shortages, the District facilitated an effort between certain of its landowners to permanently retire specific less productive lands in order to utilize the water supply in more productive areas. Alternative uses on these retired lands currently include dry land farming, grazing, and/or habitat mitigation. In addition to this permanent program, annual efforts of a similar nature are undertaken by growers who seek to utilize their limited surface supplies on the most productive land available, while temporarily fallowing any lands that may be less productive.

2. Facilitate use of available recycled urban wastewater that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils

The District is currently pursuing a feasibility study on the use of recycled water produced by the cities of Modesto and Turlock, California. This study will identify and evaluate any legal and institutional issues associated with the proposed project, analyze alternatives and identify a recommended delivery system, identify all environmental, permitting, design, construction, operations, maintenance, and financing requirements, as well as determine the approximate costs and assess the financial feasibility of the project.

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
North Valley Regional Recycled Water Project (Modesto/Turlock) Phase I	31,252 AF	0
North Valley Regional Recycled Water Project (Modesto/Turlock) Phase II	15,682 AF	0

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

The District currently facilitates landowner water management best practices by promoting and coordinating a low interest loan programs whereby customers can purchase and install high-efficiency irrigation and/or drainage return systems. The recently finalized SRF Loan program funded 81 projects throughout the District, funding the installation of $4 million worth of drip, micro, and sprinkler systems. This program was replaced in 2007 by the Agricultural Drain Loan Program, which thus far has funded 31 projects worth over $3.3 million. (Note: Due to the State of California's current fiscal crisis, the remaining $1.6 million in available program funding for the ADLP is currently frozen). (See Attached Exhibit I – Notice of Irrigation System Improvement Program)

Funding source Programs	*How provide assistance*
Proposition 13 Drainage Grants	$500,000.00 Grants
State Revolving Fund Loan Program	$4,000,000.00 Low Interest Loans
Agricultural Drain Loan Program	$5,000,000.00 Low Interest Loans

4. Incentive pricing

While the District has adopted policies that ensure that "excess" supplies over base crop requirements are sold at rates that include greater-than-cost components, because of inadequate supplies available to meet in-District needs, these policies have become somewhat "moot". By default, incentive pricing occurs as a result of the District's on-going need to access supplemental supplies at greatly increased costs, thereby resulting in a *de facto* "tiered rate" structure for any water supplies required in excess of the current year's contract allocation.

Structure of incentive pricing	*Related goal*

Supplemental Supply Costs	More efficient water use at the farm level

5. a) Line or pipe ditches and canals

N/A – No delivery system

Canal/Lateral (Reach)	*Type of Improvement*	*Number of Miles in Reach*	*Estimated Seepage (AF/Y)*	*Accomplished/ Planned Date*

b) Construct regulatory reservoirs

N/A – No delivery system regulatory reservoirs

Reservoir Name	*Annual Spill in Section (AF/Y)*	*Estimated Spill Recovery (AF/Y)*	*Accomplished/ Planned Date*

6. Increase flexibility in water ordering by, and delivery to, water users

Because growers in the District have the ability to begin and/or end irrigation cycles on short notice (i.e. same day), maximum irrigation efficiency is available to growers through the District's water ordering/delivery system. (See Attached Exhibit J - Contractor "Agricultural Water Order Form")

7. Construct and operate district spill and tailwater recovery systems

The District has no operational spills. While there are no District-managed tailwater recovery systems, there are numerous tailwater systems operated by individual landowners. Many of these systems have been constructed through grant and financing programs sponsored by the District. The District has also participated with neighboring Water Districts in the development of the Marshall Road Drain Project. This project reduces direct discharges into the San Joaquin River and allows for improved water management by recycling this water back to the local irrigation supply. There are also numerous parcels of land that either drain into delivery laterals of downslope Water Districts for reuse, as well as lands that drain into the Delta Mendota Canal allowing for reuse.

Distribution System Lateral	*Annual Spill (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
Total		

Drainage System Lateral	*Annual Drainage Outflow (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
Marshall Road Drain	971	971
Private Tailwater Recovery Systems	1,208	1,208
Delta Mendota Canal	717	717
Drainage into downslope districts	718	718
Total	3,614	3,614

8. Plan to measure outflow

Total # of outflow (surface) locations/points 8
Total # of outflow (subsurface) locations/points N/A
Total # of measured outflow points 0
Percentage of total outflow (volume) measured during report year N/A

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

Location & Priority	*Estimated cost (in $1,000s)*				
	2009	*2010*	*2011*	*2012*	*2013*
Plan is being developed					

9. Optimize conjunctive use of surface and ground water

Groundwater is used when and where surface water is unable to meet demands (as available). Non-project water from private wells is introduced into the DMC under the auspices of the District's Warren Act Contract and redelivered to lands commonly held by the individuals that pump the supply. However, groundwater is spotty in many areas of the District and/or lacks the quality requirements for cropping.

10. Automate canal structures

N/A – The District does not operate or maintain a delivery system.

11. Facilitate or promote water customer pump testing and evaluation

The District participates with the SLDMWA to provide 50% cost sharing for irrigation system pump testing and efficiency analysis. This service is available to all water users within the District at no cost to the customer.

12. Mapping

The District is currently engaged with a GIS consulting firm to develop a database of District parcel data that will result in a GIS-based wall map of the entire District. The cost of this effort is estimated to be

$7,000. It is anticipated that future GIS-based mapping efforts could be pursued in relation to groundwater and soils information.

GIS maps	*Estimated cost (in $1,000s)*				
	2009	*2010*	*2011*	*2012*	*2013*
Layer 1 – Distribution system-Turnout Locations	$0	$4,933	$2,067		
Layer 2 – Drainage system				$1,500	
Suggested layers:					
Layer 3 – Ground water information					$1,500
Layer 4 – Soils map					
Layer 5 – Natural & cultural resources					
Layer 6 – Problem areas					

C. Provide a 3-Year Budget for Implementing BMPs

1. Amount actually spent during current year.

BMP #		*BMP Name*	*Actual Expenditure (not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$10,000*	*1040*
	2	*Conservation staff*	*$0*	*150*
	3	*On-farm evaluation /water delivery info*	*$0*	*0*
		Irrigation Scheduling	*$0*	*0*
		Water quality	*$99,938*	*260*
		Agricultural Education Program	*$2,645*	*100*
	4	*Quantity pricing*	*$0*	*250*
	5	*Policy changes*	*$0*	*350*
	6	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	*$0*	*0*
	2	*Urban recycled water use*	*$0*	*20*
	3	*Financing of on-farm improvements*	*$459,760*	*150*
	4	*Incentive pricing*	*$0*	*500*
	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*	*240*
	9	*Optimize conjunctive use*	*$0*	*0*
	10	*Automate canal structures*	*$0*	*0*
	11	*Customer pump testing*	*$0*	*0*
	12	*Mapping*	*$0*	*0*
		Total	*$572,343*	*3260*

2. Projected budget summary for the next year.

BMP #		BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A	*1*	*Measurement*	*$10,000*	*1040*
	2	*Conservation staff*	*$0*	*150*
	3	*On-farm evaluations/water delivery info*	*$800*	*0*
		Irrigation Scheduling	*$0*	*0*
		Water quality	*$64,931*	*260*
		Agricultural Education Program	*$4,846*	*100*
	4	*Quantity pricing*	*$0*	*250*
	5	*Policy changes*	*$0*	*350*
	6	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	*$0*	*0*
	2	*Urban recycled water use*	*$0*	*40*
	3	*Financing of on-farm improvements*	*$0*	*150*
	4	*Incentive pricing*	*$0*	*500*
	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*	*240*
	9	*Optimize conjunctive use*	*$0*	*0*
	10	*Automate canal structures*	*$0*	*0*
	11	*Customer pump testing*	*$0*	*0*
	12	*Mapping*	*$0*	*0*
		Total	*$80,577*	*3280*

3. Projected budget summary for 3rd year.

BMP #		BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A	*1*	*Measurement*	*$10,000*	*1040*
	2	*Conservation staff*	*$0*	*150*
	3	*On-farm evaluations/water delivery info*	*$800*	*0*
		Irrigation Scheduling	*$0*	*0*
		Water quality	*$80,071*	*260*
		Agricultural Education Program	*$0*	*100*
	4	*Quantity pricing*	*$0*	*250*
	5	*Policy changes*	*$0*	*350*
	6	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	*$0*	*0*
	2	*Urban recycled water use*	*$44,244*	*400*
	3	*Financing of on-farm improvements*	*$0*	*150*
	4	*Incentive pricing*	*$0*	*500*
	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*	*240*

9	*Optimize conjunctive use*	*$0*	*0*
10	*Automate canal structures*	*$0*	*0*
11	*Customer pump testing*	*$0*	*0*
12	*Mapping*	*$0*	*0*
	Total	*$135,115*	*3640*

Section 4: Best Management Practices for Urban Contractors

(Due to the adoption of revised BMPs in December 2008, this section will be updated in Spring 2009.)

A. Urban BMPs

1. *Utilities Operations*
   - *1.1 Operations Practices*
   - *1.2 Pricing*
   - *1.3 Metering*
   - *1.4 Water Loss Control*

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

3. *Residential*

4. *CII*

5. *Landscape*

B. Provide a 3-Year Budget for Expenditures and Staff Effort for BMPs

1. Amount actually spent during current year.

Year 2010 BMP #	BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1.	Utilities Operations		
	1.1 Operations Practices	$0	0
	1.2 Pricing$0	0	
	1.3 Metering	$0	0
	1.4 Water Loss Control	$0	0
2.	Education		
	2.1 Public Information Programs	$0	0
	2.2 School Education	$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 2011		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			
1.1 Operations Practices		*$0*	*0*
1.2 Pricing		*$0*	*0*
1.3 Metering		*$0*	*0*
1.4 Water Loss Control		*$0*	*0*
2. Education			
2.1 Public Information Programs		*$0*	*0*
2.2 School Education		*$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 2012		Projected Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1. Utilities Operations			
1.1 Operations Practices		$0	0
1.2 Pricing$0		0	
1.3 Metering		$0	0
1.4 Water Loss Control		$0	0
2. Education			
2.1 Public Information Programs		$0	0
2.2 School Education		$0	0
3. Residential		$0	0
4. CII		$0	0
5. Landscape		$0	0
	Total	$0	0

Year of Data [2008] **Enter data year here**

Table 1

Surface Water Supply

2008 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Federal Transfers In (acre-feet)	Upslope Drain (acre-feet)	Total (acre-feet)
Method							
January	42	2	0	0	0	0	44
February	397	2	0	0	0	0	399
March	4481	3	0	0	0	0	4,484
April	8502	4	0	0	0	0	8,506
May	5974	3	0	0	3,450	0	9,427
June	10351	3	0	0	0	0	10,354
July	3573	3	0	0	5,449	0	9,025
August	3216	3	0	0	8,479	0	11,698
September	600	3	0	0	5,313	0	5,916
October	3049	4	0	0	2,502	0	5,555
November	407	2	0	0	796	0	1,205
December	37	2	0	0	192	0	231
TOTAL	40,629	34	0	0	26,181	0	66,844

Table 2

Ground Water Supply

2008 Month Method	Private Groundwater Pumped w/WA Contract (acre-feet)	Private Groundwater *(acre-feet)	District Groundwater *(acre-feet)
January	0	0	0
February	0	0	0
March	0	1,000	0
April	0	1,000	0
May	235	3,000	0
June	616	8,000	0
July	721	9,000	0
August	746	9,000	0
September	73	1,000	0
October	70	0	0
November	72	0	0
December	74	0	0
TOTAL	2,607	32,000	0

*normally estimated

Table 3

Total Water Supply

2008 Month	Surface Water Total (acre-feet)	District Groundwate (acre-feet)	Recycled M&I (acre-feet)	Total District (acre-feet)
Method				
January	44	0	0	44
February	399	0	0	399
March	4,484	0	0	4,484
April	8,506	0	0	8,506
May	9,427	0	0	9,427
June	10,354	0	0	10,354
July	9,025	0	0	9,025
August	11,698	0	0	11,698
September	5,916	0	0	5,916
October	5,555	0	0	5,555
November	1,205	0	0	1,205
December	231	0	0	231
TOTAL	66,844	0	0	66,844

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

Table 4

Distribution System

2008 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitatio (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
N/A	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
	0	0	0	0	0	0	0	0
TOTAL			0	0	0	0	0	0

Table 5

Crop Water Needs

2008 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)
Almonds	14,707	3.60	0.00	0.00	0.53	45,150
Tomatoes (Mkt/Ca	3,409	2.30	0.00	0.00	0.55	5,966
Oats	3,042	1.90	0.00	0.00	0.40	4,563
Apricots	2,690	3.60	0.00	0.00	0.56	8,178
Beans (Dry/Mkt)	2,420	1.90	0.00	0.00	0.54	3,291
Walnuts	1,727	4.00	0.00	0.00	0.53	5,993
Wheat	1,675	1.90	0.00	0.00	0.40	2,513
Alfalfa Hay	1,651	4.30	0.00	0.00	0.20	6,769
Peaches	727	3.70	0.00	0.00	0.54	2,297
Cantaloupe, Melon	815	1.80	0.00	0.00	0.60	978
Broccoli	596	1.90	0.00	0.00	0.36	918
Cherries, etc	595	3.60	0.00	0.00	0.55	1,815
Corn (silage)	560	2.80	0.00	0.00	0.55	1,260
Barley (feed)	391	1.90	0.00	0.00	0.40	587
Irrigated Pasture	378	4.40	0.00	0.00	0.50	1,474
Grapes (wine)	368	2.60	0.00	0.00	0.50	773
Oranges/Lemons	544	3.70	0.00	0.25	0.44	1,909
Other Veg	305	1.90	0.00	0.00	0.55	412
Other Hay	298	1.90	0.00	0.00	0.40	447
Greens	277	1.90	0.00	0.00	0.60	360
Squash	240	1.90	0.00	0.00	0.60	312
Nursery	132	2.00	0.00	0.00	0.60	185
Misc	942	2.00	0.00	0.00	0.50	1,413
Crop Acres	38,489					97,562

Total Irrig. Acres 36,869 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2008 District Water Inventory

Water Supply	Table 3		66,844
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	intentional - ponds, injection	minus	0
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	0
Spillage	Table 4	minus	0
Transfers/exchanges/trades/wheel	(into or out of the district)	plus/minus	(10,512)
Non-Agri deliveries	delivered to non-ag customer:	minus	(34)
Water Available for sale to agricultural customers			56,298
Compare the above line with the next line to help find data gaps			
2008 Actual Agricultural Water Sales	From District Sales Records		56,283
Private Groundwater	Table 2	plus	34,607
Crop Water Needs	Table 5	minus	97,562
Drainwater outflow	(tail and tile not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		(6,672)

Table 7

Influence on Groundwater and Saline Sink

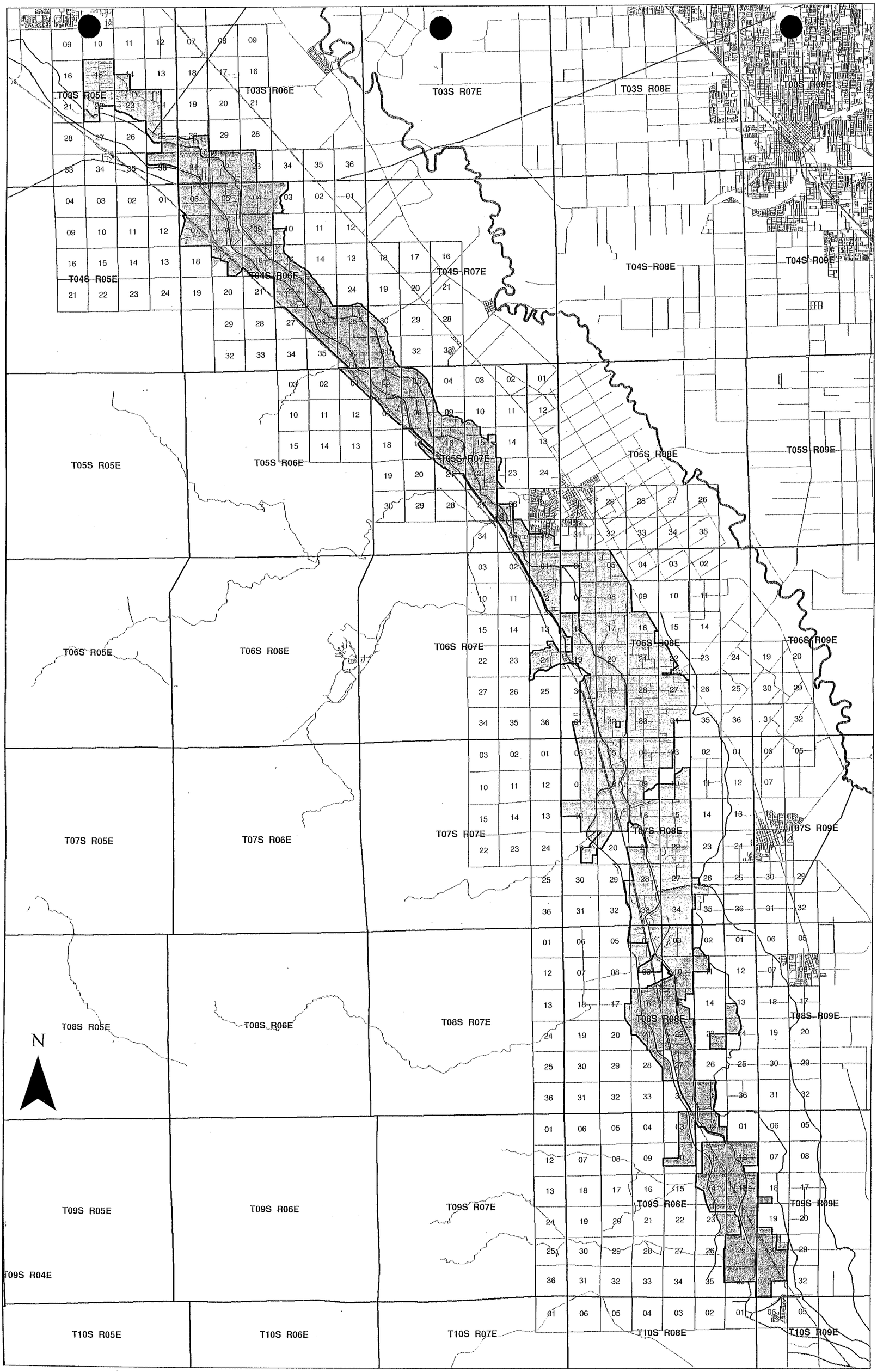
2008

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence	0
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	38,489
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 (acre-feet)	Federal Transfers In (acre-feet)	Upslope Drain (acre-feet)	Total (acre-feet)
1999	82,726	15	0	0	13,174	0	95,915
2000	56,153	14	0	0	15,003	0	71,170
2001	50,141	16	0	0	17,069	0	67,226
2002	69,335	16	0	0	9,305	0	78,656
2003	74,183	13	0	0	9,020	0	83,216
2004	75,657	27	0	0	10,742	0	86,426
2005	66,601	38	0	0	14,289	0	80,928
2006	73,256	36	0	0	2,602	0	75,894
2007	61,325	45	0	0	21,000	0	82,370
2008	40,629	34	0	0	26,181	0	66,844
Total	650,006	254	0	0	138,385	0	788,645
Average	65,001	25	0	0	13,839	0	78,865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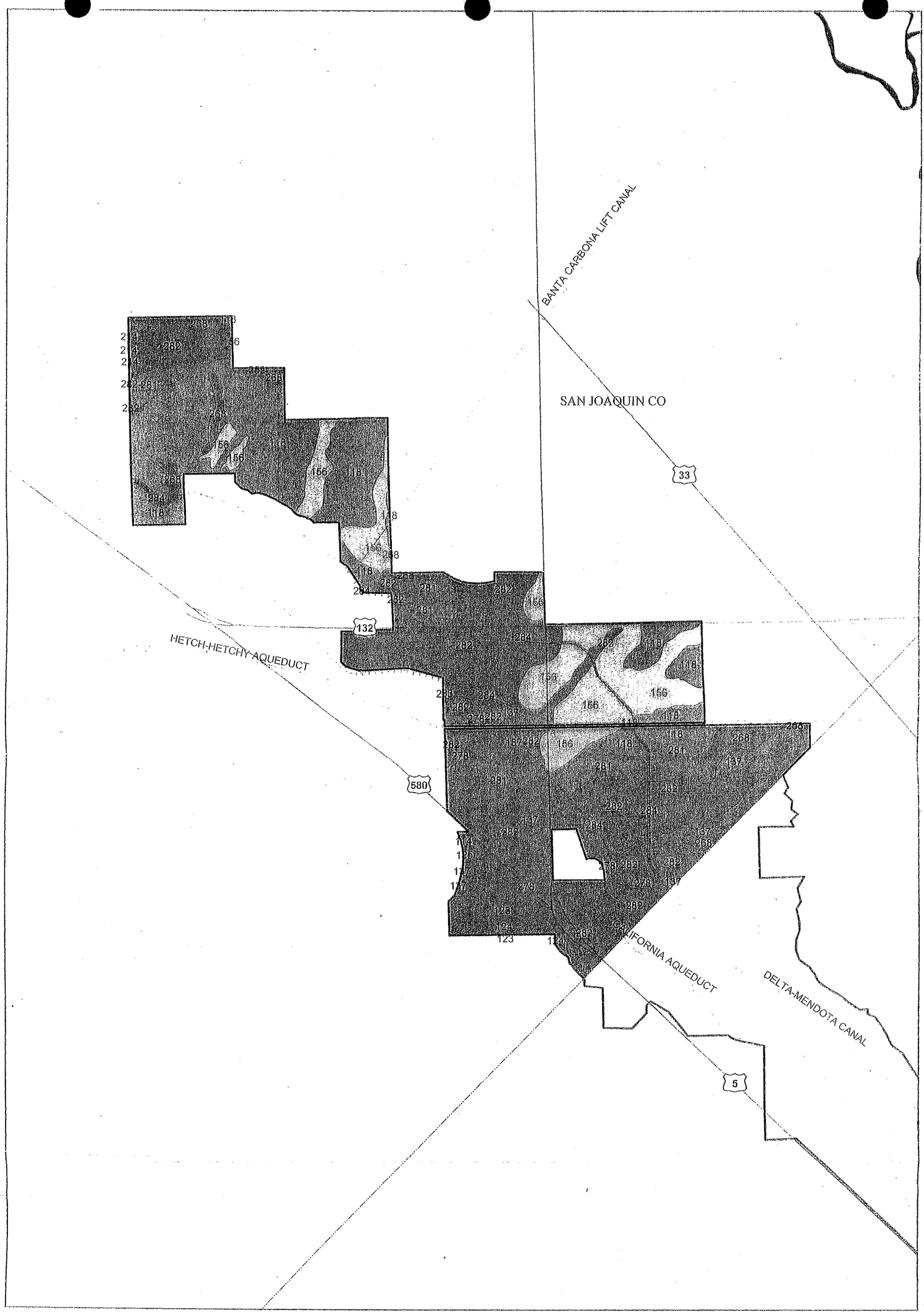
Soil Survey for Del Puerto Water District - San Joaquin County Portion				
Map Unit	Map Unit Name	County	Acres	Hectares
124	CARBONA-OROGNEN COMPLEX, 15 TO 30 PERCENT SLOPES	San Joaquin	0.13193387541	0.05339172237
123	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPES	San Joaquin	3.85710482614	1.56091427912
124	CARBONA-OROGNEN COMPLEX, 15 TO 30 PERCENT SLOPES	San Joaquin	26.26497603930	10.62905417100
123	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPES	San Joaquin	148.23186153500	59.98728054310
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	0.08455065436	0.03421642129
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	84.27350888830	34.10426446570
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	289.23990975900	117.05118880200
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	5.03479561241	2.03750862838
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	0.01537282036	0.00622115703
278	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	San Joaquin	223.53631189400	90.46189742410
278	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	San Joaquin	13.84751336300	5.60388745261
125	CARBONA-OROGNEN COMPLEX, 30 TO 50 PERCENT SLOPES	San Joaquin	1.13383479101	0.45884646522
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	49.19991727810	19.91049164390
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	77.08851886650	31.19660348330
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	22.84200821500	9.24382882849
114	CALLA-CARBONA COMPLEX, 8 TO 30 PERCENT SLOPES	San Joaquin	5.73435424459	2.32060984219
278	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	San Joaquin	58.51156707650	23.67878101840
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	17.75677939010	7.18591061183
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	63.18979783390	25.57199303080
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	248.69611402200	100.64370377100
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	141.16961945000	57.12929378620
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	153.63247587600	62.17283069550
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	47.77203579990	19.33264875690
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	145.64005470200	58.93841397690
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	25.20100735350	10.19848150340
278	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	San Joaquin	23.16238718310	9.37348154177
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	665.72001361800	269.40721654900
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	15.00915540790	6.07398710942
284	WATER	San Joaquin	34.94022402780	14.13980098000
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	32.65126298890	13.21349170630
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	114.43118483900	46.30863781040
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	50.45678988720	20.41912972640
284	WATER	San Joaquin	24.23046621620	9.80571760718
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	85.70226341150	34.68246074220
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	1.74218914388	0.70503863239
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	96.73627286950	39.14776404490
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	430.41768430700	174.18378283800
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	0.73102968286	0.29583709074
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	62.55133912750	25.31361806920
137	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES	San Joaquin	14.83204907410	6.00231474950
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	36.86721875660	14.91962774730
278	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	San Joaquin	8.70441183776	3.52254899498
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	76.15953482810	30.82065714110
283	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	San Joaquin	2.92675232627	1.18441414051
284	WATER	San Joaquin	14.26401539750	5.77243977413
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	162.04268824600	65.57632144080
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	139.23739664800	56.34735129370
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	64.79353919360	26.22100385660
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	18.30209473390	7.40659180800
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	98.42603723860	39.83158713270
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	384.45680059100	155.58408101300
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	768.35129602600	310.94060529900

282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	3.74801141979	1.51676576270
284	WATER	San Joaquin	0.00137769127	0.00055753164
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	93.33705350940	37.77214936080
284	WATER	San Joaquin	39.83896377480	16.12224977650
284	WATER	San Joaquin	0.21768897460	0.08809556498
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	49.44819871360	20.01096753330
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	7.42260260064	3.00381942150
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	196.17357393300	79.38859495390
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	45.46824226260	18.40033698670
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	24.65854283770	9.97895399594
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	0.59275634361	0.23987987946
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	52.69926888900	21.32662839500
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	88.13304887710	35.66616430070
284	WATER	San Joaquin	14.02717330890	5.67659322222
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	12.51287998350	5.06378071622
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	24.84826631050	10.05573232870
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	23.09374678970	9.34570377191
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	151.62912409700	61.36210333930
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	35.06200619720	14.18908445440
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	107.90791021400	43.66876335330
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	347.88994702600	140.78600669400
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	2.80270511931	1.13421403827
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	0.00033174834	0.00013425373
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	42.29346659570	17.11555140400
281	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	73.57270874730	29.77380621300
252	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	6.18221172453	2.50185125691
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	20.68101815640	8.36930755114
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	1017.87485119000	411.91916247600
214	PITS, GRAVEL	San Joaquin	1.03722479548	0.41974980377
214	PITS, GRAVEL	San Joaquin	0.02162354789	0.00875073564
156	EL SOLYO CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	0.19279297324	0.07802051497
214	PITS, GRAVEL	San Joaquin	0.67570876309	0.27344951832
282	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	244.19054908300	98.82036710660
268	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	San Joaquin	59.10412524040	23.91858069740
118	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	San Joaquin	2.84100088705	1.14971177903



Del Puerto Water District
Soil Survey - San Joaquin County

Water District Boundary

**see attached table
for Map Unit symbol explanation

0 1.25 2.5 5 Miles

1/12/04

Soil Survey for Del Puerto Water District - Stanislaus County Portion				
Map Unit Symbol	Map Unit Name	County	Acres	Hectares
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	53.74162532180	21.74845489790
340	CARRANZA-WOO COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	6.44485542982	2.60813934821
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	66.94370654790	27.09114534280
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	0.28991388037	0.11732393492
350	WOO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	80.34690631980	32.51522554100
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	0.61403796337	0.24849224176
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	59.49431308420	24.07648404830
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.01130508823	0.00457500494
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.71649328913	0.28995442341
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	109.39835183100	44.27192341970
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	16.09789766300	6.51458528056
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.00828033192	0.00335093002
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.38485410067	0.15574486258
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	102.97231799700	41.67140089780
123	VERNALIS CLAY LOAM, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	51.82383625530	20.97235352830
215	YOKUT SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	3.92071712900	1.58665725379
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	15.38324704260	6.22537655840
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	18.99040086020	7.68513929616
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	38.67757846170	15.65225401530
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	16.00477939170	6.47690166915
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	60.63258511640	24.53712620060
101	CAPAY CLAY, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	94.04866571990	38.06012848260
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	51.29375818900	20.75783863690
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	97.35859337020	39.39960810920
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	596.42920779900	241.36623423500
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	26.72455264500	10.81503814570
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	104.82045623100	42.41931558760
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	86.64632589250	35.06450911100
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	127.17146998400	51.46444609150
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	19.88831951950	8.04851393077
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	116.10481481900	46.98593154560
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	33.12843383340	13.40659581370
215	YOKUT SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	261.33915370800	105.76015822800
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	273.68199899900	110.75512837500
215	YOKUT SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	71.02590541370	28.74315190920
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	42.65925613260	17.26358111470
215	YOKUT SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	34.22205336630	13.84916774830
101	CAPAY CLAY, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	140.05083240400	56.67653692470
430	VAQUERO-CARBONA COMPLEX, 8 TO 30 PERCENT SLOPES	Stanislaus	0.73162153481	0.29607660462
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.28386727746	0.11487696257
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	39.69740152830	16.06496159230
215	YOKUT SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	176.30712932200	71.34893348080
300	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	102.57218190300	41.50947163470
430	VAQUERO-CARBONA COMPLEX, 8 TO 30 PERCENT SLOPES	Stanislaus	1.97570704217	0.79953993280
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	91.53831525720	37.04422612590
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	14.59326042390	5.90568045237
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	4.20100389789	1.70008523657
430	VAQUERO-CARBONA COMPLEX, 8 TO 30 PERCENT SLOPES	Stanislaus	5.39501130446	2.18328268499
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	23.36646892840	9.45607045875
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	24.72126987610	10.00433871690
401	ALO-VAQUERO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	202.49719982600	81.94767446990
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	73.23732129300	29.63807978340
430	VAQUERO-CARBONA COMPLEX, 8 TO 30 PERCENT SLOPES	Stanislaus	6.86598688731	2.77856512998
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	107.99035251100	43.70212655320
401	ALO-VAQUERO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	11.11068787220	4.49633394273

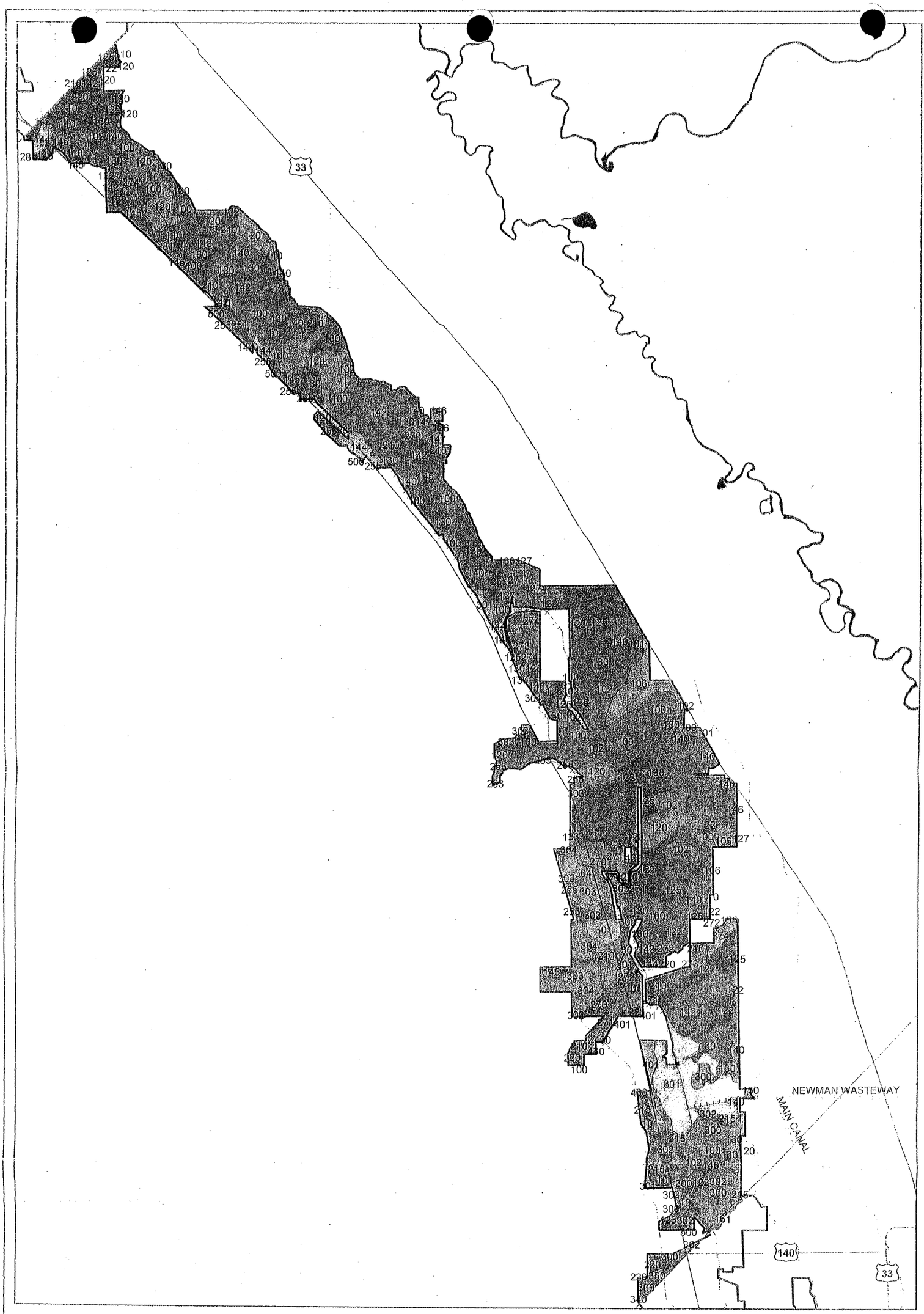
401	ALO-VAQUERO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.08439800122	0.03415464478
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	5.66461560123	2.29238762652
401	ALO-VAQUERO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	2.07954414326	0.84156129884
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	1374.32251854000	556.16835424200
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	50.79294841100	20.55516819650
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	0.17445937356	0.07060117357
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	14.40290267710	5.82864543817
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	234.45846356400	94.88193350500
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	305.08435206000	123.46320438000
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	13.44563037100	5.44125124512
270	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	98.50702619720	39.86436218740
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	197.82626479000	80.05741493000
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	1.48249217619	0.59994304298
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	0.92346179859	0.37371157192
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	932.55364757300	377.39091109800
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	159.37614846100	64.49721153470
303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	52.54788355860	21.26536495150
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	68.72685400790	27.81275921060
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	6.58977739683	2.66678716253
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	7.64785641591	3.09497636758
272	ELSALADO LOAM, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	36.50089472600	14.77138173490
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	18.49933896510	7.48641368238
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	9.92252060052	4.01549991205
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	3.39335273089	1.37324054452
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	6.40785286599	2.59316494828
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	2.81263713800	1.13823338192
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	0.00242547835	0.00098155584
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	58.00471766310	23.47366642530
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	9.35930280481	3.78757385373
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	642.83386772500	260.14552584300
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	2.73489451101	1.10677207038
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	0.02365999768	0.00957485728
273	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	122.54513712200	49.59223640300
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	30.42328112900	12.31185982030
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	44.43747877430	17.98320198000
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	65.00287236160	26.30571794810
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	2.21318463055	0.89564366224
272	ELSALADO LOAM, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	207.50959940500	83.97611974880
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	0.88958695704	0.36000291575
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	441.18211445800	178.53999131200
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	74.09166522680	29.98382035980
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	22.24600618860	9.00263546838
155	COLUMBIA FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	1.13178568620	0.45801722227
274	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	129.39302413300	52.36347677620
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	184.53346707900	74.67801284180
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	315.48027770600	127.67028443500
272	ELSALADO LOAM, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	3.00898482685	1.21769243865
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.24625440833	0.09965558096
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	121.41771013200	49.13598308200
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	11.34570800240	4.59144317458
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	52.50974322470	21.24993011250
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.24079487482	0.09744618707
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	26.67482278340	10.79491319320
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	158.27118575500	64.05004918260
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	381.74316560500	154.48591236300
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	43.14341283700	17.45951229810
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	9.31275210214	3.76873546074

303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	24.17261686180	9.78230681404
270	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	9.47043650749	3.83254804842
270	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	14.22686323000	5.75740483176
303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	90.26850434670	36.53035210090
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	224.30273421100	90.77205739930
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	7.58383135324	3.06906635501
106	CAPAY CLAY, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	3.29523061295	1.33353194911
270	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	8.37651583178	3.38985424571
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	61.69682765690	24.96780969320
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	62.88099874740	25.44702652740
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	32.25904148940	13.05476536450
303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	578.65596647100	234.17366171600
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	142.80984128500	57.79306773030
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	98.21287788400	39.74532463910
123	VERNALIS CLAY LOAM, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	0.38968381909	0.15769937945
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	208.76721525700	84.48505861100
106	CAPAY CLAY, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	60.58156958450	24.51648095610
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	89.13862748110	36.07310735060
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	17.28641485910	6.99556092056
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	934.59744146800	378.21800479100
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	32.27814363970	13.06249572710
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	46.93502018280	18.99392069860
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	255.23389862300	103.28945020500
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	310.37992444700	125.60624558000
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	272.92155722700	110.44738863900
146	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	52.88242491870	21.40074897900
253	CHAQUA-ARBURUA COMPLEX, 8 TO 15 PERCENT SLOPES	Stanislaus	1.80776970514	0.73157813264
303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	54.22773153490	21.94517501910
253	CHAQUA-ARBURUA COMPLEX, 8 TO 15 PERCENT SLOPES	Stanislaus	0.02658135715	0.01075708901
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	8.87575250006	3.59188807142
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	44.14271356120	17.86391478130
253	CHAQUA-ARBURUA COMPLEX, 8 TO 15 PERCENT SLOPES	Stanislaus	0.10226799115	0.04138637006
253	CHAQUA-ARBURUA COMPLEX, 8 TO 15 PERCENT SLOPES	Stanislaus	0.44123403383	0.17856100233
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	5.64234703969	2.28337586323
253	CHAQUA-ARBURUA COMPLEX, 8 TO 15 PERCENT SLOPES	Stanislaus	3.74696590074	1.51634265633
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.03935413192	0.01592604537
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	257.46390643200	104.19190196300
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	253.66050071700	102.65271893400
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	111.52803030000	45.13377335180
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	1823.63412110000	737.99823126700
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	26.23490229990	10.61688376560
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	99.50127349500	40.26671962240
303	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	0.49064717690	0.19855778335
302	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	2.79342205941	1.13045731881
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	196.15684624100	79.38182550010
101	CAPAY CLAY, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	24.72140526450	10.00439350670
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	230.96720538800	93.46907204950
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	94.05036750090	38.06081716860
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	25.85573529790	10.46344038930
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	1081.18554125000	437.54007883800
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	10.54394240260	4.26698028604
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	24.42427054360	9.88414740250
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	0.00659210534	0.00266772925
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	2.63942084205	1.06813526379
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	67.19615349090	27.19330695260
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.04366993139	0.01767258671
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	2.28503845463	0.92472186081

125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	35.07227242420	14.19323904730
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	539.60034440200	218.36841894600
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.00353623426	0.00143106262
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	342.09092791200	138.43922791900
304	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Stanislaus	4.72905752249	1.91378086579
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	100.64110173700	40.72799155000
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.22943555671	0.09284923608
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	100.55566546200	40.69341673100
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.72184785767	0.29212133950
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	2.71429836054	1.09843710755
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.07153059408	0.02894739208
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.02233344535	0.00903802083
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.00006260447	0.00002533512
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	366.02423773400	148.12469065100
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	86.95668621770	35.19010742510
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	3.92795983947	1.58958827348
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	6.47374736516	2.61983149464
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.76647416295	0.31018095682
106	CAPAY CLAY, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	570.15034993400	230.73156229100
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	194.33320934700	78.64382614670
101	CAPAY CLAY, WET, 0 TO 2 PERCENT SLOPES	Stanislaus	65.94456101220	26.68680566220
274	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	94.38575049190	38.19654179200
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	1.79645924766	0.72700095484
273	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	142.80863049500	57.79257774110
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	32.12878417280	13.00205212110
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	0.00010494498	0.00004246971
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	26.51538284330	10.73039016620
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	373.85778292800	151.29481256900
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	92.05974354950	37.25524057950
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	114.78515109700	46.45188281190
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	9.04044172440	3.65853540756
274	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	77.47097641580	31.35137849630
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	0.20310883533	0.08219519447
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	3.27990236112	1.32732882832
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	37.60129665060	15.21669840480
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	92.74961907560	37.53442318090
301	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Stanislaus	69.01577376430	27.92968083800
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	977.17039051600	395.44665868200
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	77.39852674420	31.32205916690
274	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	225.04109255600	91.07086029340
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	133.33531025600	53.95886268860
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	5.46085457241	2.20992849882
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	1.09004507964	0.44112540529
271	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	243.45504880700	98.52272083170
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	208.35226772700	84.31713537480
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	135.64293089400	54.89272323090
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	152.84628515700	61.85467073480
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	8.89360039005	3.59911085317
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	325.50177078200	131.72583707000
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	236.49881836200	95.70763544540
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	3.28277393393	1.32849091211
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	81.38146183330	32.93389512520
500	WISFLAT-ARBURUA-SAN TIMOTEO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.11613200804	0.04699693625
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	201.70287248500	81.62622173650
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	75.12061930510	30.40022312450
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	273.15251684900	110.54085464200
128	WATER	Stanislaus	2.43913883386	0.98708404519

210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	99.00902632640	40.06751434570
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	58.77996334100	23.78739708680
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	182.94469985700	74.03506183200
147	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	80.46993758180	32.56501450500
270	ELSALADO FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	42.41625811160	17.16524334630
126	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	25.17196373780	10.18672797410
281	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPE	Stanislaus	20.37111375220	8.24389374170
127	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	4.42653469188	1.79135427192
500	WISFLAT-ARBURUA-SAN TIMOTEO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.18326620632	0.07416517082
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	14.15391613430	5.72788420207
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	75.34773493110	30.49213351830
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	9.62113803327	3.89353476620
147	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	127.14119106100	51.45219265140
146	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES, RARELY FLOODED	Stanislaus	7.33539307724	2.96852699454
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	31.84520494070	12.88729172620
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	1.26163875097	0.51056687081
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	990.78979801000	400.95823500400
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	10.39618807720	4.20718625744
500	WISFLAT-ARBURUA-SAN TIMOTEO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.18443700563	0.07463897629
500	WISFLAT-ARBURUA-SAN TIMOTEO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	0.00732252861	0.00296332093
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	168.45787808200	68.17245555400
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	175.96984659500	71.21244006200
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	127.83812210300	51.73423051760
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	53.40545925070	21.61241337340
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	4.55578101922	1.84365838263
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	22.95395030300	9.28913016498
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	0.35727181907	0.14458271399
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	66.47796843070	26.90266789400
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	209.64174924800	84.83896981000
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	189.68784432700	76.76391442040
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	28.17014207900	11.40004718510
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	52.77303014330	21.35647850290
281	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPE	Stanislaus	109.67091620800	44.38222626260
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	175.11871493800	70.86799944730
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	774.68045201800	313.50192276600
500	WISFLAT-ARBURUA-SAN TIMOTEO COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	25.01694991890	10.12399613400
255	CALLA-CARBONA COMPLEX, 30 TO 50 PERCENT SLOPES	Stanislaus	71.74081071030	29.03246369500
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	28.30622032250	11.45511607300
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	432.91298028900	175.19359286400
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	36.28068066580	14.68226430440
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	13.62740232810	5.51481171500
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	527.60342469500	213.51343985600
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	3.67354649177	1.48663088831
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	151.25213334000	61.20954065780
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	54.78170987470	22.16936200390
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	90.06044341010	36.44615286300
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	20.80606302260	8.41991139158
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	103.54661936400	41.90381231630
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	26.33167369520	10.65604574320
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	101.04169882400	40.89010737050
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	206.62416142100	83.61779586240
281	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPE	Stanislaus	54.15230360910	21.91465043350
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	129.25604144900	52.30804187450
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	407.73613894000	165.00489099200
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	86.91605259480	35.17366358830
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	268.45676344300	108.64055146800
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	90.94589247430	36.80448123360

122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	22.59738689280	9.14483413376
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	191.58172026300	77.53033849340
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	157.00931726500	63.53938934000
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	42.27299364690	17.10726629910
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	6.11546278606	2.47483893138
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	11.58921744710	4.68998790863
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	334.95618655800	135.55190176100
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	50.66415755810	20.50304840970
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.20791357189	0.08413960154
274	ELSALADO LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	67.92714849760	27.48913001040
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	112.66674029600	45.59459274170
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	114.77401512000	46.44737624390
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	0.90750168974	0.36725274777
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	21.83465649730	8.83616822523
281	CARBONA CLAY LOAM, 2 TO 8 PERCENT SLOPE	Stanislaus	8.62211090175	3.48924300201
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	18.36988184090	7.43402426522
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	75.33809320630	30.48823165240
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	28.75297006980	11.63590920440
145	ZACHARIAS CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	13.10163016320	5.30203935936
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	0.12807103701	0.05182848779
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	9.99690079275	4.04560049510
100	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	Stanislaus	111.77330361400	45.23303189790
140	ZACHARIAS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	68.43752533830	27.69567210200
144	ZACHARIAS GRAVELLY CLAY LOAM, 2 TO 5 PERCENT SLOPES	Stanislaus	97.30437295870	39.37766589650
102	CAPAY CLAY, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	Stanislaus	204.33260840800	82.69043765440
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	636.39279480900	257.53891722400
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	109.84894605700	44.45427235590
130	STOMAR CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	96.14200424860	38.90727216880
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	0.00638232541	0.00258283436
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	50.31840229290	20.36312627780
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	87.92254366170	35.58097589870
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	6.73931941988	2.72730464640
220	XEROFLUVENTS-XERORTHENTS COMPLEX, 1 TO 8 PERCENT SLOPES, OCCASIONALLY FLOODED	Stanislaus	84.56581153880	34.22255518210
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	343.35890980200	138.95236176600
142	ZACHARIAS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	47.30720671400	19.14453917990
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	12.15855422710	4.92039023098
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	19.35964651050	7.83456764567
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	25.04067461480	10.13359717370
210	CORTINA GRAVELLY SANDY LOAM, 0 TO 5 PERCENT SLOPES, RARELY FLOODED	Stanislaus	9.69568687100	3.92370359763
120	VERNALIS-ZACHARIAS COMPLEX, 0 TO 2 PERCENT SLOPES	Stanislaus	2.76354828520	1.11836783646
122	VERNALIS LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	31.03824350260	12.56072615750
110	EL SOLYO SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	13.83338915060	5.59817158907
125	VERNALIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Stanislaus	62.69697974320	25.37255671020



Water District Boundary

**see attached table
for Map Unit symbol explanation

Del Puerto Water District
Soil Survey - Stanislaus County

0 2.5 5 10 Miles

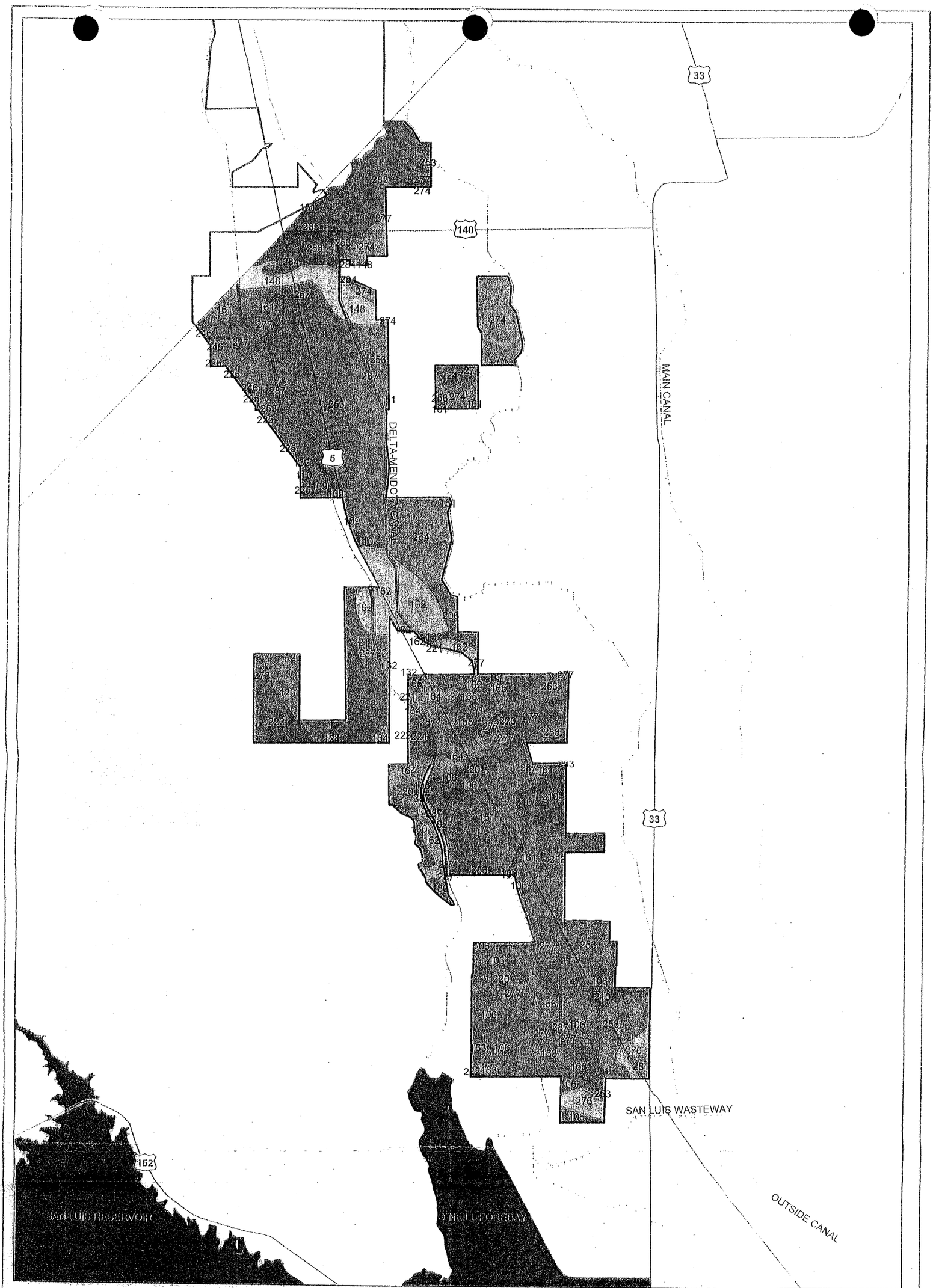
1/12/04

Soil Survey for Del Puerto Water district - Merced County Portion				
Map Unit	Map Unit Name	County	Acres	Hectares
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	34.10276998860	13.80089549850
253	STANISLAUS CLAY LOAM	Merced	3.72089195198	1.50579090813
276	WOO SANDY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	77.09827908170	31.20055330050
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	15.70446826030	6.35537011785
222	ONEIL SILT LOAM, 15 TO 30 PERCENT SLOPE	Merced	6.75812826780	2.73491631386
163	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	7.56393749849	3.06101560106
281	WOO-ANELA-URBAN LAND COMPLEX, 0 TO 2 PERCENT SLOPES	Merced	26.06935822170	10.54989048260
163	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	5.87469256771	2.37740272242
163	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	151.08190967800	61.14065361530
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	7.22855061480	2.92528940242
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	160.72915015800	65.04475166230
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	19.23030151890	7.78222360696
163	DAMLUIS GRAVELLY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	148.31048371900	60.01909779870
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	16.90963817520	6.84308487120
276	WOO SANDY CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	70.98910942080	28.72826110550
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	91.68678935080	37.10431143430
253	STANISLAUS CLAY LOAM	Merced	55.33635013850	22.39381685970
210	LOS BANOS VARIANT GRAVELLY SANDY CLAY LOAM	Merced	33.96317326840	13.74440273420
253	STANISLAUS CLAY LOAM	Merced	368.15170117900	148.98564419500
220	MOLLIC XEROFLUVENTS, CHANNELED	Merced	23.51322411910	9.51546015206
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	63.01919664940	25.50295321030
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	34.17270301060	13.82919637640
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	9.93464070324	4.02040474152
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	296.00260344600	119.78795267400
287	WATER	Merced	18.74627132900	7.58634362211
253	STANISLAUS CLAY LOAM	Merced	183.08078216100	74.09013236280
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	224.15548157600	90.71246639750
287	WATER	Merced	0.00438100106	0.00177292747
287	WATER	Merced	0.00106682456	0.00043172840
130	AYAR-ONEIL COMPLEX, 30 TO 50 PERCENT SLOPES	Merced	25.82116576440	10.44945060140
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	3.26044974544	1.31945663740
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	0.15803015943	0.06395250933
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	0.23193234760	0.09385965108
253	STANISLAUS CLAY LOAM	Merced	35.63944400220	14.42276514390
287	WATER	Merced	0.57338162540	0.23203921252
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	135.29260256700	54.75095044690
253	STANISLAUS CLAY LOAM	Merced	227.68937720600	92.14258261150
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	24.10524356870	9.75504182123
130	AYAR-ONEIL COMPLEX, 30 TO 50 PERCENT SLOPES	Merced	58.13554795780	23.52661154460
123	AYAR CLAY, 5 TO 8 PERCENT SLOPES	Merced	6.56823180664	2.65806797524
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	95.58409541570	38.68149457060
287	WATER	Merced	0.11251730367	0.04553411791

287	WATER	Merced	1.09807465125	0.44437485625
220	MOLLIC XEROFLUVENTS, CHANNELED	Merced	21.00203033150	8.49921651408
210	LOS BANOS VARIANT GRAVELLY SANDY CLAY LOAM	Merced	30.91620924690	12.51134066740
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	8.50264617544	3.44089736311
210	LOS BANOS VARIANT GRAVELLY SANDY CLAY LOAM	Merced	151.27372413700	61.21827813970
253	STANISLAUS CLAY LOAM	Merced	0.02765628067	0.01119209494
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	43.46872542050	17.59116157380
106	ANELA GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES	Merced	32.83402263990	13.28745188150
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	22.96123301110	9.29207737112
164	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	81.24956458660	32.88051822590
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	598.83606775000	242.34025548500
222	ONEIL SILT LOAM, 15 TO 30 PERCENT SLOPE	Merced	0.01141142194	0.00461803665
124	AYAR CLAY, 8 TO 15 PERCENT SLOPES	Merced	8.00640538956	3.24007592748
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	45.40036053930	18.37286623960
164	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	13.28501391040	5.37625209729
220	MOLLIC XEROFLUVENTS, CHANNELED	Merced	67.89872412640	27.47762708030
253	STANISLAUS CLAY LOAM	Merced	44.91909903220	18.17810670040
220	MOLLIC XEROFLUVENTS, CHANNELED	Merced	2.14285603474	0.86718270140
164	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	153.39236809200	62.07566256420
221	ONEIL SILT LOAM, 8 TO 15 PERCENT SLOPES	Merced	76.77025738740	31.06780768700
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	22.87220086190	9.25604735400
164	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	6.00129345931	2.42863626374
287	WATER	Merced	12.84426617760	5.19788789391
221	ONEIL SILT LOAM, 8 TO 15 PERCENT SLOPES	Merced	0.05604034637	0.02267871391
155	CONOSTA CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	91.44085447640	37.00478516410
222	ONEIL SILT LOAM, 15 TO 30 PERCENT SLOPE	Merced	170.89138888200	69.15726201570
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	4.88254691642	1.97589579330
132	BALLVAR-PEDCAT, ERODED ASSOCIATION, 0 TO 5 PERCENT SLOPES	Merced	0.89016748332	0.36023784630
165	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Merced	15.59673600880	6.31177244102
164	DAMLUIS GRAVELLY CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	88.49104813170	35.81104139730
287	WATER	Merced	27.95863310820	11.31445257780
165	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Merced	136.12378928300	55.08731963390
165	DAMLUIS GRAVELLY CLAY LOAM, 8 TO 15 PERCENT SLOPES	Merced	19.18045714470	7.76205231296
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	4.34760355394	1.75941198727
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	239.44445829800	96.89969312710
253	STANISLAUS CLAY LOAM	Merced	58.39879796430	23.63314499720
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	1.71618056829	0.69451333975
132	BALLVAR-PEDCAT, ERODED ASSOCIATION, 0 TO 5 PERCENT SLOPES	Merced	0.11495430376	0.04652033644
273	WISFLAT-ROCK OUTCROP-ONEIL COMPLEX, 30 TO 50 PERCENT SLOPES	Merced	44.90490618810	18.17236306260
126	AYAR CLAY, 30 TO 50 PERCENT SLOPES	Merced	161.08646898000	65.18935339780
120	ARBURUA LOAM, 30 TO 50 PERCENT SLOPES	Merced	6.56730790745	2.65769408666
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	3.94031073128	1.59458649994
221	ONEIL SILT LOAM, 8 TO 15 PERCENT SLOPES	Merced	1.25867629427	0.50936800763
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	38.85165207690	15.72269907810

162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	0.36960118729	0.14957223016
221	ONEIL SILT LOAM, 8 TO 15 PERCENT SLOPES	Merced	37.58160795350	15.20873067520
222	ONEIL SILT LOAM, 15 TO 30 PERCENT SLOPE	Merced	277.19647032100	112.17738385300
132	BALLVAR-PEDCAT, ERODED ASSOCIATION, 0 TO 5 PERCENT SLOPES	Merced	19.08990254580	7.72540618255
132	BALLVAR-PEDCAT, ERODED ASSOCIATION, 0 TO 5 PERCENT SLOPES	Merced	2.36722246899	0.95798053728
221	ONEIL SILT LOAM, 8 TO 15 PERCENT SLOPES	Merced	122.73755149700	49.67010370500
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	48.35626547560	19.56907801780
287	WATER	Merced	18.34946196190	7.42576063690
206	LOS BANOS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	89.89047928330	36.37737085050
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	185.53535343400	75.08346169200
162	DAMLUIS CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	165.64439023000	67.03387790070
110	APOLLO CLAY LOAM, 8 TO 15 PERCENT SLOPES	Merced	20.16079680440	8.15878152885
109	APOLLO CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	9.29653147298	3.76217120781
254	STANISLAUS CLAY LOAM, WET	Merced	346.49562668700	140.22174551300
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	6.02613760250	2.43869032750
109	APOLLO CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	5.10948528797	2.06773445483
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	16.80442522610	6.80050671941
109	APOLLO CLAY LOAM, 2 TO 8 PERCENT SLOPES	Merced	25.31465909420	10.24447471150
110	APOLLO CLAY LOAM, 8 TO 15 PERCENT SLOPES	Merced	8.03325396804	3.25094115708
132	BALLVAR-PEDCAT, ERODED ASSOCIATION, 0 TO 5 PERCENT SLOPES	Merced	4.67474171282	1.89180004683
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	8.61847056740	3.48776981160
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	0.84979419052	0.34389936133
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	2.30068638778	0.93105435199
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	5.84820736877	2.36668454725
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	0.96396923915	0.39010434454
253	STANISLAUS CLAY LOAM	Merced	10.47837793720	4.24044729954
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	7.54977837925	3.05528561123
246	SAN EMIGDIO FINE SANDY LOAM	Merced	7.74939045084	3.13606571622
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	0.00009127516	0.00003693773
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	67.38610320080	27.27017684020
247	SAN EMIGDIO LOAM	Merced	52.19169656660	21.12122125120
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	11.97325089700	4.84540066577
225	OQUIN FINE SANDY LOAM, 15 TO 30 PERCENT SLOPES	Merced	3.49997681809	1.41638976335
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	14.68530553510	5.94292977145
253	STANISLAUS CLAY LOAM	Merced	267.81961178700	108.38270545100
246	SAN EMIGDIO FINE SANDY LOAM	Merced	13.11765402970	5.30852398530
246	SAN EMIGDIO FINE SANDY LOAM	Merced	2.40432160214	0.97299401741
253	STANISLAUS CLAY LOAM	Merced	188.44518889800	76.26102982420
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	0.08781233990	0.03553637804
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	149.37800017700	60.45110619780
253	STANISLAUS CLAY LOAM	Merced	1240.86812110000	502.16129870300
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	55.95908431410	22.64582833220
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	67.87822650100	27.46933198920
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	172.96077957700	69.99471436170

287	WATER	Merced	43.18454573090	17.47615818260
253	STANISLAUS CLAY LOAM	Merced	71.90080817840	29.09721234560
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	25.61113863670	10.36445567450
284	XEROFLUVENTS, EXTREMELY GRAVELLY	Merced	0.45338743352	0.18347930659
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	248.21929003700	100.45074003300
148	CARRANZA-WOO COMPLEX, 0 TO 2 PERCENT SLOPES	Merced	90.89298788210	36.78307151390
284	XEROFLUVENTS, EXTREMELY GRAVELLY	Merced	0.53051483876	0.21469164683
148	CARRANZA-WOO COMPLEX, 0 TO 2 PERCENT SLOPES	Merced	0.53667392607	0.21718413997
148	CARRANZA-WOO COMPLEX, 0 TO 2 PERCENT SLOPES	Merced	178.91258936100	72.40332530090
284	XEROFLUVENTS, EXTREMELY GRAVELLY	Merced	0.28733775016	0.11628141245
284	XEROFLUVENTS, EXTREMELY GRAVELLY	Merced	95.26479806460	38.55227957200
253	STANISLAUS CLAY LOAM	Merced	4.82483271180	1.95253969328
253	STANISLAUS CLAY LOAM	Merced	59.39496368530	24.03627879010
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	104.42040552700	42.25742088040
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	1.89932531643	0.76862935822
161	DAMLUIS CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	3.09018933126	1.25055472168
285	YOKUT SANDY LOAM	Merced	135.81568910000	54.96263596670
287	WATER	Merced	55.41628672950	22.42616603660
274	WOO LOAM, 0 TO 2 PERCENT SLOPES	Merced	2.39856816686	0.97066568575
277	WOO CLAY LOAM, 0 TO 2 PERCENT SLOPES	Merced	20.63631883310	8.35121838449
253	STANISLAUS CLAY LOAM	Merced	9.54557889527	3.86295708093
285	YOKUT SANDY LOAM	Merced	493.39950668700	199.67161122400



Water District Boundary

**see attached table
for Map Unit symbol explanation

Del Puerto Water District
Soil Survey - Merced County

0 1.25 2.5 5 Miles

1/12/04

GROUNDWATER MANAGEMENT PLAN FOR THE NORTHERN AGENCIES IN THE DELTA-MENDOTA CANAL SERVICE AREA AND A PORTION OF SAN JOAQUIN COUNTY

I. INTRODUCTION

The Groundwater Management Act, Assembly Bill 3030 (AB 3030), signed into law in 1992, establishes provisions to allow local water agencies to develop and implement groundwater management plans. The Act provides a systematic procedure for existing local agencies to develop these plans. Amendments to the Water Code Section 10750 et seq., made in 2002, enacted through the passage of Senate Bill 1938 (SB 1938) (Stats 2002, Ch 603), require AB 3030 groundwater management plans to contain specific plan components in order to receive state funding for water projects.

The Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County (GMP) is part of the ongoing efforts by the San Luis and Delta-Mendota Water Authority (SLDMWA) and their Participating Agencies (PAs) to manage their limited water resources in the region. It will benefit the residents of the Groundwater Management Area (GMA) that rely on the groundwater resource as a part of their water supply. This GMP provides a mechanism to bridge gaps and interface in local PAs' programs to support comprehensive regional water resources management in the GMA.

The PAs of the SLDMWA, located in the northern Delta-Mendota Canal (DMC) service area, entered into an agreement under the SLDMWA umbrella to jointly fund the preparation of a coordinated regional plan. The area in the southwestern portion of San Joaquin County is being represented by the San Joaquin County Flood Control and Water Conservation District (SJCFCWCD), which entered into a memorandum of understanding with the SLDMWA such that the GMP could cover this portion of San Joaquin County.

The water needed is obtained from three sources for agricultural, municipal, and industrial uses within the GMA. The first source is imported surface water diverted from the DMC under the Central Valley Project (CVP). The DMC provides water for urban use in the City of Tracy (Tracy) and for agricultural production. During drought conditions, supplies from the CVP surface water are limited, which requires many water users to pump groundwater to meet water demand. Surface water supplies diverted south of the Sacramento-San Joaquin Delta are further limited by restrictions in water export set in place to protect endangered species that depend on adequate water conditions within the Delta.

The second source is local surface water supply diverted from the San Joaquin River for agricultural use. Several of the PAs possess water rights to divert water from the river.

The third source is groundwater, which is used for municipal and industrial purposes, for rural domestic needs, and for agricultural production where the surface water supplies are either not available or are insufficient to meet the crop demand. Communities that rely on groundwater for their water supply have experienced water quality deterioration over time, while regulations governing domestic water quality become stricter. This combination has made it increasingly difficult for these communities to find viable groundwater supplies and has raised serious concerns about the sustainability of groundwater resources to meet domestic demands without expensive treatment. As an example, Tracy uses treated surface water to blend with high salinity groundwater to provide potable domestic water for the community.

Proper management of groundwater requires knowledge of the storage, distribution, depletion, and replenishment of the groundwater resource as well as various other local and regional geologic and hydrologic factors. Without such knowledge, the effect of current and future activities on groundwater resources cannot be adequately predicted.

SLDMWA would be responsible under this plan to monitor the regional groundwater conditions within the basin, although water level and water quality monitoring would be conducted by others agencies (the PAs, California Department of Water Resources (DWR), United States Geological Survey, Counties and Cities). SLDMWA would collect these data from the various

agencies in order to evaluate the general condition of the groundwater basin and to evaluate and promote projects that appear to provide effective and efficient utilization and protection of groundwater resources.

As the PAs have very different motivations with regard to groundwater management, it will be very difficult to develop or implement a single set of groundwater management programs that suit the needs of the group as a whole. Rather, it would be more efficient, and programs would be better focused, if they are undertaken by each individual agency or group of agencies depending on their specific needs. The PAs can also prepare their own GMP (for example the GMP that Tracy is currently pursuing). The regional plan would be prepared to facilitate coordinated regional management of groundwater resources. Each PA would independently adopt the whole plan or portions of it. Implementation of this GMP will provide the means for collection of the necessary groundwater monitoring data needed to assess the impacts of activities that affect the groundwater basin such that sustained use of groundwater can be optimized without adverse impacts to the water quality and yield. Sustainability is the basic goal of groundwater management.

The PAs within the GMA have engaged in and will continue to reserve operational flexibility to engage in transfers of water supplies to qualified purchasers. Circumstances occur where shortages of water have the potential to create hardship in other areas of the region or state, which have access to federal water project facilities, and the PAs may have a water supply surplus that can help alleviate the hardship.

Prior to undertaking any water transfer program, the PAs will evaluate the economic and environmental impacts of the program. The evaluation may include, but is not limited to, an assessment of water management practices, groundwater storage capacity, and conjunctive use with surface water supplies. These transfer programs may be undertaken to assist other areas in need of water and to benefit the PAs and their consumers, as long as such programs do not:

- Result in conditions of overdraft or otherwise fail to comply with provisions of California Water Code Section 1745.10;
- Result in unmitigated adverse impacts upon landowners affected by the program.

This plan characterizes the groundwater basin, summarizes the existing groundwater management activities in the GMA, identifies management objectives, develops the relative elements of the GMP, and provides recommendations for project implementation.

II. THE GROUNDWATER MANAGEMENT AREA

The DWR Bulletin 118 Update 2003, for planning purposes, divides California into 10 hydrologic regions (HRs) that generally correspond to the State's major drainage areas (DWR, 2003). HR boundaries are shown in Figure 1. The San Joaquin River HR is further divided into subbasins largely based on political considerations for groundwater management purposes (Figure 2). The area included in this GMP is part of the Tracy and Delta-Mendota Subbasins of the San Joaquin River HR and covers portions of Merced, Stanislaus and San Joaquin Counties. The GMA is bounded on the north by Old River, on the south by the southern boundary of the Del Puerto Water District, on the west by the Coast Ranges, and on the east by the San Joaquin River. The GMA encompasses approximately173,000 acres. Figure 3 shows the boundaries of the GMA.

The GMA includes the following agricultural water supply districts: Banta-Carbona Irrigation District, Westside Irrigation District, West Stanislaus Irrigation District, Patterson Irrigation District, Del Puerto Water District, and the Central Valley Project Service Area (CVPSA) within the Byron-Bethany Irrigation District. Non-district lands within San Joaquin County are included in the plan and are represented by the San Joaquin Flood Control and Water Conservation District. The GMA also contains Tracy and the City of Patterson (Patterson) as well as several unincorporated communities. Tracy is the only city participating at this time.

Del Puerto Water District includes the former Davis, Foothill, Mustang, Orestimba, Hospital, Kern Canon, Quinto, Romero, Salado, and Sunflower Water Districts. These district boundaries continue to be recognized within Del Puerto Water District in the management of water transfers. A list of the current PAs involved in the GMP is given in Table 1.

TABLE 1
List of Agencies Participating in the
Groundwater Management Plan

AUTHORITY
Water or Irrigation District:
▪ Banta Carbona Irrigation District ▪ Byron-Bethany Irrigation District (only the CVPSA) ▪ Del Puerto Water District ▪ Patterson Irrigation District ▪ West Stanislaus Irrigation District ▪ Westside Irrigation District
Cities:
▪ City of Tracy
Non-District Lands:
San Joaquin County west of the San Joaquin River

III. CHARACTERISTICS OF THE GMA

A. LAND USE AND GROUNDWATER BENEFICIAL USE

Most of the land in the San Joaquin Valley is utilized for agricultural crop production. Major agricultural activities include the operation of dairies, and the production of cotton, alfalfa, corn, grapes, walnuts, almonds and oranges. A number of small rural communities, as well as some large municipalities exist within the San Joaquin Valley. The largest of these communities, Fresno, has a population of nearly a half of a million people. The majority of communities have populations of less than 100,000 people, and many have less than 10,000. Other notable large municipalities in the San Joaquin Valley include Stockton, Modesto, and Bakersfield. The southern end of the San Joaquin Valley also has a large oil production industry, and numerous oil/gas fields are located through out the San Joaquin Valley.

Within the GMA in the sourthern end of the valley, the majority of the current land use is agricultural, with irrigated crops, dairies and rangeland. There are two municipalities within the GMA, the cities of Tracy and Patterson. Tracy is a municipality with a population

of about 80,000 people, and Patterson has a population of about 19,000 people. There are also some smaller unincorporated communities within the GMA.

The beneficial uses of groundwater in the GMA are predominantly for agriculture and related industry, domestic potable water, and other municipal uses. Groundwater is generally used conjunctively to supplement surface water supplies that support the water needs in the GMA.

B. TOPOGRAPHY AND STRUCTURE

The San Joaquin Valley is the southern portion of the Great Valley Geomorphic Province in central California. The San Joaquin Valley is a structural trough up to 200 miles long and 45 to 70 miles wide. It conjoins the northern portion of the Great Valley Geomorphic Province, the Sacramento Valley, at the confluence of the Sacramento and San Joaquin Rivers ("the Delta"). The Great Valley opens to the San Francisco Bay west of this Delta.

The San Joaquin Valley is bounded by the Sierra Nevada Mountains to the east, the Coast Range Mountains to the west, and the Tehachapi Mountains to the south. It is a broad, fault bounded, northwest trending, asymmetric topographic and structural trough, with axis of the valley offset nearer the western margin. The topographic slope along the axis declines gently, generally towards the north-northwest.

Within the GMA, the land surface generally slopes easterly to northeasterly from the base of the Coast Range Mountains, near the western boundary, towards the trough of the valley and the San Joaquin River, along the eastern boundary. Small ephemeral streams drain from the Coast Range Mountains typically trending northeasterly toward the trough of the valley. The natural land surface is relatively flat to slightly undulating. However, agricultural practices have modified many topographic features to provide suitable conditions for crop production. The land surface elevation in the GMA ranges from about 60-feet above mean sea level (msl) in the southwest to about sea level in the north. Major

man-made features include Interstate Highway 5, the California Aqueduct, the DMC, and a number of smaller canals used for water supply distribution and drainage.

C. CLIMATE

The San Joaquin Valley has a more continental climate than much of the more populous coastal areas, with relatively warm summers and cooler winters. The mean annual high temperatures in the valley range from about 73° Fahrenheit (°f) to 79°f, and the mean annual lows range from about 48°f to 50°f.

Due to some rain shadow effects from the Coast Range Mountains and the lower elevations of the valley floor, the valley experiences relatively little rainfall, typically less than 12-inches. Some areas of the southern San Joaquin Valley experience desert conditions due to the very low seasonal precipitation. Rainfall occurs typically between late fall and early spring, with dry summers. Mean annual rainfall amounts range from 5 to 13-inches per year on the valley floor.

The range of typical climatic conditions experienced within the GMA can vary. Two representative weather stations, with long documented histories, have been chosen to demonstrate the range of climatic conditions with in the GMA. The City of Los Banos (Los Banos) lies within 10-nukes of the southern boundary of the GMA, and Tracy lies within the GMA near the northern boundary. The recent climatic history recorded for each location is presented below:

- **Los Banos:**

  Between 1948 and 2005, the average monthly high temperature of 96.2 °f was in July, and the average monthly low temperature of 36.1°f was in December (WRCC, 2006). Los Banos averages about 96-days per year above 90°f, and 28-days below 32°f. The hottest day on record was 114°f on June 30, 1950, and the coldest was 14°f on January 11, 1949.

Between 1948 and 2005, the average annual rainfall was 9.43-inches. The highest annual rainfall was 21.80-inches in 1998, and the lowest annual rainfall was 5.24-inches in 1989. The maximum-recorded rainfall over a 24-hour period was 2.25-inches on September 30, 1983. Annually, Los Banos experiences, on average, about 48-days with precipitation greater than 0.01-inches, 26-days with precipitation greater than 0.10-inches, 5-days with precipitation greater than 0.50-inches, and 1-day with precipition greater than 1.0-inch.

- **Tracy:**

Between 1955 and 2005, average monthly high temperature of 92.6°f was in July, and the average monthly low temperature of 38.2°f was in January (WRCC, 2006). Tracy averages about 74-days per year above 90°f, and 18-days below 32°f. The hottest day on record was 112°f on June 16, 1961, and the coldest was 17°f on December 26, 1990.

Between 1955 and 2005, the average annual rainfall was 12.26-inches. The highest annual rainfall was 27.48-inches in 1983, and the lowest annual rainfall was 5.44-inches in 1976. The maximum recorded rainfall over a 24-hour period was 2.80-inches on January 4, 1982. On average, annually, Tracy experiences about 55-days with precipitation greater than 0.01-inches, 31-days with precipitation greater than 0.10-inches, 7-days with precipitation greater than 0.50-inches, and 1-day with precipitation greater than 1.0-inch.

TABLE 2
Summary of Climatic Data for Los Banos and Tracy

		Los Banos	Tracy
Average Monthly High-Temperature	°f	96.2	92.6
Average Monthly Low Temperature	°f	36.1	38.2
Hottest Recorded High Temperature	°f	114	112
Coldest Recorded Low Temperature	°f	14	17
Average Number of Days Above 90°f		96	74
Average number of Days Below 32°f		28	18
Average Annual Rainfall	Inch	9.43	12.26
Highest Annual Rainfall	Inch	21.80	27.48
Lowest Annual Rainfall	Inch	5.24	5.44
Maximum 24-hour Rainfall	Inch	2.25	2.80

D. GEOLOGY

The geologic materials that fill the San Joaquin Valley are comprised of mostly unconsolidated alluvial and lacustrine sediments, Holocene to Jurassic in age, derived from parent materials of the Coast Range and the Sierra Nevada Mountains, these sediments are overlying older marine sediments. The Valley fill reaches a thickness of about 28,000-feet in the southwestern corner (Page, 1986). Continental deposits shed from the surrounding mountains form an alluvial wedge that thickens from the valley margins toward the axis of the structural trough. This depositional axis is below to slightly west of the series of rivers, lakes, sloughs, and marshes, which mark the current and historic axis of surface drainage in the San Joaquin Valley (DWR, 2003). Major faults run parallel to the western boundary of the GMA, along the east side of the Coast Range Mountains. In particular, the Greenville and Ortigalita faults lie within about 10 to 20 kilometers of the western boundary.

The water bearing geologic formations within the GMA typically are comprised of continental deposits of Late Tertiary to Quaternary age. These deposits include the Tulare Formation, older alluvium, flood basin deposits, terrace deposits, and younger alluvium. The cumulative thickness of these deposits ranges from a few hundred feet near the Coast

Range foothills west of the GMA to about 3,000 feet along the trough of the valley east of the GMA (DWR, 2003).

The Tulare Formation is composed of beds, lenses, and tongues of clay, sand, and gravel that have been alternately deposited in oxidizing and reducing environments (Hotchkiss, 1972). The Tulare Formation dips eastward from the Coast Range in the west towards the trough of the valley. The total thickness of the Tulare Formation is about 1,400 feet (DWR, 2006). The Corcoran Clay occurs near the top of the Tulare Formation and confines the underlying fresh water deposits.

1. **Confined Aquifer:**

The confined zone underlying the clay stratum extends downward from the base of the Corcoran Clay to the base of fresh water (Page, 1971). Sierran Sand and Coast Range alluvium interfinger in a similar fashion as those of the semi-confined zone, except that Sierran sediments extend further to the west in the confined zone (Dubrovsky et al., 1991).

2. **Corcoran Clay Layer:**

The Pleistocene layer known as the Corcoran Clay layer, or E-clay, is continuous across much of the central and northern portions of the valley, near the trough of the valley. This layer is comprised of fine-grained lacustrine and marsh deposits that divide the aquifer system vertically into an upper semiconfined zone and a lower confined zone (Davis and DeWiest, 1966). Because of this, the underlying aquifer is typically designated the confined aquifer or zone in the regions where the Corcoran Clay occurs. The Corcoran Clay member of the formation underlies the basin at depths ranging from about 100 to 500 feet and acts as a confining bed (DWR 1981). The unconsolidated sediments of the valley floor taper toward the Coast Ranges, and the Corcoran Clay becomes discontinuous along the west margin of the valley, near the western limits of the GMA. Other, less-extensive, younger, continuous fine-grained lacustrine layers also exist at depths shallower than

the Corcoran Clay. However, these other lacustrine layers do not appear to extend into the GMA.

3. Semiconfined Aquifer:

In the area of the GMA, overlying the Corcoran Clay is the semiconfined zone. It is comprised of sediments derived from the Coast Ranges on the west interfingered to the east with sediments derived from the Sierra Nevada. These sediments comprise the older alluvium, younger alluvium and terrace deposit layers. The Coast Ranges and Sierran sediments differ in their hydrogeologic characteristics. The Coast Range sediments consist of beds, lenses, and tongues of clay, sand, and gravel, and form most of the sedimentary material deposited west of the San Joaquin River (Hotchkiss, 1972). Although there are no distinct continuous aquifers or aquitards within the Coast Range alluvium, the term "semiconfined" is used to emphasize the cumulative effect of the vertically distributed fine-grained materials. The Sierran sediment that interfingers with the Coast Range alluvium is well sorted, medium to coarse-grained micaceous sand derived from the Sierra Nevada. The uppermost expression of the interface between the Coast Ranges and Sierran deposits is close to the eastern boundary of the GMA.

Across much of the San Joaquin Basin, a layer of older alluvium consisting of loosely to moderately compacted sand, silt and gravel deposited in alluvial fans during the Pliocene and Pleistocene ages overlies the Tulare Formation. The older alluvium is widely exposed between the Coast Range foothills and the Delta. The thickness of the older alluvium is up to about 150 feet. It is moderately to locally highly permeable.

A layer of younger alluvium overlies the layer of older alluvium. This layer includes sediments deposited in the channels of active streams as well as overbank deposits and terraces of those streams. They consist of unconsolidated silt, fine to medium grained sand, and gravel. Sand and gravel zones in the younger alluvium are highly permeable and, where saturated, yield significant quantities of water to wells. The thickness of the younger alluvium near Tracy is less than 100 feet (DWR, 2006). Further south, terrace deposits of

Pleistocene age lie up to several feet higher than present streambeds. They are composed of yellow, tan, and light-to-dark brown silt, sand, and gravel with a matrix that varies from sand to clay (Hotchkiss 1971). The water table generally lies below the bottom of the terrace deposits.

In the northern portion of the GMA, flood basin deposits occur (DWR, 2006). They are the distal equivalents of the Tulare Formation and older and younger alluvial units and consist primarily of silts and clays. Occasional interbeds of gravel occur along the present waterways. Because of their fine-grained nature, the flood basin deposits have low permeability and generally yield low quantities of water to wells. The flood basin deposits are generally composed of light-to-dark brown and gray clay, silt, sand, and organic materials with locally high concentrations of salts and alkali. Occasional zones of fresh water are found in the basin deposits, but they generally contain poor quality groundwater. The maximum thickness of the flood basin deposits is about 1,400 feet.

E. HYDROLOGY

The following sections discuss the surface and groundwater hydrology of the area. Hydrologically, the GMA has inflow from outside bringing water supplies into the area. Inflows include diversions into the GMA from the San Joaquin River, the streams and channels conveying storm runoff from the east side of the Coast Range Mountains, the network of canals conveying surface water south from the Delta, subsurface groundwater flowing in from the southwest, and precipitation. Outflows from the GMA include surface runoff to the San Joaquin River, groundwater flow moving towards the trough of the valley and exiting the GMA, groundwater discharged to the San Joaquin River system, evaporation, canals and drainage ways conveying water ouside the GMA, and crop and phreatophyte evapotranspiration.

1. Surface Hydrology:

Streams flowing from the Sierra Nevada and Coast Range mountains that drain into the northern two-thirds of the San Joaquin Valley empty into the San

Joaquin River and drain northward to join the Delta. Historically, the rivers and streams in the southern one-third of the San Joaquin Valley had no natural drainage connecting to the ocean, but rather drained into Tulare and Buena Vista Lakes. Seasonal flooding would occur along these rivers and streams in spring as rainfall and snowmelt from the mountains drained to the valley floor. A number of dams placed along the major watercourses, particularly in the Sierra Nevada Mountains, have alleviated the flooding. The majority of the runoff that drains into the San Joaquin River is derived from the rainfall and snowmelt from the western side of the Sierra Nevada Mountains. These rivers typically drain southwest to west out of the Sierra Nevada Mountains, turning north at the trough of the valley floor, where the San Joaquin River is located.

The ephemeral streams of the eastern side of the Coast Range Mountains typically drain east to northeast out of the mountains towards the trough of the valley floor. Many of these streams only flow during torrential winter storms and for very short periods following. In the past many of these ephemeral streams would drain out onto the valley into wetlands and infiltrate before reaching the San Joaquin River. This infiltrated water would supply base flow for the San Joaquin River and recharge groundwater. Many of these ephemeral streams have been transected by canals and highways, their drainage courses diverted, and agriculture reclaimed and drained much of the wetlands and lakes. Much of the surface hydrology of the San Joaquin Valley is controlled by man-made structures and practices. Surface waters in the San Joaquin Valley are frequently conveyed into and out of the valley by a network of large canals that supply users' needs in areas far from the natural source. Large man-made reservoirs are used to retain and store runoff from the mountains and temporary surface water being conveyed to other locations.

Consistent with most of the San Joaquin Valley, within the GMA, much of the surface hydrology is governed by the man-made structures, agricultural practices, and urbanization. A notable few ephemeral streams convey water into the GMA from the east side of the Coast Range Mountains. These streams include: Corral

Hollow Creek, Lone Tree Creek, Hospital Creek, Ingram Creek, Del Puerto Creek, Crow Creek, Salado Creek, Orestimba Creek, and Garzas Creek. North of Tracy, a network of sloughs and river channels intertwine as the San Joaquin River system and nearby streams form a large flat low lying Delta system that drains the San Joaquin Valley. Some areas within the GMA are relatively flat, and groundwater can be seasonally shallow. These conditions may create seasonal wetlands where the drainage has not been modified. The San Joaquin River flows along the eastern boundary of the GMA and is a major source of water to the GMA.

Besides the natural water conveyance systems, some major canals convey water from the Delta, to and through the GMA. These canals include the California Aqueduct and the DMC. Other smaller canals in the network convey surface water supplies to the users and drain runoff from areas within the GMA. The DMC is a major water supply source to the GMA.

2. Subsurface Hydrology:

Groundwater in the region occurs in three water-bearing zones (DWR, 2006). These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits, and a shallow zone which contains semi-confined and unconfined water to within about 25 feet of the land surface.

Agricultural irrigation in the GMA provides most of the recharge water of the semiconfined zone through seepage losses occurring in irrigation water conveyance channels and by deep percolation of applied water. Other sources of recharge include seepage from creeks and rainfall. Occasional recharge from the creeks that enter the GMA from the Coast Ranges to the west is relatively small compared to the other sources (KJC, 1990). Recharge to the lower confined zone occurs primarily by infiltration downward from the unconfined zone through the Corcoran Clay.

Groundwater pumping from below the Corcoran Clay in the GMA is likely to increase percolation through the clay layer.

Historically, groundwater flow was northwestward parallel to the San Joaquin River (Hotchkiss and Balding, 1971). More recent data shows flow tending northeastward, toward the San Joaquin River (DWR 2003). The groundwater flow direction towards the San Joaquin River typically causes subsurface outflow laterally along the eastern boundary of the GMA. The hydraulic gradients west of the San Joaquin River are generally steeper than those east of the river (Phillips, et al., 1991). Typically, notwithstanding local influences, the water table west of the San Joaquin River can be thought of as a subdued replica of the ground surface topography, sloping gently toward the river from the Coast Ranges.

The previous GMP (Stoddard & Associates, 1996) indicated that the average groundwater level from 1986 through 1993 have declined in the subbasins, but from 1993 through 1994, water levels rose throughout the study area, demonstrating recovery in the groundwater storage system. That report concluded that the study area was in a hydrologically balanced condition over the study period.

As a part of this planning effort, changes in groundwater levels were examined over the 1993 to 2004 period.

From 1993 through 1998, the groundwater levels continued to rise throughout most of the GMA (Figure 4). This pattern reversed during the 1998 to 2004 period (Figure 5). Figure 6 shows lines of equal change of groundwater levels for selected wells from 1993 through 2004. The influence of Tracy on the groundwater levels in the vicinity can be observed. The northern part of the subbasin (From Tracy to Westley) shows a depression in groundwater levels up to 5 feet below the surrounding levels. This depression could be a developing overdraft condition in that area. The exception for the overdraft condition is the area west of Vernalis where groundwater levels rose during the time period, indicating recharge in the area exceeded use. No overdraft condition appears to be occurring in this

area. From Westley through the southern border of the GMA, water levels slightly rose on the east (along CA-33), and appreciably dropped on the west (along I-5). During this period the water levels underlying the vicinity of Patterson appeared to have minimal change. This appears to indicate equilibrium between recharge and use during the period.

Figure 7 shows lines of equal elevation of groundwater for selected wells during the spring of 2004 and the direction of groundwater flow throughout the study area. The flow direction arrows show groundwater in the study area generally flows northeast towards the San Joaquin River.

The DWR groundwater database utilized different wells for water level measurements between 1993 and 2004 for the central part of the GMA (West Stanislaus ID and Patterson WD). For this reason, it is difficult to establish the groundwater level change for the period analyzed in this study. Data from close by monitoring wells was used when there was no other information available.

F. GROUNDWATER QUALITY

The USGS, between March and July 1985, analyzed water samples from 44 wells in the northern part of western San Joaquin Valley (Dubrovsky, et al., 1991). Their objective was to assess the geochemical relations and distribution of major ions and selected trace element concentrations in groundwater of the area. Their results indicate a relatively better quality of water in the confined zone than in the semiconfined zone. These results were supportive of those of Hotchkiss and Balding (1971). Concentrations of selected constituents reported by USGS (Dubrovsky, et al., 1991) in both zones are provided in Table 3. It was concluded that the areal and vertical distributions of groundwater of varying quality has been affected by different agricultural and natural sources of recharge, and the sources and geochemical nature of the sediments are products of a depositional environment.

TABLE 3
Chemical Analysis of Selected Constituents in Groundwater

State Well No.	Sampling Date	Sulfate	TDS	N	Boron	As	Se
		(mg/L)				(µg/L)	
Upper Zone							
2S/5E-13P1	3/28/85	320	1400	9.1	2.2	<1	4
3S/6E-7E1	3/11/85	230	1100	6.4	1.6	1	2
4S/7E-33B1	3/12/85	370	1400	0.13	0.90	3	10
5S/7E-1M2	5/01/85	120	750	18	0.58	<1	2
5S/8E-22C1	4/30/85	1200	2400	0.9	2.2	3	13
6S/8E-4P1	5/16/85	540	1300	15	0.51	<1	4
7S/8E-13N1	3/26/85	300	1900	11	0.64	<1	<1
8S/8E-1H1	3/27/85	120	750	11	0.48	<1	2
Lower Zone							
2S/5E-21D1	3/27/85	220	650	2.3	1.3	1	3
2S/6E-20L2	5/21/85	140	510	<.10	0.57	5	<1
3S/5E-20A2	3/28/85	330	920	1.4	3.0	<1	2
3S/6E-26Q1	3/12/85	120	710	5.6	0.79	<1	1
4S/6E-9M1	3/13/85	44	340	9.1	0.43	<1	2
4S/7E-36Q3	3/13/85	120	690	8.3	0.59	<1	1
5S/7E-27B1	5/16/85	190	760	16	1.2	1	5
5S/8E-32K3	4/30/85	530	1000	4	0.67	1	11
6S/7E-1R1	5/16/85	630	1300	9.6	0.86	1	6
6S/8E-3R2	5/16/85	360	820	6.4	0.41	2	8
7S/8E-27Q1	5/13/85	56	650	10	0.47	<1	<1

1. Hydrochemical Facies:

Chemical analyses of groundwater from the semiconfined zone shows considerable variation in water type and concentration of dissolved solids (Hotchkiss and Balding, 1971). In general, the chemical character of the water in the upper water bearing zone (except near Patterson and Crows Landing) is a transitional type, i.e., groundwater in which no single anion or cation reacting value amounts to 50 percent or more of the total reacting values. The transitional type groundwater in the GMA occurs in many combinations.

Groundwater near Tracy is very hard. Northwest of Tracy, in the vicinity of the Tracy pumping station, groundwater is a chloride type. The sodium chloride type

groundwater in the area northwest of Tracy is probably due to infiltration of water from Old River. Old River water varies from transitional chloride bicarbonate to sodium chloride type (Hotchkiss and Balding, 1971).

Sulfate type groundwater occurs in areas located west of Patterson and Crows Landing. Near Patterson, groundwater is sodium magnesium sulfate type to the west and sodium calcium sulfate type to the east. Waring (1915) mentioned some small sulfur springs on Crow and Orestimba Creeks, indicative of sulfate bearing deposits that are probably responsible for the sulfate groundwater type in the area near Patterson (Hotchkiss and Balding, 1971).

2. Dissolved Solids:

Results of the USGS sampling study showed that in the semi-confined zone the total dissolved solids (TDS) concentration ranges from 1,000 to 1,500 mg/L. Areal distribution of the data shows a high TDS concentration (>1,500 mg/L) in groundwater in the semiconfined zone measured near Patterson and west of Newman, and low concentration (<1,000 mg/L) is reported near the community of Westley. The TDS concentration in water in the confined zone generally ranged between 500 and 1,000 mg/L. Although high TDS concentrations (>1,000 mg/L) in water in the confined zone have been reported southwest of Patterson by the USGS, Patterson has reported TDS concentrations between 600 and 1,000 mg/L (Patterson, 2004). Low TDS concentrations (<500 mg/L) have been measured west of Vernalis. The distribution of TDS in groundwater in the two zones has shown little similarity.

3. Sulfate:

Sulfate concentrations vary greatly in both water-bearing zones, but areal distribution is similar in both zones. Highest sulfate concentration in groundwater (>500 mg/L) is measured in an area centered near Crows Landing and Patterson. A similar area of high sulfate concentration was also reported by Hotchkiss and Balding (1971) and is likely related to the Coast Range streams that recharge this area (Hotchkiss and Balding, 1971). Smaller sulfate concentrations were reported in 2004

by Patterson, which detected concentrations in a range between 190 and 380 mg/L (Patterson, 2004). In 2004, Tracy reported groundwater sulfate concentrations between 160 and 330 mg/L (Tracy, 2004). The lowest concentrations of sulfate in groundwater (<100 mg/L) were measured in an area south of Vernalis. The similarity of sulfate concentrations in both zones in the GMA could result from the presence of similar sulfate concentrations in the streams that were the major source of recharge under natural conditions over a long period of time. In addition, mixing of groundwater between the two water bearing zones occurs due to wells that are screened in both the upper and lower zone.

4. Boron:

Concentrations of boron in groundwater range from 0.51 to 2.2 mg/L in the semiconfined zone and from 0.41 to 3.0 mg/L in the confined zone. Areal distribution of boron in the semiconfined zone shows high concentrations (>0.75 mg/L) near Tracy and northeast of Crows Landing near Patterson. The areal distribution of boron in the confined zone shows high boron concentrations (>0.75 mg/L) near Tracy, Vernalis and west of Patterson. This agrees with the results presented by Tracy (Tracy, 2004). The U.S. Environmental Protection Agency (EPA) suggested criterion for boron concentration in water used for long-term irrigation of sensitive crops is 0.75 mg/L. This limit was exceeded in four samples in the semiconfined zone and five samples in the confined zone (Table 2).

5. Arsenic:

Recently, the federal primary drinking water standard maximum contaminant level (MCL) for arsenic was lowered from 50 µg/L to 10 µg/L. This change became effective for all states as of January 23, 2006 (DHS, 2006). Currently, the California standard is consistent with the federal standard. Arsenic is typically derived by dissolution of igneous parent materials, and released from iron and manganese oxides when pH declines. Based on the USGS study, arsenic concentrations in the groundwater samples from the semi-confined aquifer in the GMA vicinity ranged between 1 and 38 µg/L, which at that time were below the MCL (Dubrovsky, et al,

1991). Based on the USGS study, arsenic concentrations in the groundwater samples from the confined aquifer in the region ranged between 1 and 18 µg/L. Within the GMA the highest reported arsenic concentrations were 3 µg/L and 5 µg/L, respectively. In both aquifers, arsenic concentrations were reported that exceeded the current MCL in the vicinity of the GMA, but none within the GMA. The arsenic distribution between the groundwater in the semi-confined and confined aquifers showed little difference. However, the areal distribution showed an increase in arsenic concentrations in the GMA toward the southeast. The concentrations increased in the Sierran sediments. The increase is probably related to the higher proportion of Sierra sediments in the profile towards the southeast. In their respective water quality reports, Tracy reported arsenic concentrations as high as 3 µg/L, and Patterson reported arsenic concentrations as high as 6 µg/L, which are below the current MCL (Tracy, 2004; Patterson, 2004).

6. Selenium:

Selenium concentrations in the GMA groundwater range from a less than detectable limit of 1 µg/L to 13 µg/L (Table 3). The current MCL for selenium in drinking water is 50 µg/L. The selenium MCL concentration was equaled or exceeded in two samples from the unconfined zone and in one sample from the confined zone. The concentration and areal distribution of selenium were similar in both zones. Selenium concentrations are relatively high (10 µg/L) in a narrow area of both zones between Patterson and Crows Landing. Lower concentrations (between 3 and 8 µg/L) were reported in 2004 by Patterson (Patterson, 2004). In the Tracy and Vernalis area, the selenium concentrations range between 1 µg/L to 5 µg/L. The USGS (Dubrovsky, et al., 1991) study concluded that selenium was transported to the area under natural conditions by runoff from the Coast Range.

7. Nitrate:

The MCL for nitrate in drinking water is 45 mg/L. The USGS (Dubrovsky, et al., 1991) sampling study indicated that no well water in the GMA exceeds the MCL for nitrate. This agrees with the results presented by Tracy (Tracy, 2004) and

Patterson (Patterson, 2004). However, Dubrovksy et al (1991) mentioned that there were reports of nitrate MCL exceedence in shallow domestic wells. In general, higher nitrate concentrations in groundwater exist along the west side of the GMA and in the Westley area. The areas along the San Joaquin River have lower nitrate concentrations (Hotchkiss and Balding, 1971).

8. **Trace Elements:**

The Deverel et al. (1984) study (reported by Dubrovsky, et al., 1991) states that the shallow groundwater, near the top of the semiconfined zone and less than 30-feet below the land surface, generally has higher trace element concentrations than the deeper zones. This study indicates that the higher trace element concentrations in the shallow groundwater might correlate with the generally higher TDS concentrations in the shallow groundwater. The higher concentrations probably result from leaching of soil salts and evaporative concentration of shallow groundwater near the land surface.

Because of the high variability of groundwater quality in the GMA, focused groundwater supply investigations are necessary to determine if groundwater is suitable for the intended use. Additionally, management practices must be designed to maintain or improve groundwater quality to meet the differing needs of the users within the GMA.

IV. MANAGEMENT OBJECTIVES

As it was stated before, typically, this regional program will rely on the PAs to develop the specific programs and projects to meet management objectives that address local groundwater concerns while considering regional interests.

There are general objectives that should be considered for management of groundwater resources within the GMA:

- Assure an affordable groundwater supply for the long term needs of the users.

- Prevent long-term depletion of groundwater resources, and maintain adequate groundwater supplies for all users.
- Maintain groundwater quality to meet the long-term needs of users.
- Attempt to reduce or prevent inelastic land subsidence due to groundwater overdraft.

V. PROGRAM COMPONENTS RELATING TO MANAGEMENT

During recent years, there have been several groundwater management activities undertaken by various agencies and individuals in the GMA to protect the groundwater resources. Previous activities within the GMA are detailed by Stoddard & Associates (1996). The following activities can be mentioned as examples of the PAs actions:

- In 1996, the PAs included in the Northern Subbasin Groundwater Management Area under the leadership of the SLDMWA, developed the Northern Subbasin Groundwater Management Plan (NSGMP) under AB 3030 (Stoddard & Associates, 1996). The implementation of this plan provided the means for collection of the necessary monitoring data needed to assess the impact of activities that affect the groundwater basin such that sustained use of groundwater could be optimized without adverse impacts to the water quality and yield.

- A Groundwater Monitoring Program was prepared in 1999 as the first step in the implementation of the NSGMP (Stoddard & Associates, 1999). This program was designed to utilize existing agricultural and public water supply wells to monitor regional changes in groundwater quantity and quality in the semiconfined and the confined zones. The program outlined networks of wells for water level and water quality monitoring, proposed monitoring frequencies for each network, and proposed new monitoring well locations for future inclusion in the networks. Maps depicting the location of wells in each network were presented and relevant construction data were tabulated. To date, the monitoring program has not initiated groundwater quality measurements. Under this program, the groundwater levels are measured twice a year.

- In June 2000, San Joaquin County adopted the Groundwater Export Ordinance to prevent the deliberate export of groundwater for use outside of the County and placed conditions on the extraction of banked groundwater by out-of-County partners without a permit. Under the Ordinance, the County seeks to foster prudent water management practices to avoid significant adverse overdraft and related environmental, social, and economic impacts.

- The SJCFCWCD developed the San Joaquin County Water Management Plan, which was adopted in 2002. This plan addresses overdraft conditions, prevents further degradations of groundwater quality due to saline water intrusion, increases water supply reliability, meets the projected year 2030 county water demand, identifies viable water supply and recharge options, and identifies the institutional structure to implement the options (Camp Dresser and McKee, 2001).

The passage of SB 1938 requires a GMP to include components relating to the management of groundwater levels, groundwater quality, inelastic land surface subsidence and changes in surface flow and water quality that directly affect groundwater levels or quality, or are caused by groundwater pumping.

The following sections discuss how these components are included in the GMP, identify elements to be included in potential programs, and briefly describe the related activities within the GMA.

A. COMPONENTS RELATING TO GROUNDWATER LEVEL MANAGEMENT

1. Reduction of groundwater use by development of new surface water supplies.

Agencies buy water from out-of-basin sellers to supplement their supplies.

Activities within the GMA: Tracy is participating with the cities of Manteca, Lathrop, Escalon and the South San Joaquin Irrigation District in the South County

Surface Water Supply Project (SCSWSP), to bring high quality Sierra Nevada water from the Stanislaus River to cities for their urban use. The intent of the project is to reduce the reliance on groundwater and to satisfy future urban demand increases. A water treatment plant on the Stanislaus River uses water that the irrigation district has conserved from improvements in irrigation practices and water efficiencies. Water is taken from Woodward Reservoir, treated to drinking standards, and conveyed to the cities. Water deliveries commenced in July 2005.

2. Increased use of available surface water supplies.

There are some in-basin water transfers and purchases from agencies to others with limited water rights overlying areas having more depressed groundwater levels.

Activities within the GMA: Surface water purchases by Tracy from West Side ID and Banta Carbona ID, and the use of Byron-Bethany ID CVP water supply for M & I purposes.

3. Development of overdraft mitigation programs.

According to the DWR definition, overdraft occurs when continuation of present water management practices would probably result in significant adverse overdraft related impact upon environmental, social, or economic conditions at a local, regional, or state level. Long-term depletion of storage can cause several problems, including land subsidence, degradation of groundwater quality, and increased pumping costs.

Although overdraft of the entire basin is not occurring, conditions of localized overdraft could happen, since areas of extraction do not typically coincide with areas of recharge. One portion of the GMA can experience an increase in groundwater storage while another shows a continual decrease. Such localized overdraft can cause the same adverse impact as basin-wide overdraft, except on a smaller scale. Monitoring of groundwater levels and water quality is necessary to identify areas where localized overdraft is occurring, and to evaluate its effect. The

monitoring will allow the overdraft to be quantified, which is needed to evaluate means to control or reverse the overdraft. Curtailing local overdraft usually requires increasing or redistribution of basin surface water supplies or reducing the amount of groundwater pumped.

The prerequisite to implementation of an overdraft mitigation program is to monitor groundwater levels. Once groundwater trends are known, a responsive overdraft investigation program should be developed around the following components:

- Identify areas of overdraft.
- Determine the potential for significant adverse impact due to the overdraft.
- Formulate a plan to mitigate the impact and a strategy for plan implementation.

Activities within the GMA: The programs described in 1 and 2 above.

4. Development of conjunctive use programs and projects.

Conjunctive use of groundwater and surface water typically occurs when the surface water supply varies from year to year and is insufficient at times to meet an area's demand. In some years, the surface water supply is greater than the water demand; and in other years, the surface water supply cannot meet the entire water demand. In the years when water is plentiful, water available above the demand is utilized to recharge the groundwater aquifer. Recharge can occur either directly by operation of recharge facilities or injection wells, or indirectly, by applying surface water where available to areas to avoid the use of groundwater. In effect, the groundwater basin is utilized as a storage reservoir, and water is placed in the reservoir during wet periods and withdrawn from the reservoir during dry periods.

There are opportunities for conjunctive use in the study area that could increase overall water supply yield; however, each must be evaluated in terms of

available water supply, basin geology, available storage capacity, pumping zones, and recharge potential to determine yield, costs, and potential adverse impacts. In the GMA, pumping takes place primarily from the confined zone, while unoccupied aquifer storage is available only in the unconfined zone. Based on the basin characteristics, water supply sources, and current groundwater usage, potential conjunctive use opportunities should focus on the following:

- Identifying areas of local overdraft and evaluating the viability of a recharge program using direct recharge.
- Evaluating the availability of additional surface water supplies, which could be utilized in conjunctive use programs either directly or via exchange of CVP supplies.
- Optimizing the overall groundwater yields during dry periods through sound basin management

In recent history in the GMA, conjunctive use has been practiced in an unmanaged fashion. When full CVP water supplies are being received, relatively little pumping occurrs. During the water short periods of 1976-1977 and 1989-1992, water was withdrawn from the aquifer to make up for the deficits in surface water supply.

Activities within the GMA:

a- Patterson Irrigation District pumps groundwater on an as needed basis. The District has focused its efforts on improving surface water delivery and pumping efficiencies by recycling surface drainage as opposed to limiting canal seepage. Deep perculation of irrigation water and distribution system seepage/losses, enter the groundwater aquifer and is either stored there or is lost as baseflow into the San Joaquin River. The stored groundwater supply is available to the District during drought conditions. Such recharge is important to the District to recharge the groundwater supply (Patterson ID, 2005).

b- DWR has implemented, through its Conjunctive Water Management Program (CWMP), several integrated programs to improve the management of groundwater resources in California. The program emphasis is on forming partnerships with local agencies and stakeholders to share technical data and costs for planning and developing locally controlled and managed conjunctive water use projects. DWR and SJCFCWCD entered into a Memorandum of Understanding to cooperatively develop a CWMP, establish an advisory committee representative of all water stakeholders, and complete a basin management evaluation (DWR, 2006).

c- Tracy is evaluating the use of the Tracy groundwater basin for water storage, as a way to increase the reliability of the City's water supply during droughts or reduction in surface water imports. This consists of injecting surface water treated to drinking water standards into the aquifer via deep wells during times of surplus water and recovery of that potable water from the aquifer to optimize water quality and meet seasonal peak demands during droughts or when emergency or disaster scenarios preclude the use of imported water supplies. Tracy anticipates that, under this Aquifer Storage and Recovery (ASR) program, approximately 3,000 acre-feet (af) of high-quality groundwater would be available in drought years, thereby increasing the reliability of Tracy's water supply and closing the potential future gap between supply and demand during drought or emergency conditions (EKI, 2005).

d- Tracy is also studying the possibility of procuring surface water storage to increase water supply reliability. Tracy is evaluating the potential to buy water storage capacity in the Semitropic Water Banking Project (Semitropic) in Kern County. In order to store water in Semitropic, Tracy would not withdraw a portion of its CVP water from the DMC, such that this water would move through the DMC and California Aqueduct systems for

delivery to Semitropic. During a drought, Semitropic would pump the stored water into the California Aqueduct and a like amount of water would be made available to Tracy to pump from the DMC. Tracy is currently in negotiations with Semitropic to purchase up to 10,500 af of storage volume. If this storage were secured, it would provide Tracy with up to 3,500 af of water annually for three years during water short periods (EKI, 2005).

5. Development of agricultural and urban incentive based conservation and demand management programs.

Reduction of demand, either urban or agricultural, should be an important component of the long-term planning and management of water resources. It reduces the need for new water supply projects, often at relatively low cost, and assists in making prudent use of the available supplies.

The experience of active urban water conservation programs in California is that the potential for water savings are initially about 10 to 20 percent of the volume of water used. Such programs typically include distribution system leak-reduction programs, household metering, tiered pricing to discourage high use, education of children and the public and market-enforced transition to water-saving household plumbing devices.

The greatest potential for agricultural water conservation relies mainly on the use of more efficient irrigation technologies. Increasing irrigation efficiency decreases the amount of water that is lost to the system or leaves the site through surface water runoff or deep percolation to groundwater.

From the hydrologic system perspective, the water conservation efforts must be planned locally, taking into account groundwater levels, groundwater quality, and groundwater supply.

Activities within the GMA:

a- Tracy developed a Water Conservation Plan in 2000. The conservation efforts include implementation of the California Urban Water Conservation Council's (CUWCC) 14 Best Management Practices (BMPs). The BMPs include residential water surveys, system water audits and leak detection, water pricing to encourage conservation, waste prohibitions, public information, landscape guidelines, etc.

b- An update of the Urban Water Management Plan (UWMP) for Tracy was prepared in 2005 to fulfill the UWMP Act requirements. This UWMP describes how Tracy intends to manage its current and future water resources and demands to continue to provide its customers with an adequate and reliable water supply. This updated UWMP reflects changes to the Tracy's water supply portfolio and water demands since 2000 (EKI, 2005).

c- Many of the PAs have completed agricultural water conservation plans and periodically update the plans pursuant to the Central Valley Project Improvement Act. In these plans, water conservation practices have been identified and instituted to maximize beneficial use of the water supply. Practices include better irrigation management, physical improvements, and institutional adjustments. Irrigation management practices include on-farm water management and district water accounting, use of efficient irrigation methods, and on-farm irrigation system evaluations. Physical improvements include lining of canals, replacement of unlined ditches with pipeline conveyance systems, and improvement of on-farm irrigation and drainage technology. Institutional adjustments include improvements in communication and cooperative work among districts, water users, and state and federal agencies, increased conjunctive use of groundwater and surface water, and facilitating the financing of on-farm capital improvements. Other practices that have been instituted include installation of flow measuring devices, modification of distribution facilities to increase the flexibility of

water deliveries, and changes in the water fee structure to provide incentive for more efficient use of water.

The water conservation plans have helped the districts identify the opportunities for better irrigation water utilization.

B. COMPONENTS RELATING TO GROUNDWATER QUALITY MANAGEMENT

1. Protection and mitigation of groundwater contamination.

Contaminants addressed in this section are those that result from improper application, storage or disposal of petroleum products, solvents, pesticides, fertilizers and other chemicals used by industry, and are distinguished from salinity degradation. The SLDMWA's role in protecting groundwater from contamination by point sources will be supporting the Regional Water Quality Control Board (RWQCB), whose primary responsibility is enforcing water quality regulations, in the respective counties. The SLDMWA will help develop a better understanding of the regional hydrogeology of the GMA, the vertical and lateral groundwater flow directions, and groundwater quality based on the various groundwater monitoring activities supporting this program. The PAs shall make the appropriate regulatory agencies aware of changes in groundwater quality, which may indicate that new sources of contamination or changes in existing plumes of contamination are occurring.

Activities within the GMA:

a- The San Joaquin County Environmental Health Department (SJCEHD) carries out different management programs. The purpose of the "Underground Injection Control" program is to protect public health and the environment from exposure to contaminants that may exist in shallow underground injection wells, such as dry wells, seepage pits, sumps, etc. These injection wells could transport contaminants to soil and groundwater. The primary focus is on protection of groundwater from contamination.

Activities include identifying, mapping, inspecting and remediating potential or existing contaminant sources. The SJCEHD also permits and inspects well installation and destruction to minimize the potential for the wells to adversely impact groundwater.

b- The "Underground Storage Tanks (UST)" program was developed by SJCEHD to protect public health and the environment from exposure to hazardous materials stored in USTs. The primary focus is on protection of groundwater from contamination. Activities include inspection, permitting, monitoring, repair, installation and removal of USTs. UST sites with identified contamination are referred to the SJCEHD Site Mitigation Unit for cleanup oversight.

c- SJCEHD is also responsible for a "Site Mitigation Database". This contains information about all the known hazardous material contamination sites within San Joaquin County. The database was established in 1993, although it includes information as far back as 1985. It is available to the public.

d- The Stanislaus County Department of Environmental Resources, Hazardous Material Division has an UST program. The goal of the program is to protect public health, the environment and groundwater. UST inspectors make certain that businesses and facilities with ongoing UST operations are properly permitted and meet the monitoring requirements applicable to their type of equipment. The UST Program and the Site Assessment and Mitigation Program oversee UST removal and soil clean-up activities. The primary function of the Site Assessment and Mitigation Program in UST removal activities is to provide regulatory oversight for the site assessment and mitigation of properties where unauthorized releases from UST systems have occurred.

e- The State Water Resources Control Board (SWRCB) developed a UST program which purposes are to protect public health and safety and the environment from releases of petroleum and other hazardous substances from tanks. By 2005, there were approximately 2,650 open UST cases in the Central Valley Region. There are four program elements: leak prevention program (requirements for tank installation, construction, testing, leak detection, spill containment and overfill protection), cleanup of leaking tanks, enforcement, and tank tester licensing. In addition, there is a database and geographic information system (GIS), Geo Tracker, that provides online access to environmental data (http://www.geotracker.waterboards.ca.gov/). It tracks regulatory data about underground fuel tanks and public drinking water wells, as well as other types of sites, such as above ground storage tanks and site cleanup cases (SWRCB, 2006).

2. Development of saline water intrusion control programs.

Groundwater quality within an aquifer can be permanently degraded if saline groundwater migrates into the aquifer. Such degradation has the potential to render the groundwater unsuitable for some uses, particularly potable water use, if not treated. Desalination treatment systems are very expensive. In the GMA, saline water intrusion does not occur from an ocean or saltwater body; instead, it results from: naturally occurring salts present in the soil, salts imported with surface water, and other activities on the land surface.

When water is applied for irrigation purposes, plants consume the water for plant growth leaving excess salts in the soil profile. Water is applied to crops in amounts in excess of the crop consumptive use requirement, so there is sufficient water to migrate downward and carry these salts beyond the crop root zone. This water also carries naturally occurring salts that are dissolved from the soil profile. Chemical fertilizers used in agricultural production, and percolation of effluent from waste treatment facilities also contributes salts to the groundwater basin. Without a

means to remove the accumulated salts, the salts remain in the basin and ultimately increase the salinity of the groundwater.

Due to the nature of the processes, shallower groundwater is the first to degrade and a vertical water quality gradient is established, with the poorer quality water in the upper zones and the better quality water in the deeper zones. In the GMA, the best quality water typically occurs in the confined zone just below the Corcoran Clay.

While it is recognized that there is slow groundwater quality degradation occurring due to the regional downward movement of surface salts, upwelling of deep saline groundwater may also be occurring. Both downward and upward migration may be accelerated due to increased groundwater pumping. During the 1976-1977 and 1986-1992 drought periods there were substantial increases in groundwater pumping that may have caused accelerated water quality degradation (Stoddard & Associates, 1996).

To maximize the sustainability of the groundwater basin, knowledge of the various water quality zones and groundwater flow patterns is necessary. Once this information is gained, groundwater management techniques can be evaluated to protect zones of high water quality so that the beneficial uses are protected. A program to minimize water quality deterioration due to saline water intrusion should contain the following elements:

- Analysis of groundwater data obtained from different Agencies.
- Identify areas where water quality monitoring and the groundwater flow patterns suggest a high probability of water quality degradation.
- Identify zones of marginal quality water, which can be used in conjunction by blending with surface water to increase water supply to reduce migration of saline water.

- Identify water management measures that may be employed to minimize the degradation.
- Cooperate in programs aimed at providing a way to export salts out of the GMA via some type of drainage program to export salts to provide a balance with imported salts.

Activities within the GMA: currently there are no related programs within the GMA.

3. Identification and Management of Wellhead Protection Areas and Recharge Areas.

The Federal Wellhead Protection Program established by Section 1428 of the Safe Drinking Water Act (SDWA) Amendments of 1986 was designed to protect groundwater resources of public drinking water from contamination, and to minimize the need for costly treatment to meet drinking water standards. A Wellhead Protection Area, as defined by the 1986 Amendments, is *"the surface and subsurface area surrounding a water well or well field supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water or well field."*

The California's Drinking Water Source Assessment and Protection (DWSAP) Program has been prepared in response to the 1996 reauthorization of the federal SDWA, which included an amendment requiring states to develop a program to assess sources of drinking water and encourages states to establish protection programs. The Department of Health Services (DHS) Division of Drinking Water and Environmental Management is the lead agency for development of the DWSAP Program and its implementation. Since California has not developed a wellhead protection program, the groundwater portion of the DWSAP will serve as the State's wellhead protection program (DHS, 1999).

According to the California Water Plan Update 2005 (DWR, 2005), recharge area protection includes keeping groundwater recharge areas from being paved over or otherwise developed and guarding the recharge areas so they do not become contaminated. Protection of recharge areas, whether natural or man-made, is necessary if the quantity and quality of groundwater in the aquifer are to be maintained. Existing and potential recharge areas must be protected so that they remain functional and they are not contaminated with chemical or microbial constituents. Zoning can play a major role in recharge area protection by regulating land-use practices so that existing recharge sites are retained as recharge areas.

In the GMA the primary source of recharge is from percolation of excess irrigation water. Incidental recharge sources include seepage losses from canals and ditches and from the westside streams that flow intermittently during the rainfall season. To protect recharge areas, the PAs should review applications for Waste Discharge Permits within and adjoining their boundaries that have the potential to degrade groundwater. Such waste disposal systems include disposal of dairy wastes, disposal of industrial wastes, sewage treatment plant effluent disposal, and solid waste disposal. Environmental documents for such facilities and Tentative Waste Discharge Permits issued by the RWQCB should be closely reviewed such that appropriate monitoring and mitigation measures are developed to preclude the possibility of migration of pollutants from the disposal sites. PAs should be on the lookout for existing and proposed land use activities that have the potential to degrade groundwater, so that appropriate action can be taken.

Activities within the GMA: Through programs administered by RWQCB, the California Integrated Waste Management Board (CIWMB) and the Department of Toxic Substances Control, the State of California regulates waste disposal. The PAs will rely on continued regulation by the State; however, the PAs will assist the State by identifying areas that are threatened or are the most susceptible to groundwater contamination.

4. Administration of Well Abandonment and Well Destruction Program.

State regulations require that all unused wells be properly abandoned or destroyed so that they do not act as conduits for mixing of groundwater of differing quality. Non-pumped wells are a much greater threat than pumped wells, since pumping normally quickly removes contaminants that may have migrated during idle periods. In gravel packed wells, the gravel pack as well as the casing itself can act as a conduit for mixing and potential contamination.

Permits are required from the applicable county or city for abandonment of wells within their jurisdiction. For public water supply wells, additional requirements may be prescribed by the DHS. Permit fees are normally required.

Activities within the GMA: The PAs rely on continued administration of the well abandonment and destruction program by the permitting agencies. The PAs' role in well abandonment and destruction is to provide available groundwater data, assist in identifying locations of operating and abandoned wells, and advise well owners why proper well destruction is important for protection of water quality.

5. Well Construction.

Improperly constructed wells can establish pathways for pollutants to enter from surface drainage and can cause mixing of water between aquifers of differing quality. Sections 13700 through 13806 of the California Water Code require proper construction of wells. The standards of well construction are specified in DWR Bulletins 74-81 and 74-90.

The counties and cities within the GMA have the fiduciary responsibility to enforce well construction standards. Well construction permits are required to drill a new well or to modify an existing well. Well Driller's Reports must be filed with the DWR and the respective counties.

The environmental health divisions of the respective counties maintain records on wells and groundwater quality because of their responsibility to enforce standards for construction and abandonment of wells, and for issuance of drinking water permits for small community water supply systems. These data are publicly available and should be collected to incorporate into regional monitoring. It should be supplemented with data on water levels and groundwater quality collected by other agencies to identify locations susceptible to intermixing of aquifer zones of varying water quality. The information should be used to establish specifications for well construction and destruction to optimize well water quality and minimize mixing of water between zones of varying water quality.

A better understanding of the subsurface geology and water quality is needed to define the confining beds between aquifer zones of differing water quality. Site-specific hydrogeologic investigations should be conducted to support well designs and should be submitted with the proposed well designs to obtain the well drilling permit.

Activities within the GMA: Merced and Stanislaus Counties have adopted the DWR standards. San Joaquin County has developed its own standards to better protect against migration of contaminants. The authority over well construction remains with the respective counties and cities. The PAs should request that the counties supply them with copies of well permits, logs, and studies to assist in their groundwater management activities.

6. Review of Land Use Plans to Assess Risk of Groundwater Contamination.

Land use planning is used by counties and cities for regulation of land uses within their boundary or sphere of influence to create a quality of life and to achieve compatibility between man's activities and the environment. It is a very effective method to mitigate impacts of changes in land use on groundwater quantity and quality.

Policies set forth in county general plans, city general plans, and community specific plans that affect groundwater may include:

- Regulating growth in groundwater recharge areas to protect water quality.
- Monitoring water quality and groundwater levels.
- Providing planning for proper disposal for solid waste, sanitary waste and storm runoff, and hazardous wastes generated by the community.
- Matching projected growth in water consumption to available water supplies.
- Mitigating the impacts of reduction in surface water supply resulting from conversion of land from agricultural use to urban use.

To achieve the common goals between the various land use plans and this GMP, close coordination between agencies is needed. During periodic land use plan preparation and updates, cities or counties should consult with the appropriate PAs to avail themselves of the latest information on hydrogeologic conditions that may be affected by proposed activities, so that appropriate mitigation measures can be included in the plans to avoid significant adverse impacts to the groundwater basin. Proposed land use plans and supporting environmental documentation should be reviewed and commented upon by the PAs.

C. COMPONENTS RELATING TO INELASTIC LAND SURFACE SUBSIDENCE

Reducing the amount of groundwater in storage by pumping could cause the dewatering of fine-grained geological formations, potentially resulting in land subsidence and a reduction in the storage capacity of the aquifer.

The management of the land subsidence would include monitoring and prevention programs. Management of land surface subsidence should contain the following elements:

- Establish a subsidence monitoring program. Benchmarks should be established at well locations, so it would be possible to relate the subsidence to groundwater extraction.
- Identify areas where monitoring suggest land subsidence.
- Identify management measures that may be employed to minimize the subsidence.

Activities within the GMA: Tracy established a subsidence-monitoring program in 2003. Benchmarks were established at each of the City's monitoring wells. An annual benchmark survey is performed in the spring of each year by using the Global Positioning System (GPS). The results of the Monitoring Program are presented in semiannual reports.

D. SURFACE WATER QUALITY AND FLOW

SB 1938 requires the inclusion of components relating to the management of changes in surface flow and water quality that directly affect groundwater levels or quality, or are caused by groundwater pumping. Specific actions may include:

- Use of surface water supplies when available in a recharge program or conjunctive use program that is sensitive to downstream users and the environment;
- Avoidance or mitigation of projects that detrimentally affect surface water quality and flow;
- Increase understanding of the interaction between surface water quality and groundwater through the GMA monitoring programs.

Activities within the GMA: The current and planned actions within the GMA related to recharge and conjunctive use are detailed in previous sections.

VI. GROUNDWATER MONITORING PROGRAM AND MONITORING PROTOCOLS

A. GROUNDWATER MONITORING PROGRAM

The purposes of a groundwater monitoring program are to identify areas of overdraft, provide information that will allow computation of changes in groundwater storage to determine net recharge or depletion, and identify the areas and extent of water quality degradation for potential mitigation. Groundwater level monitoring is essential to understand the impact on aquifer storage due to changes in water inflow and outflow components and in pumping activities. Mapping of groundwater levels depicts the direction of groundwater movement and the hydraulic gradient necessary for quantifying groundwater inflow and outflow to the GMA. Monitoring and mapping should be done independently in the unconfined and confined zones.

The monitoring program for this plan would rely on data collected by agencies like DWR, USGS, DHS, SLDMWA, PAs, Counties, and Cities. Groundwater levels and groundwater quality data would be reviewed individually or as a group during the PAs meetings, and the PAs would decide if additional monitoring programs are necessary to supplement information for areas where existing data indicates possible overdraft or water quality issues.

The agencies that collect groundwater data for this area are the following:

- **DWR**

  The DWR measures groundwater levels in monitoring wells, and develop databases for groundwater levels. Statewide groundwater level data are available for download at the Department's Groundwater Level Database website (http://wdl.water.ca.gov/). This site provides a graphical interface that allows selection of individual wells from a local area map. Data can also be retrieved by specifying the groundwater basin or township of interest. A selected well will return a groundwater level hydrograph and data table including the depth to water below

reference point, elevation of water surface and depth to water below land surface. This site maintains groundwater level information for nearly 18,000 wells within the San Joaquin District boundary and about 60,000 wells statewide.

- **USGS**

The USGS Ground-Water Data for the Nation database (http://waterdata.usgs.gov/nwis/gw) contains groundwater site inventory, groundwater level data, and water quality data. The groundwater site inventory consists of more than 850,000 records of wells, springs, test holes, tunnels, drains, and excavations in the United States. Available site descriptive information includes well location information such as latitude and longitude, well depth, and aquifer. The USGS annually monitors groundwater levels in thousands of wells in the United States. Groundwater level data are collected and stored either as discrete groundwater level measurements or as continuous record. The data available for this GMA is not updated.

- **SWRCB – USGS – Lawrence Livermore National Laboratory (LLNL)**

The SWRCB is collaborating with the USGS and the LLNL to implement the Groundwater Ambient Monitoring and Assessment Program (GAMA). Statewide, the GAMA Program was developed in response to the Groundwater Quality Monitoring Act of 2001 (Water Code sec.10780-10782.3). The goals are to improve statewide groundwater monitoring, and facilitate the availability of information about groundwater quality to the public. The data collected will provide an early indication of potential water quality problems. It will also be used to identify the natural and human factors affecting groundwater quality. Prior to 2003, the GAMA Program conducted the California Aquifer Susceptibility (CAS) Assessment. The CAS Assessment addressed the relative susceptibility to contamination of public wells. This effort was the foundation for the GAMA Program. The GAMA Program also addresses the quality of private/domestic drinking water wells through the Voluntary Domestic Well Assessment Project.

The groundwater basins in California were ranked in groups of sampling priority on the basis of the number of public wells, groundwater usage, and potential sources of groundwater contamination in each basin. Three types of water quality assessments will be conducted for each unit:

1. The assessment of current groundwater quality.
2. The detection of changes in water quality.
3. The assessment of natural and human factors that affect groundwater quality.

To facilitate a statewide, comprehensive groundwater quality-monitoring and assessment program most efficiently, uniform and consistent study-design and data-collection protocols are being applied to the entire state. The GAMA Program monitors groundwater for a broad suite of chemicals at very low detection limits, including exotic chemicals such as wastewater chemicals and pharmaceuticals. Monitoring and assessments for priority groundwater basins are to be completed every ten years, with trend monitoring every 3 years. The sampling for the Western San Joaquin Valley Unit will be performed during Fall 2007. The Report for the Northern San Joaquin Valley Unit can be found at http://pubs.usgs.gov/ds/2006/196/ds_196.dpf. More information about this program is available at http://www.swrcb.ca.gov/gama/ or http://ca.water.usgs.gov/gama/.

- **DHS - Division of Drinking Water and Environmental Management**

Every public water system in the State has to have the analyzing laboratory enter the results of all chemical monitoring to the Drinking Water Program, a water quality monitoring database. A CD containing the database can be purchased from the Monitoring and Evaluation Unit (Contact: Steve Book, Phone: 916-449-5566; sbook@dhs.ca.gov). For security reasons, DHS does not provide the coordinates of each well included in the database. However, a lot of general vicinity locational information is easy to deduce from names of the water systems.

- **SLDMWA**

The PAs cooperatively developed a comprehensive groundwater level and quality monitoring plan for the GMA (Stoddard & Associates, 1999). Currently, only the groundwater levels are monitoring twice a year in accordance to the plan. Other elements of the plan have not yet been implemented though implementation of additional elements may occur in the future. (Contact: Joe Martin, Phone: 209-832-6241; joe.martin@sldmwa.org.)

- **San Joaquin County**

The San Joaquin County Groundwater Data Center (GDC) is a countywide centralized groundwater information medium that provides access to groundwater data collected and shared by agencies throughout San Joaquin County. The county groundwater level monitoring program includes semi-annual measurements of over 550 wells, of which approximately 300 are measured by County Staff. The data collected is stored electronically in a database for further analysis. Over the internet, water interests are able to access historic groundwater data at: http://www.sjmap.org/groundwater/.

- **Stanislaus County**

The County has groundwater quality information available from the Public Water System data base. An appointment is necessary to gather that information. At this time, there is no groundwater level information available. (Contact: Tom Wolf, Phone: 209-525-6756)

- **City of Tracy**

Tracy developed a Mitigation Monitoring Program in 2001. The monitoring network consists of eight active production wells, four nested monitoring wells, and 18 clustered monitoring wells. Because of the design of the monitoring wells, data from those wells are considered representative of individual aquifer conditions and are generally of higher quality than the data obtained from production wells. Groundwater levels are obtained monthly, and water quality is collected quarterly.

This Program also includes a subsidence survey. The annual benchmark survey is performed in the spring of each year. The results of the Monitoring Program are presented in semiannual reports (GEI Consultants, 2005). (Contact: Steve Bayley, Phone: 209-831-4420; steve.bayley@ci.tracy.ca.us.)

B. MONITORING PROTOCOLS

SB 1938 requires the adoption of monitoring protocols in order to collect the groundwater data in a systematic and consistent manner. For this GMP, monitoring protocols would be defined based on goals of particular programs.

VII. IMPLEMENTATION OF THE GROUNDWATER MANAGEMENT PLAN

GMP implementation involves development of programs through cooperative efforts of the PAs. Implementation of some aspects of the plan may require considerable expenditures and formulas must be developed to allocate costs amongst the PAs. Implementation of regional groundwater management plans is ultimately less costly than implementation of plans by individual agencies, but the implementation strategy is complicated since the PAs have varied reliance on the groundwater resource. The priorities for implementation of the various elements of the GMP will vary from PA to PA. The potential benefits of regional planning within a common groundwater basin or subbasin far outweigh the difficulties of plan implementation. The cooperation of agencies increases the opportunities for water resource management.

In the GMA, the PAs can be generally separated into four categories:

1. Urban water users that currently rely exclusively or primarily on groundwater.
2. Agricultural water users who rely solely on groundwater for water supply.
3. Agricultural water users that rely on groundwater for supplemental supply.
4. Agricultural water users with sufficient surface water supply, with groundwater used only for incidental purposes.

Depending on the category, a PA will be willing to invest an appropriate amount of time, effort, and dollars in groundwater management and make the investment in those management elements that affect it the most. It cannot be expected that all agencies will invest equally in all the elements of the GMP. Hence, an implementation strategy must provide flexibility in the level of agency participation in each element of the plan. For instance, urban agencies and agricultural agencies that rely solely on groundwater supplies may be much more prone to invest in controlling saline water intrusion and localized overdraft; whereas, urban agencies may be the only ones interested in wellhead protection or controlling migration of contaminated groundwater. Participating in conjunctive use operations is obviously desirable for those PAs with water supply deficits, but may also be attractive to those with surplus surface supplies that can be used for recharge purposes.

With consideration given to the reliance upon groundwater by the PAs and the varying importance of the groundwater management elements, the recommended implementation strategy is as follows:

1. After public review and consideration of comments received, the final plan should be adopted by each agency.
2. The SLDMWA will coordinate plan implementation among the PAs.
3. A plan implementation committee made up of representatives of each PA will meet twice a year to review particular projects being implemented or considered by the PAs, and coordinate these projects under the regional GMP. The groundwater level and quality data, collected and analyzed, would be reviewed with the group at these meetings.
4. With consideration given to the identified problem areas, the committee shall establish a priority list for management actions.
5. Management activity groups will be formed of those participating agencies interested in implementing certain elements of the groundwater management plan to identify specific management actions, develop budgets, and apportion costs.

6. Once a year the PAs would submit a report to the SLDMWA summarizing their programs under each plan component for consideration by the PAs and for coordination purposes.

7. An annual summary would be prepared to report the current state of the basin and describe the management activity that has taken place for each plan element. It would be used to keep PAs and the SLDMWA abreast of the group's activities.

This implementation strategy is expected to be refined as necessary by the management committee.

Attachment D

San Joaquin Valley Drainage Authority

Westside San Joaquin River Watershed Coalition

Semi-Annual Monitoring Report
2008/2009 Non-Irrigation Season Report

Covering the period: September 2008 through February 2009
(Sampling Events 48 through 52, and Rain Event 7)

June 15, 2009

Prepared by:
Summers Engineering, Inc.
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SECTION 1: EXECUTIVE SUMMARY

In June, 2003, the San Joaquin Valley Drainage Authority (SJVDA) submitted a Conditional Waiver Report for the Westside San Joaquin River Watershed Coalition (Westside Coalition). The Westside Coalition watershed generally lies on the westside of the San Joaquin River from approximately the Stanislaus River on the north to 10 miles south of Mendota and encompasses an area of approximately 460,500 acres. There are approximately 4,000 landowners and 1,500 operators within the watershed. Most of the watershed receives water supplies from the Central Valley Project, while certain areas receive water from the State Water Project. In addition, some areas receive supplies from the San Joaquin River and local water sources, one area receives a Kings River supply, and some areas receive water from groundwater wells. The Delta-Mendota Canal and San Luis Canal run through the center of the watershed. Water deliveries are made to Federal Central Valley Project Contractors and to San Joaquin River Exchange Contractors from these facilities. State water deliveries are also made to one area.

The Grassland Drainage Area encompasses 97,400 acres that are geographically within the watershed. The Grassland Drainage Area is covered under waste discharge requirements (No. 5-01-234), which regulates the discharge of subsurface drainage water through the San Luis Drain to the San Joaquin River. The area coordinates its separate monitoring and reporting program under the above waste discharge requirements.

The described Westside Coalition area also includes federal, state and private managed wetlands. These areas share water delivery and drainage conveyance systems with the surrounding agricultural areas. Due to the integrated nature of the water facilities the managed wetlands have joined the Westside Coalition as a wetland sub-watershed participant to comply with the Conditional Waiver and effectively and efficiently address water quality issues. The effects of discharges from the wetland areas are covered in this monitoring program.

The communities of Grayson, Westley, Vernalis, Crows Landing, Patterson, Newman, Gustine, Stevinson, Los Banos, Dos Palos, South Dos Palos, Firebaugh, Mendota and Tranquillity lie within the geographic area of the Westside Coalition. These communities do not have discharges from irrigated lands and are not included in the Westside Coalition, but contribute storm waters and municipal waste waters to the watershed and may impact discharges from irrigated lands.

Interstate Highway 5 and State Highways 33, 140, 165 and 152 and many county roads run through the geographic area of the Westside Watershed. Storm water discharges from these roads and highways could contribute contaminants to the same water bodies that carry agricultural return water.

The San Joaquin Valley Drainage Authority, a joint powers agency, is the umbrella organization for the Westside Coalition for purposes of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region (Resolution No.R5-2003-0105). On July 30, 2004, the Westside Coalition received approval for its irrigated agricultural monitoring plan from the Central Valley Regional Water Quality Control Board. The first sampling event took place on July 6, 2004, with subsequent event samples collected

monthly. In February, 2008, the Westside Coalition received approval for a revised Monitoring and Reporting Plan (Revised MRP). The Revised MRP was designed to focus monitoring efforts at sites with known water or sediment issues and to support the Management Plan issues. The Revised MRP was implemented in March of 2008.

This report covers the 2008/2009 non-irrigation season sampling events beginning September 2008 through February 2009 (Event 48 through Event 52, and Rain Event 7).

The Revised MRP includes a targeted monthly sampling plan for 26 monitoring sites within the Coalition area as well as plans for sampling for two rain events during each year. The monitoring sites include three source water sites and 23 sites that discharge agricultural drain water. Four of the discharge sites are within San Luis Water District, which maintains a tailwater discharge prohibition. These sites generally only discharge during severe storm events. None of the San Luis Water District sites discharged during this report period.

During any given sampling event, each accessible site is visited, visually assessed, and samples are collected in accordance with the field sampling manual. **Table 1**, shows the monitoring events summary by site for the reporting period.

The objectives of the original monitoring program are:

- To assess the existing water quality characteristics of major agricultural drains within the watershed area.
- To determine the location and magnitude of water quality problems.
- To determine the cause of water quality problems and develop solutions.

Three sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 26 sites; the field coordinator for the northerly region is responsible for collecting samples from north of Newman Wasteway. The field coordinator for the southerly region is responsible for collecting samples south of (and including) Newman Wasteway, and staff from San Luis Water District are responsible for monitoring and sampling sites within that district. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. The parameters analyzed at each site are shown in **Table 2**. The laboratory, method, and constituents analyzed are shown in **Table 3.**

Table 1: March 2008 through August 2008 Sampling Events Summary

Map Designation	Monitoring Site	Event 48		Event 49	Event 50	Event 51	Event 52	Event R7
	Discharge Sites	Sep		Oct	Nov	Dec	Jan	Feb
1	Hospital Cr at River Road	SS	S	NF	NF	NF	NF	S
2	Ingram Cr at River Road	SS	S	S	NF	S	NF	S
3	Westley Wasteway near Cox Road	SS	S	NF	S	NF	NF	NA
4	Del Puerto Cr near Cox Road	SS	S	S	NF	S	NF	S
5	Del Puerto Cr at Hwy 33	NF	NF	S	S	NF	NF	S
7	Ramona Lake near Fig Avenue	SS	S	NF	NF	NF	NF	NF
8	Marshall Road Drain near River Road	NP	S	NF	NF	NF	NF	NF
9	Orestimba Cr at River Road	SS	S	S	NF	NF	NF	S
10	Orestimba Cr at Hwy 33	SS	S	S	S	NF	S	S
11	Newman Wasteway near Hills Ferry Road	SS	S	S	S	S	S	S
13	San Joaquin River at Lander Avenue	NP	S	S	S	S	S	S
14	Mud Slough u/s San Luis Drain	NP	S	S	S	S	S	S
15	Salt Slough at Lander Avenue	NP	S	S	S	S	S	S
16	Salt Slough at Sand Dam	NP	S	S	S	S	S	S
17	Los Banos Creek at Highway 140	NP	S	S	S	S	S	S
18	Los Banos Creek at China Camp Road	SS	S	S	NF	S	S	S
19	Turner Slough near Edminster Road	NP	NF	NF	NA	NA	NA	S
20	Blewett Drain near Highway 132	SS	S	S	NF	NF	NF	S
21	Poso Slough at Indiana Avenue	SS	S	S	S	S	S	S
24	Los Banos Creek at Sunset Ave	NF	NF	NF	NF	NF	NF	NF
25	Little Panoche Cr at Western Boundary	NF	NF	NF	NF	NF	NF	NF
26	Little Panoche Cr at San Luis Canal	NF	NF	NF	NF	NF	NF	NF
27	Russell Ave. Drain at San Luis Canal	NF	NF	NF	NF	NF	NF	NF
	Source Water Sites							
12	San Joaquin River at Sack Dam	NP	S	S	S	S	S	S
22	San Joaquin River at PID Pumps	NP	S	S	S	S	S	S
23	Delta Mendota Canal at Del Puerto WD	NP	S	S	S	S	S	S

Notes: S = Water sampled according to the MRP.
SS = Sediment sampled according to the MRP.
NA = Not sampled due to lack of safe access.
NF = Not sampled due to lack of flow.
NP = Not included in the sampling plan.

Table 2: Monitoring Stations and Samples

Monitoring Site	Site Code	Season: Irrigation (Mar-Aug)*	Season: Non-Irrigation (Sep-Feb)*	Season: Rain Event (2x per year)	Ceriodaphnia Toxicity	Fathead Toxicity	Algae Toxicity	Sediment Toxicity	Pesticides: OP	OC	Group A	Carb	Herb
Discharge Sites													
Blewett Drain at Highway 132	VH132	Assmt	Core	Assmt	x	x	x	x	x	x	x	x	x
Poso Slough at Indiana Avenue	PSAIA	Assmt	Core	Assmt	x	x	x	x	x	x	x	x	x
Hospital Cr at River Road	HCARR	Special	-	Rain**	x			x	x	x			x
Ingram Cr at River Road	ICARR	Core + Special	Core	Rain**	x			x	x	x	x	x	x
Westley Wasteway near Cox Road	WWNCR	Core + Special	Core	Rain**	x		x	x	x	x	x		x
Del Puerto Cr near Cox Road	DPCCR	Core + Special	Core	Rain**	x			x	x	x	x		x
Del Puerto Cr at Hwy 33	DPCHW	Special	-	Rain**	x			x	x	x	x		x
Ramona Lake near Fig Avenue	ROLFA	Core + Special	Core	Rain**	x			x	x	x			x
Marshall Road Drain near River Road	MRDRR	Core + Special	Core	Rain**	x				x	x	x		x
Orestimba Cr at River Road	OCARR	Core + Special	Core	Rain**	x			x	x	x	x		x
Orestimba Cr at Hwy 33	OCAHW	Special	-	Rain**	x		x	x	x	x	x		x
Newman Wasteway near Hills Ferry Road	NWHFR	Core + Special	Core	Rain**	x			x	x	x	x		x
San Joaquin River at Lander Avenue	SJRLA	Core + Special	Core + Special	Rain**	x		x		x				x
Mud Slough u/s San Luis Drain	MSUSL	Core + Special	Core + Special	Rain**	x				x	x	x	x	x
Salt Slough at Lander Avenue	SSALA	Core + Special	Core + Special	Rain**	x		x		x	x	x	x	x
Salt Slough at Sand Dam	SSASD	Special	-	Rain**	x		x		x	x		x	x
Los Banos Creek at Highway 140	LBCHW	Core + Special	Core + Special	Rain**	x				x				x
Los Banos Creek at China Camp Road	LBCCC	Core + Special	Core	Rain**	x	x	x	x	x				x
Turner Slough near Edminster Road	TSAER	Core + Special	Core	Rain**	x	x			x				x
Little Panoche Cr at Western Boundary	LPCWB	Core + Special	Core	Rain**	x	x	x	x	x	x		x	x
Little Panoche Cr at San Luis Canal	LPCSL	Core + Special	Core	Rain**	x	x	x	x	x	x		x	x
Russell Ave. Drain at San Luis Canal	RADSL	Core + Special	Core	Rain**	x	x	x	x	x	x		x	x
Los Banos Creek at Sunset Ave	LBCSA	Core + Special	Core	Rain**	x	x	x	x	x	x		x	x
Source Water Sites													
San Joaquin River at Sack Dam	SJRSD	Source	Source	Source									
Delta Mendota Canal at Del Puerto WD	DMCDP	Source	Source	Source									
San Joaquin River at PID Pumps	SJRPP	Source	Source	Source									

* Irrigation season will run from March through August. Non-irrigation season will run from September through February. The Westside Coalition, in colaboration with the Regional Water Quality Control Board, may shift the seasons up or back 1 month to accont for actual practices.

Table 3: Analytes, Laboratories, and Methods

	Constituent	Laboratory	Method	Units	Laboratory SOP No.
Field Data	pH	Field Crew	YSI meter	-	Field Manual
	Temperature	Field Crew	YSI meter	°C	Field Manual
	Conductivity	Field Crew	YSI meter	µmhos/cm	Field Manual
	Dissolved Oxygen	Field Crew	YSI meter	mg/L	Field Manual
	Flow	Field Crew	Estimate	cfs	Field Manual
Gen. Phy. / D.W.	Color (A.P.H.A.)	Caltest	SM 2120B	-	COLOR-rev4E
	pH	Caltest	SM 4500-H+B	-	PH-rev4
	TDS	Caltest	SM 2540C	mg/L	TDS-rev4E
	TSS	Caltest	SM 2540D	mg/L	TSS-rev4
	Turbidity	Caltest	SM 2130B	NTU	TURB-rev4E
	Hardness	Caltest	EPA 130.2	mg/L	HARD-rev5E
	Metals	Caltest	EPA 200.7, 200.8	mg/L	M-ICP-rev10E & 2008rev5Ea
	Bromide/Nitrate	Caltest	EPA 300.0	mg/L	DIONEX-rev5E
	Nitrogen, Nitrite	Caltest	EPA 354.1	mg/L	NO2-rev6
	TKN	Caltest	EPA 351.3	mg/L	NH3-TKN-rev6E
	Phosphate	Caltest	EPA 365.2	mg/L	PHOS-rev4
	Ammonia (as N)	Caltest	EPA 350.2	mg/L	NH3-TKN-rev6E
	DOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	TOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	Fecal coliform	Caltest	SM20-9221B/E	mpn/100ml	MMOMUG-rev8E
	E. Coli	Caltest	SM 9221BF/9223-B	mpn/100ml	MMOMUG-rev8E
Pesticides	Organophosphates	APPL	EPA 8141A	µg/L	ANA8141A
	Organochlorines	APPL	8081A/8082	µg/L	ANA8081A
	Carbamates	APPL	EPA 8321A LL	µg/L	HPL8321A
	Herbicides	APPL	EPA 619	µg/L	ANA8151A
Sediment	Organochlorine	Caltest	SW846 8081	mg/kg (dry)	8081rev8
	Pyrethroid	Caltest	SW846 8270(SIM)	mg/kg (dry)	Pyrethroidsrev4a
	% Solids	Caltest	EPA 160.3	%	Residue-rev6
	TOC	Caltest	EPA 9060A	%	WalkleyBlack TOC
Toxicity	*Ceriodaphnia d.*	PER	EPA-821-R-02-012	% survival	Acute Cerio SOP
	Selenastrum c.	PER	EPA-821-R-02-013 & EPA-600-4-91-002	cell growth	Chronic Selenastrum SOP
	Pimephales p.	PER	EPA-821-R-02-012	% survival	Acute FHM SOP
	Hyalella a.	PER	EPA-600-R-99-064	% survival	10-D HyalellaAcuteSedTest

CalTest Labs in Napa, California
APPL labs in Fresno, California
Pacific Ecorisk (PER) in Martinez, California

Aquatic toxicity samples were collected and analyzed by Pacific Ecorisk, Inc. using the methods described below:

- *Ceriodaphnia dubia*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Pimephales promelas*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Selenastrum capricornutum*: "Short-term Methods for Estimated the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (USEPA 2002b).

- *Hyalella azteca*: "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Organisms" (USEPA 2000).

Nineteen of the 26 monitoring sites are located on streams that are dominated by summer agricultural drainage runoff. The irrigation season within the Westside Coalition typically starts in March, with pre-irrigation and typically ends in August, just before harvest of the late season crops (such as cotton and fall corn). Because the irrigation period is also when pesticides are applied, and most likely to be carried off by tailwater drainage, the Westside Coalition has targeted this period for pesticide and toxicity analysis (see the Revised MRP). All monitoring events during this reporting period occurred during the non-irrigation season, during which time there is minimal agricultural activity. During non-irrigation season events, four sites are tested for aquatic toxicity: San Joaquin River at Lander Ave. (algae and water flea), Salt Slough at Lander Ave. (algae and water flea), Los Banos Creek at Highway 140 (water flea), and Mud Slough (water flea). During rain events, accessible/sample-able sites are tested for all three indicator species (algae, water flea, and minnow) as well as for pesticides and general chemistry. The 2008/2009 non-irrigation season was extremely dry and only one rain event (February 2009) generated sufficient runoff for sample collection.

Attachment 1 details the samples collected at each site during each sampling event. A summary of the monitoring results is presented in **Appendix A.** Significant aquatic toxicity was measured five times, all of which were for *Ceriodaphnia dubia.* The measurements of significant toxicity occurred during three sampling events, with one measurement during event 48 (September at Mud Slough), one during Event 52 (January, Los Banos Creek at Highway 140) and three during Rain Event 7 (February, at Turner Slough, San Joaquin River at Sack Dam[1], and Hospital Creek). These results, along with associated water quality and flow data, are summarized in **Attachment 2.** Details of the aquatic toxicity analyses are shown in **Appendix C.**

Quality control samples were collected in addition to the event analysis sample. The quality control samples included field blanks, field duplicates, and matrix spike/matrix spike duplicate samples (MS/MSD). One significant quality control event was encountered: during Event 48 (September) the courier failed to pick up the general chemistry samples for the southerly region and a second collection of samples was completed the following week. There were also a handful of minor quality control issues, including apparent contamination of field blank samples, exceedance of the field duplicate relative percent difference (RPD) value, or control sample failure. Results of the Quality Control samples are discussed in Section 4 and **Attachment 3.**

Four sites within San Luis Water District (SLWD) were monitored monthly in accordance with the Monitoring and Reporting Plan. SLWD has implemented an aggressive tailwater prohibition and none of these sites discharged during this reporting period. No samples have been collected at any of the SLWD sites since they joined the Westside Coalition.

Monitoring Toxicity Event Summaries.
The Fall of 2008 and Winter of 2009 were extremely dry. Observed flow at many of the Westside Coalition monitoring sites was lower than in prior years.

[1] San Joaquin River at Sack Dam is a source water site, not a discharge site.

Event 48, September 8th, 9th, 10th, and 18th 2008.
Sediment samples were collected on September 9th at 10 monitoring sites. Water samples were collected on September 8th for the Southerly region and on the 10th in the Northerly region. A logistical error in sample pickup caused the general chemistry samples for the Southerly site to be delayed beyond standard hold time and 10 sites within the Southerly region were resampled on September 18th and tested for general chemistry constituents. Three sites had no flow and were not sampled during the initial sample collection on September 8th and 10th (Los Banos Creek at China Camp Rd., Del Puerto Creek at Highway 33, and Turner Slough). During the September 18th resample collection, water was present at Los Banos Creek at China Camp Road and field observations and general chemistry samples were collected at that time. Aquatic toxicity was measured at Mud Slough for *Ceriodaphnia dubia,* (55% survival) however no other aquatic toxicity was observed. Significant sediment toxicity was observed in six samples (Del Puerto Creek near Cox Rd. 62.5% survival, Hospital Creek – 25%, Ingram Creek – 0%, Poso Slough – 72.5%, Blewett Drain – 16.25%, and Westley Wasteway – 1.25%). Sediment samples from Hospital Creek, Ingram Creek, Blewett Drain, and Westley Wasteway were tested for pesticides. See Section 6. There was no flow at any of the San Luis Water District sites.

Event 49, October 14th and 23rd, 2008.
Non-irrigation season water samples were collected on October 14th and 23rd. Eight samples were collected on the 14th from the Northerly region. Hospital Creek, Ramona Lake, Marshall Road Drain, and Westley Wasteway had no flow and were not sampled. Nine sites were sampled in the Southerly region (Turner Slough had no flow). No significant toxicity was observed in the tested samples. Northerly and Southerly samples were collected on separate days due to a schedule conflict with the sampling crews. There was no flow at any of the San Luis Water District sites.

Event 50, November 12, 2008.
Non-irrigation season samples were collected on November 12th. Eight sites were not sampled due to lack of flow (Blewett Drain, Hospital Creek, Ingram Creek, Del Puerto Creek near Cox Rd., Ramona Lake, Marshall Road Drain, Orestimba Creek at River Rd., and Los Banos Creek at China Camp Rd.) and one site was not sampled because a locked gate prevented access (Turner Slough). No significant toxicity was observed in the tested samples. There was no flow at any of the San Luis Water District Sites.

Event 51, December 9th, 2008.
Non-irrigation season samples were collected on December 9th in accordance with the Westside Coalition's Monitoring Program. Eight sites had no flow and were not sampled (Blewett Drain, Hospital Creek, Westley Wasteway, Ramona Lake, Del Puerto Creek at Highway 33, Marshall Road Drain, and both Orestimba Creek sites) and a locked gate prevented access to Turner Slough. An accident in the laboratory caused some of the *Ceriodaphnia dubia* test samples to spill, resulting in a retest, however neither the initial test nor the retest results indicated significant toxicity. There was no flow at any of the San Luis Water District Sites.

Event 52, January 13th, 2009.
Non-irrigation season samples were collected on January 13th in accordance with the Westside Coalition's Monitoring Program. Nine sites had no flow and were not sampled (Blewett Drain,

Hospital Creek, Ingram Creek, Westley Wasteway, Ramona Lake, both Del Puerto Creek sites, Marshall Road Drain, and Orestimba Creek at River Road) and a locked gate prevented access to Turner Slough. Significant toxicity to *Ceriodaphnia dubia* (55% survival) was observed at Los Banos Creek at Highway 140. No pesticides were detected in that sample and the cause of toxicity is not known. A documentation error in the field caused the field observations for the two Orestimba Creek sites to be recorded on the wrong sheets (Highway 33 data was recorded on the River Road sheet), however the labels and COCs were completed correctly and the error has been noted on the field sheets.

Rain Event 7, February 12th, 13th, 14th, and 18th, 2009.

A series of minor storm events generated sufficient runoff to collect rain event samples on February 12th, 13th, 14th, and 18th[2]. Runoff was sporadic, resulting in several sampling trips required to obtain samples. Westley Wasteway, Ramona Lake, Marshall Road Drain, and the four San Luis Water District sites did not discharge during the rain event. Significant toxicity to *Ceriodaphnia dubia* was measured at Turner Slough (80% survival), the San Joaquin River at Sack Dam (75% survival), and Hospital Creek (0% survival). Due to a delay in sample delivery, the toxicity samples for Blewett Drain, Hospital Creek, and Ingram Creek were tested a few hours outside of hold time. A dilution series test and TIE were performed on the Hospital Creek sample. The dilution series measured 2.0 toxic units. The TIE indicated that a combination of pesticides and metals contributed to the toxicity. Chlorpyrifos (0.57µg/L), DDE (0.04µg/L), and copper (31µg/L, total) were detected in the sample and may have contributed to toxicity. Other detected pesticides were Diuron (3.3µg/L), Prowl (3.0µg/L) and Simazine (0.93µg/L).

SECTION 2: SAMPLING SITE DESCRIPTIONS

Figure 1 shows the Westside Coalition area and the location of the monitoring sites. Following is a description and rationale for the monitoring sites.

- Blewett Drain near Highway 132 (also called Vernalis at Highway 132 [VH132]). This site is located at the northerly boundary of the Westside Coalition, and has not been regularly monitored. Regional Board staff have observed turbid water discharges at this site on a number of occasions.
- Poso Slough at Indiana Avenue (PSAIA). This site is located on Poso Slough near the boundary between San Luis Canal Company and Central California Irrigation District in the Dos Palos Subarea of the Westside Coalition.
- Hospital Creek at River Road (HCARR). This site is a significant drainage for the Patterson Subarea of the Westside Coalition and has been monitored since July 2004 for a variety of constituents. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site. It is on the 303(d) list for pesticides.
- Ingram Creek at River Road (ICARR) This site is a significant drainage for the Patterson Subarea of the Westside Coalition and has been monitored since July 2004 for a variety of constituents. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site. It is on the 303(d) list for pesticides.

[2] CIMIS February rainfall totals prior to sample collection were 0.08 for Firebaugh/Telles, 1.67 for Kesterson, and 1.96 for Patterson.

- Westley Wasteway near Cox Road (WWNCR). Westley Wasteway is a significant drainage for the Patterson Subarea for both tailwater and storm runoff. Land use upstream of this monitoring station is similar to that of Del Puerto Creek. This site has been monitored for a variety of constituents since 2004. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site.
- Del Puerto Creek near Cox Road (DPCCR) and Del Puerto Creek near Highway 33 (DPCHW). Del Puerto Creek is on the 303(d) list for pesticides and is a major drainage for the Patterson Subarea and major storm runoff collector. Two stations are identified on this waterbody; one near the discharge to the San Joaquin River, and one at Highway 33, near the middle of the Patterson Subarea. Biological assessments are performed on Del Puerto Creek to assess its overall health, which will be useful in relating to collected water quality data. Both of these sites have been monitored for a variety of constituents since 2004. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at both sites.
- Ramona Lake near Fig Avenue (ROLFA). This site monitors discharge from a small lake as it flows into the San Joaquin River. Agricultural and storm runoff from the Patterson Subarea can discharge into the lake. This site has been monitored for a variety of constituents since 2004. Some pesticides have been measured at this site.
- Marshall Road Drain near River Road (MRDRR). This site monitors a pipe drain that carries agricultural and storm runoff from the Patterson Subarea of the Westside Coalition. This site has been monitored for a variety of constituents since 2004. Some pesticides and aquatic toxicity have been measured at this site.
- Orestimba Creek at River Road (OCARR) and Highway 33 (OCAHW). There are two monitoring locations on Orestimba Creek; one near the discharge point to the San Joaquin River; and one upstream at Highway 33. Orestimba Creek is similar to that of Del Puerto in both the surrounding landscape and discharged water quality. It is on the 303(d) list for pesticides, is a major drainage for the Patterson Subarea, and is included in the biological assessment portion of the monitoring program. Pesticides, sediment discharge, sediment toxicity, and aquatic toxicity have been measured at these sites.
- Newman Wasteway near Hills Ferry Road (NWHFR). The Newman Wasteway is a significant drainage for the Patterson Subarea and is on the 303(d) list for salt and pesticides. This site measures drainage that originates from the southerly region of the Patterson Subarea, and has been monitored for a variety of constituents since 2004. Pesticides, sediment discharge, sediment toxicity, and aquatic toxicity have been measured at this site.
- The San Joaquin River at Lander Avenue (SJRLA). This site is both a receiving waterbody for agricultural and storm drainage and a source water for districts that pump from the San Joaquin River. It also receives drainage flows from irrigated wetlands in the fall and winter months. It has been monitored for a variety of constituents since 2004, and pesticides, sediment toxicity, and aquatic toxicity have been measured.
- Mud Slough upstream of the San Luis Drain (MSUSL). This site measures drainage originating from the Dos Palos and Los Banos Subareas that flow through the wetlands as well as the wetlands themselves. Mud Slough is on the 303(d) list for a variety of constituents. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board, Surface Water Ambient Monitoring Program (SWAMP) collects and analyzes samples from this site throughout the year.

These samples are analyzed for selenium, boron, and EC, along with other constituents. The SWAMP Data is available via the internet at: http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html.

- Salt Slough at Lander Avenue (SSALA) Salt Slough at Lander Avenue measures agricultural, storm, and wetland runoff from the Dos Palos and Los Banos Subareas, and has been monitored (and 303(d) listed) for a variety of constituents since 2004. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board, SWAMP collects and analyzes samples from this site throughout the year. These samples are analyzed for selenium, boron, and EC, along with other constituents. The SWAMP Data is available via the internet at: http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html.
- Salt Slough at Sand Dam (SSASD). This site is upstream of the Lander Avenue site and measures agricultural and storm drainage originating in portions of the Dos Palos Subarea. Pesticides and aquatic toxicity have been measured at this site, which has been monitored for a variety of constituents since 2004.
- Los Banos Creek at Highway 140 (LBCHW). This site carries agricultural, storm and irrigated wetland runoff from the Los Banos Subarea. Some pesticides have been measured at this site.
- Los Banos Creek at China Camp Road (LBCCC). This site monitors agricultural and storm runoff from the Los Banos Subarea. There is a farmer-maintained dam downstream of this site which is frequently used to stop flows so that it may be diverted for irrigation.
- Turner Slough near Edminster Road (TSAER). This station is located on the eastside of the San Joaquin River and measures drainage from a portion of the Patterson Subarea. A very small number of pesticides have been detected at this site since 2004. In 2007, Stevinson Water District constructed a drain water return system upstream of the Turner Slough discharge (and monitoring) point. This system captures most of the drainage that flows through Turner Slough and returns it the the Stevinson Water District irrigation system. Since the construction of this system, discharges from Turner Slough into the San Joaquin River have become infrequent.
- Little Panoche Creek at Western Boundary (LPCWB) and at San Luis Canal (LPCSL). These two sites were incorporated from the San Luis Water District Water Quality Coalition. Because San Luis Water District has a strict no-discharge policy, these sites will typically measure only storm runoff or releases from the Little Panoche reservoir. These sites typically convey storm water and have not been extensively monitored. Since inclusion within the Westside Coalition, this site has not had any observed flow and has not been sampled.
- Russell Avenue Drain at San Luis Canal (RADSL). This is a small drain along Russell Avenue that discharges into the San Luis Canal. These two sites were incorporated from the San Luis Water District Water Quality Coalition. Because San Luis Water District has a strict no-discharge policy, this site will typically measure only storm runoff. Since inclusion within the Westside Coalition, this site has not had any observed flow and has not been sampled.
- Los Banos Creek at Sunset Avenue (LBCSA). This monitoring site was incorporated from the San Luis Water District Water Quality Coalition, and is located near the western boundary of the Westside Coalition, downstream of the Los Banos Reservoir. There is

not a large amount of actively farmed land at or upstream of this site, and discharges here are likely to be storm runoff or releases from the Los Banos Reservoir. Since inclusion within the Westside Coalition, this site has not had any observed flow and has not been sampled.

- San Joaquin River at Sack Dam (SJRSD). This is a source water monitoring site located at the diversion point for San Luis Canal Company. This site is monitored for source water constituents.
- Delta Mendota Canal at Del Puerto Water District (DMCDP). This site monitors water quality in the Delta Mendota Canal at a Del Puerto Water District turnout. This site characterizes the source water quality typical of the Delta Mendota Canal, and is monitored for source water constituents.
- San Joaquin River at Patterson Irrigation District Pumps (SJRPP). This monitoring site is located at the Patterson Irrigation District pump station on the San Joaquin River and characterizes the source water quality of the San Joaquin River in the Patterson Subarea. This site is monitored for source water constituents.

More than 59 different varieties of crops are grown within the Westside Coalition watershed area, ranging from fruit and nut trees to melons and cotton. **Table 4** shows the top ten crops within the Coalition area based on 2008/09 Agricultural Commissioner pesticide use data.

Table 4: Top 10 Crops Grown by County

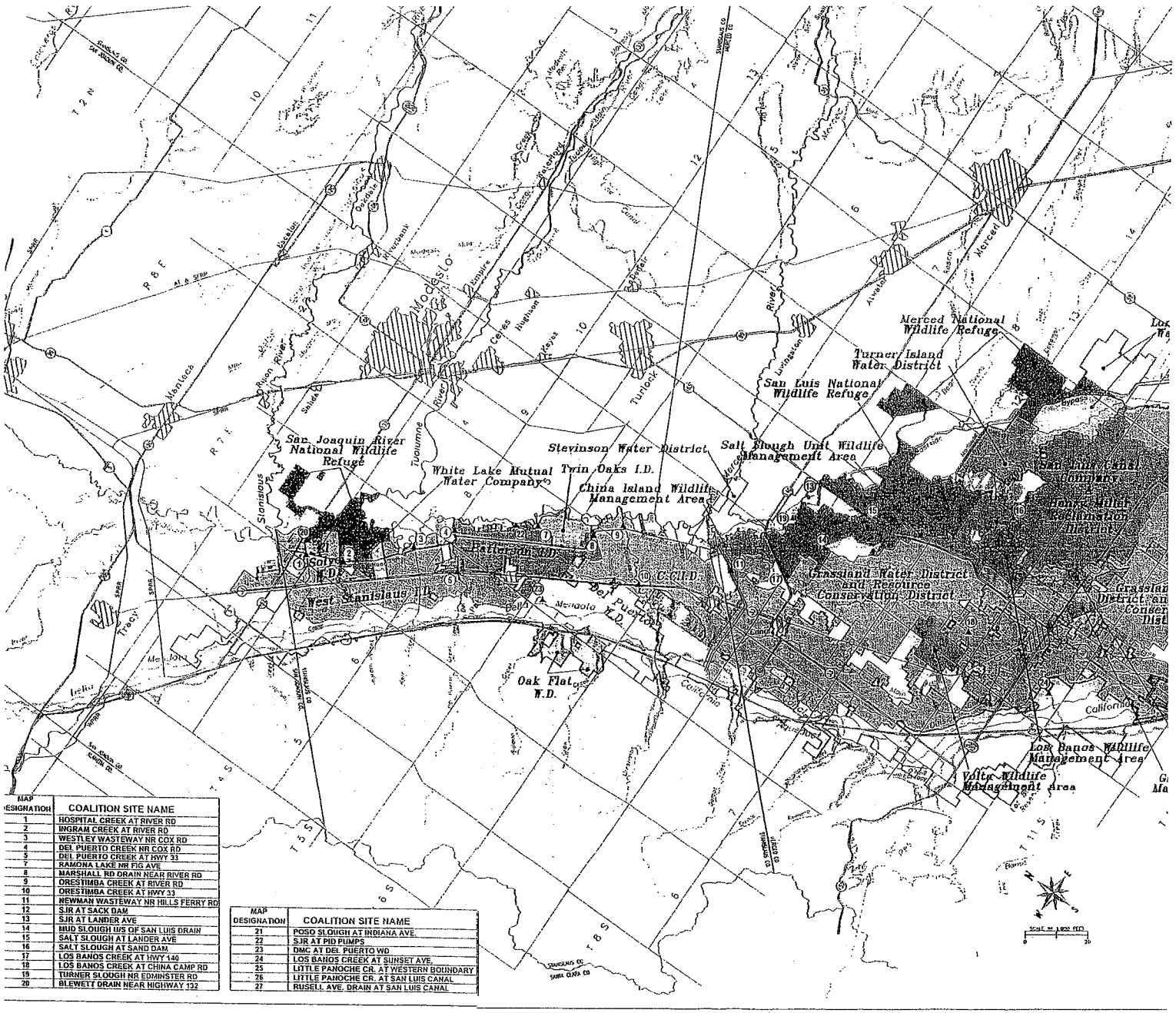
Fresno	Merced	Stanislaus
Alfalfa	Alfalfa	Almonds
Cotton	Cotton	Tomatoes
Grapes (Raisins)	Tomatoes	Alfalfa
Almonds	Almonds	Beans (dry)
Tomatoes	Oats	Walnuts
Melons	Corn	Corn
Wheat	Wheat	Grapes (wine)
Corn	Melons	Apricots
Grapes (Wine)	Walnuts	Oats
Sugarbeets	Pistachios	Wheat

These crops are dispersed approximately evenly throughout the Coalition area, with the exceptions of cotton (mostly in the Los Banos, Dos Palos and Tranquillity Subareas), and fruit trees and beans (mostly in the Patterson Subarea). The planting practices are typical for conventional agriculture within the Central Valley. A complete crop list and detailed crop calendar was presented in the "Watershed Evaluation Report", submitted in April, 2004.

Annual field crops are typically planted as seed or transplants after the field has been pre-irrigated to provide salt leaching and soil moisture for germination. These crops are usually furrow irrigated using either a plowed head ditch or gated pipe, but may also be sprinkler or sub-surface drip irrigated. Permanent field crops such as pasture or alfalfa are usually flood or sprinkler irrigated. The younger fruit and nut trees are almost universally irrigated with drip or micro-sprinkler systems, though many of the older orchards are still flood irrigated. **Table 5** shows the types of pesticides used in the 2008/09 non-irrigation season reported from the Stanislaus County Agricultural Commissioner, by sub-watershed and crop type. This area includes 7 of the 23 discharge monitoring sites within the Westside Coalition.

Table 5: Stanislaus County 2008/09 Non-Irrigation Season Pesticide Use by Subwatershed

	Pesticide Type	Fallow / Native	Field Crops	Pasture	Orchard Crops	Vineyards	Nursery
Del Puerto Cr. Subwatershed	Carbamates						
	Herbicides	X	X	X	X	X	
	Organochlorine						
	Organophosphorus		X		X		
	Pyrethroid		X		X		
Hospital/Ingram Cr. Subwatershed	Carbamates		X				
	Herbicides	X	X		X	X	
	Organochlorine						
	Organophosphorus		X				
	Pyrethroid		X		X		
Orestimba Cr. Subwatershed	Carbamates		X				
	Herbicides	X	X		X		X
	Organochlorine						
	Organophosphorus		X		X		
	Pyrethroid		X		X		X
Westley Wasteway Subwatershed	Carbamates						
	Herbicides		X		X	X	
	Organochlorine						
	Organophosphorus		X		X		
	Pyrethroid		X				



MAP DESIGNATION	COALITION SITE NAME
1	HOSPITAL CREEK AT RIVER RD
2	INGRAM CREEK AT RIVER RD
3	WESTLEY WASTEWAY NR COX RD
4	DEL PUERTO CREEK NR COX RD
5	DEL PUERTO CREEK AT HWY 33
7	RAMONA LAKE NR FIG AVE
8	MARSHALL RD DRAIN NEAR RIVER RD
9	ORESTIMBA CREEK AT RIVER RD
10	ORESTIMBA CREEK AT HWY 33
11	NEWMAN WASTEWAY NR HILLS FERRY RD
12	SJR AT SACK DAM
13	SJR AT LANDER AVE
14	MUD SLOUGH U/S OF SAN LUIS DRAIN
15	SALT SLOUGH AT LANDER AVE
16	SALT SLOUGH AT SAND DAM
17	LOS BANOS CREEK AT HWY 140
18	LOS BANOS CREEK AT CHINA CAMP RD
19	TURNER SLOUGH NR EDMINSTER RD
20	BLEWETT DRAIN NEAR HIGHWAY 132

MAP DESIGNATION	COALITION SITE NAME
21	POSO SLOUGH AT INDIANA AVE.
22	SJR AT PID PUMPS
23	DMC AT DEL PUERTO WD
24	LOS BANOS CREEK AT SUNSET AVE.
25	LITTLE PANOCHE CR. AT WESTERN BOUNDARY
26	LITTLE PANOCHE CR. AT SAN LUIS CANAL
27	RUSSELL AVE. DRAIN AT SAN LUIS CANAL

Table 6 shows the 10 most commonly applied pesticides (by acreage) during the 2008/09 non-irrigation season within the three counties occupied by the Westside Coalition.

Table 6: Most Commonly Applied Pesticides by County (2008/09 Non-Irrigation Season)

Fresno County		Merced County		Stanislaus County	
Pesticide	**Class**	**Pesticide**	**Class**	**Pesticide**	**Class**
Ethephon	Organophosphorus	Ethephon	Organophosphorus	Glyphosate	Herbicide
Diuron	Herbicide	Diuron	Herbicide	Paraquat Dichloride	Herbicide
Paraquat Dichloride	Herbicide	Paraquat Dichloride	Herbicide	Oxyfluoren	Herbicide
Thidiazuron	Herbicide	Thidiazuron	Herbicide	Pendimethalin	Herbicide
Pendimethalin	Herbicide	Glyphosate	Herbicide	Lambda-Cyhalothrin	Pyrethroid
Glyphosate	Herbicide	Pendimethalin	Herbicide	Dimethoate	Organophosphorus
Hexazinone	Herbicide	MCPA	Herbicide	Phenmedipham	Herbicide
MCPA	Herbicide	Oxyfluoren	Herbicide	MCPA	Herbicide
Trifluralin	Herbicide	Dicamba	Herbicide	Ethephon	Organophosphorus
2,4-D	Herbicide	Hexazinone	Herbicide	Esfenvalerate	Pyrethroid

During the non-irrigation season, herbicides dominate the pesticide applications, primarily for pre-emergent and winter weed control.

SECTION 3: FIELD SAMPLING PROCEDURE

Field water quality data and sample collections were collected as outlined in the Westside Coalition's Quality Assurance Project Plan (QAPP) and Field Sampling Manual. Three sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 26 sites: The field coordinator for the northerly region is responsible for collecting samples from north of Newman Wasteway. The field coordinator for the southerly region is responsible for collecting samples south of (and including) Newman Wasteway, and staff from San Luis Water District are responsible for monitoring and sampling sites within that district. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. Samples are collected either as a direct grab from the waterbody or as a bucket grab, where a large volume of water is collected in a stainless steel bucket and transferred to the sample bottles. Details of these collection methods are explained in the Field Sampling Manual. The list of tested constituents are discussed in the Revised MRP.

SECTION 4: FIELD QUALITY CONTROL SAMPLES

Field quality control samples included the collection of field duplicate samples for sediment and aquatic toxicity analysis, and the collection of both field duplicate and field blank samples for pesticides, drinking water, and general physical constituent analysis. It should be noted that the field duplicate samples are typically collected as separate samples simultaneously with the event sample (as opposed to field split samples). The calculated RPD between the event sample and field duplicate sample should be considered a measurements of site water variability.

- **Water Chemistry Analyses.** Field duplicate and field blank samples were collected during all six sampling events within the reporting period and analyzed for general

chemistry and drinking water constituents. A comparison of the event samples, duplicate samples, and blank samples is tabulated in **Attachment** 3. A total of 155 duplicate analyses were completed and compared to the event sample results. Twenty duplicate samples exceeded the 25% relative percent difference (RPD) established in the QAPP for:

Ammonia	Bromide	E. Coli
Fecal coliform	Hardness	Lead
Nitrogen	Selenium	TKN
TSS	Total Suspended Solids	Turbidity

These exceedances of the field duplicate quality control criteria are reflective of the complicated nature of the site water and the naturally occurring variations of the water column quality. The Westside Coalition does not expect these variations to impact data usability.

Six field blank sample sets were analyzed during the report period (155 results, total). Of these, 14 resulted in values greater than 20% of the event sample result, including:

Ammonia	DOC	Fecal Coliform
Nitrogen	Orthophosphate	Selenium
TOC	Zinc	

Three of the field blank results exceeding 20% of the event sample results were detected below the reporting limit ("j" or "DNQ" flagged), however the number of blank results exceeding the 20% threshold is significantly higher than previous reports. A review of field blank sampling procedure has determined that there is possible contamination in the blank water container and changes to the field blank collection method have been implemented.

- **Pesticide Analyses.** Six field duplicate and field blank samples sets were collected during the reporting period and analyzed for pesticides. There was only one detection in all of the field blank samples (11/12/08 DDT 0.034 µg/L). Calculated RPD for field duplicate results did not exceed the 25% threshold for any analytes during the reporting period. The results of the field blank, field duplicate and event sample comparisons are tabulated in **Attachment** 3.

- **Aquatic Toxicity Analyses.** Field duplicate samples were collected and analyzed for toxicity to all species tested during the report period. Field duplicate results were acceptable for all of the tests except for the January Algae sample (RPD = 29.9%). As significant toxicity to algae was not observed in either the event or field duplicate sample, no impact to the data usability is anticipated. During Rain Event 7 (February 2009), toxicity samples for three sites (Hospital Creek, Ingram Creek, and Blewett Drain) were tested a few hours outside of hold time. Irregular flow patterns and the extra sampling time associated with storm sampling resulted in a delay in the sample delivery to the lab, causing the hold time violation. Because the storm runoff was low and short-lived, there

was no opportunity to recollect the samples. No impact in data usability is anticipated from this delay.

- **Sediment Toxicity Analyses.** A field duplicate sample was collected for sediment toxicity during the March sampling event. The measured RPD was 18.8%.

Completeness for sampling collection and analysis was reviewed for samples collected during this monitoring program. Completeness was measured for sample collection and transit, sample analysis, and field quality control samples.

- Collection and Transit: Completeness for this reporting period for sample collection and transit is 100%. One sediment sample was broken in transit, and 10 samples were not picked up by the courier on time, however all samples were re-collected and successfully transported to the appropriate laboratory.
- Sample Analysis: Completeness for sample analysis during this reporting period is 100%. The control for six toxicity samples failed due to a laboratory accident, and all six were successfully re-tested. During Rain Event 7, toxicity samples for three sites (a total of nine tests) were tested out of hold time by a few hours. This was caused by the additional time required to collect storm water samples, combined with a relatively short window for sample collection. Data from these sites is usable and useful, and is not considered to be lost or suspect.
- Field Quality Control Samples: Completeness for Field Blank analyses for general chemistry and drinking water analyses was 91%, due to apparent and consistent contamination of the field blank water. The cause appears to be contamination in the blank water container and this has been addressed by the field sampling crew. Field Blank analysis completeness for pesticide samples was 99.7%. Field duplicate samples were collected and successfully tested for pesticides, general chemistry, and toxicity analyses and the RPD for each duplicate constituent is calculated. Because these samples are collected as simultaneous but independent samples, rather than "split" samples (two samples decanted from a single, mixed collection container), the field duplicate results provide a qualitative measure of site water variability.

SECTION 5: ANALYTICAL METHODS

Table 3 indicates the laboratories responsible for the analytical results of this monitoring program, the analytical method used, and the standard operating procedure (SOP) document number. This table reflects the constituents analyzed as part of the Revised MRP.

Chain of Custody (COC) sheets were maintained from the time of sample collection to receipt at the laboratories. Copies of the COC sheets are included in **Appendix A**, along with a summary of the data results. The data summary includes all of the field readings, analytical chemistry results, pesticide scan results, and toxicity screening test results. The original laboratory reports are included in **Appendix C**. These reports also include all of the field and internal quality control results.

The laboratory original data sheets (raw data) for the toxicity results are included in **Appendix C**, as part of the laboratory reports. Raw data for general physical results, drinking water results,

and pesticide results are kept by the laboratories for a minimum of five years and are available upon request.

SECTION 6: DATA INTERPRETATION

The primary objective of the monitoring program is to identify water bodies that are adversely affected by agricultural discharges and to help determine the impacts of management activities. The monitoring program has used a combination of toxicity tests and pesticide analyses, along with close coordination among districts and growers to not only identify problem areas but also to determine the magnitude and cause of the problems.

The Westside Coalition's monitoring program includes 26 monitoring sites on the Westside of the San Joaquin Valley (see **Table 1** and **Figure 1**). These sites are representative of the various regions within the Coalition and include agricultural discharge sites, storm drainage sites, and irrigation source water sites. A summary of this data is presented in **Appendix A**, and the laboratory data reports are provided in **Appendix C**.

All of the analyzed parameters were reviewed regularly to evaluate the overall health of the water bodies within the Coalition area. This reporting period covered the 2008/09 non-irrigation season months and there was not significant agricultural activity during this period. Five measurements of significant aquatic toxicity were measured, all to *Ceriodaphnia dubia*. One of the toxicity measurements occurred in Event 48 (September), one in Event 52 (January) and three occurred during Rain Event 7 (February).

Ceriodaphnia dubia. Toxicity to *Ceriodaphnia dubia* was measured during Event 48 (Mud Slough), Event 52 (Los Banos Creek at Highway 140), and Rain Event 7 (Hospital Creek, Turner Slough, and San Joaquin River at Sack Dam). Only the Hospital Creek measurement (0% survival) was significant enough to require follow-up testing. The other samples measured survival equal to or greater than 55%. Insecticides were present in the Hospital Creek and Mud Slough samples in sufficient quantity to explain toxicity, however there were no insecticides detected in the other samples and the cause of toxicity is not known. See **Attachment 2**.

Selenastrum capricornutum (algae). Toxicity to Algae was not observed during the reporting period.

Pimephales Promelas (fathead minnow). Fathead minnow toxicity was only tested during Rain Event 7 (per the requirements of the Monitoring plan). No measurements of fathead minnow toxicity were observed.

Sediment Toxicity (*Hyalella azteca*). Sediment samples were collected during Event 48 (September) and tested for toxicity to *Hyalella azteca*. Eleven samples were collected, and significant toxicity was measured at eight sites (Blewett Drain, Hospital Creek, Ingram Creek, Westley Wasteway, Del Puerto Creek, Newman Wasteway, Los Banos Creek at China Camp Road, and Poso Slough). Although statistically significant, three of the sites measuring toxicity had survival rates greater than 72% (Newman Wasteway – 82.5%, Los Banos Creek at China Camp Rd. – 87.5%, Poso Slough – 72.5%). Four sites measured survival less than 50% (Blewett

Drain – 16.2%, Hospital Creek – 25%, Ingram Creek – 0%, Westley Wasteway – 1.25%). Samples from these four sites were tested for selected pesticides including chlorpyrifos, legacy organochlorines and pyrethroids. **Table 7** summarizes the detected pesticide data at those four sites. See **Appendix C** for the full laboratory report. **Table 8** shows the sediment toxicity results since the beginning of the monitoring program.

Table 7: Detected Pesticides in Sediment Samples (September 2009).

	Blewett Drain	Hospital Creek	Ingram Creek	Westley Wasteway
Sediment Toxicity (% survival)	16.2	25	0	1.25
Bifenthrin (mg/kg)	0.26	0.78	0.0009	0.0009j
Fenvalerate (mg/kg)	0.53	ND	ND	ND
DDE (mg/kg)	ND	0.16j	0.0003j	0.0039
TOC (mg/kg)	1100	240	4750	7550

Detected levels of Fenvalerate in the Blewett Drain sample and Bifenthrin in the Blewett Drain and Hospital Creek samples are elevated enough to help explain the toxicity. However the measured pesticide levels in the Ingram Creek and Westley Wasteway samples are below what would be expected to cause toxicity and the cause of toxicity at these two sites is not apparent. Details of the sediment pesticide analyses are in **Attachment 4.**

Table 8: Sediment Toxicity Results.

Site	Sept 08 % Survival	Sept 08 Toxicity (Y/N)	Mar 08 % Survival	Mar 08 Toxicity (Y/N)	Sept 07 % Survival	Sept 07 Toxicity (Y/N)	Mar 07 % Survival	Mar 07 Toxicity (Y/N)
Blewett Drain (Vernalis at hwy 132)	16.2	Y						
Hospital Creek	25	Y	80	Y	16.2	Y	0	Y
Ingram Creek	0	Y	2.5	Y	0	Y	0	Y
Westley Wasteway	1.25	Y	65	Y	0	Y	0	Y
Del Puerto Creek (Cox Rd)	62.5	Y	N/A	N/A	93.8	N	81.2	Y
Del Puerto Creek (Hwy 33)	N/A	N/A	N/A	N/A	58.8	Y	91.2	Y
Orestimba Creek at River Rd.	80	N	95	N	98.8	N	90	N
Orestimba Creek at Hwy 33	92.5	N	90	N	95	N	13.8	Y
Ramona Lake at Fig Ave.	98.8	N	68.8	Y	91.2	Y	N/A	N/A
Newman Wasteway	82.5	Y	97.5	N	51.2	Y	93.8	N
Poso Slough	72.5	Y	98.8	N	N/A	N/A	N/A	N/A
Turner Slough					92.5	N	96.2	N
SJR at Lander					95	N	90	Y
Salt Slough at Lander					86.2	N	96.2	N
Salt Slough at Sand Dam					92.5	N	96.2	N
Los Banos Creek at Hwy 140					87.5	N	96.2	N
Los Banos Creek at China Camp Rd.	87.5	Y	92.5	N	13.8	Y	98.8	N
Mud Slough					90	N	96.2	N

Site	Sep 06 % Survival	Sep 06 Toxicity (Y/N)	Mar 06 % Survival	Mar 06 Toxicity (Y/N)	Oct 05 % Survival	Oct 05 Toxicity (Y/N)	Mar 05 % Survival	Mar 05 Toxicity (Y/N)
Hospital Creek	1.25	Y	82.5	Y	0	Y	16.2	Y
Ingram Creek	0	Y	23.8	Y	0	Y	32.5	Y
Westley Wasteway	1.25	Y	0	Y	0	Y	0	Y
Del Puerto Creek (Cox Rd)	55	Y	0	Y	1.3	Y	N/A	N/A
Del Puerto Creek (Hwy 33)	1.25	Y	68.8	Y	0	Y	0	Y
Orestimba Creek at River Rd.	96.25	N	97.5	N	93.8	N	51.2	Y
Orestimba Creek at Hwy 33	6.25	Y	66.3	N	32.5	Y	N/A	N/A
Ramona Lake at Fig Ave.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Newman Wasteway	98.75	N	90	N	76.3	Y	72.5	Y
Turner Slough	98.75	N	91.3	N	95	N	85	N
SJR at Lander	95	N	N/A	N/A	97.5	N	91.2	N
Salt Slough at Lander	97.5	N	100	N	98.8	N	62.5	Y
Salt Slough at Sand Dam	98.75	N	95	N	91.3	N	87.5	N
Los Banos Creek at Hwy 140	98.75	N	95	N	97.5	N	56.2	Y
Los Banos Creek at China Camp Rd.	100	N	93.8	N	91.3	Y	58.8	Y
Mud Slough	100	N	98.8	N	97.5	N	76.2	Y

Site	Sep 04 % Survival	Sep 04 Toxicity (Y/N)
Hospital Creek	85	N
Ingram Creek	0	Y
Westley Wasteway	95.7	N
Del Puerto Creek (Cox Rd)	93.75	N
Del Puerto Creek (Hwy 33)	N/A	N/A
Orestimba Creek at River Rd.	95	N
Orestimba Creek at Hwy 33	52.5	Y
Ramona Lake at Fig Ave.	N/A	N/A
Newman Wasteway	90	N
Turner Slough	93.75	N
SJR at Lander	88.75	N
Salt Slough at Lander	92.5	N
Salt Slough at Sand Dam	95	N
Los Banos Creek at Hwy 140	93.75	N
Los Banos Creek at China Camp Rd.	95	N
Mud Slough	92.8	N

N/A indicates no sample taken or criteria not applicable.
Shaded cells indicate that the site is no longer monitored for sediment toxicity.

A total of 10 different pesticides were detected in water samples during the 2008/09 non-irrigation season for a total of 44 detections (of which 26 were detected below the reporting limit).

- Chlorpyrifos (16 detections): Chlorpyrifos is a common organophosphate pesticide used to control a wide range of insects in orchards, pasture, and field crops. It can be used as a dormant spray for fruit and nut trees. Most of the chlorpyrifos applications during this reporting season were on field crops such as corn, cotton, and alfalfa.
- DDT/DDD/DDE (7 detections): DDT is an organochlorine pesticide that was banned for agricultural use in 1972. It is a legacy pesticide that is still detected in the watershed at relatively low levels. DDE and DDD have no commercial value but are compounds normally associated with the degradation of DDT.
- Diuron (8 detections): Diuron is a substitute urea herbicide used to control weeds in a variety of field crops including cotton, alfalfa, and wheat. It is also effective in controlling algae. Most of the diuron applications during this reporting season were on cotton and alfalfa.
- Endosulfan I (1 detection): Endosulfan is a Group A organochlorine pesticide used to control a variety of insects on vegetable crops, grains, and cotton. Based on available pesticide use reports, this material is not widely used.
- Heptachlor (1 detection): Heptachlor is an organochlorine insecticide that was banned in the United States in 1978.
- Malathion (1 detection): Malathion is an organophosphate insecticide used on a variety of crops including alfalfa, walnuts, lettuce, grapes, and cotton.
- Methoxychlor (1 detection): Methoxychlor is an organochlorine pesticide used to control insects on fruits, vegetable and forage crops.
- Ethyl parathion (1 detections): Ethyl parathion is an organophosphate pesticide used to control a wide range of insects. Its use is restricted to 9 crops: alfalfa, barley, corn, cotton, canola, sorghum, soybean, sunflower, and wheat.
- Prowl (5 detections): Prowl is a herbicide used to control broadleaf and grassy weeds and is approved for a variety of crops including cotton, field corn, beans, rice, and vineyards.
- Simazine (3 detections): Simazine is a triazine herbicide used to control broadleaf weeds and annual grasses in a variety of field crops.

Exceedences of Recommended Water Quality Values

Water chemistry analyses were compared to recommended water quality values[3] (RWQV).

- **Field, General Physical and Drinking Water Quality Exceedences.** Comparisons were made to several RWQVs. **Attachment 5** tabulates the results for these constituents and the comparison to the RWQVs. The Westside Coalition performed analyses or observed almost 2,400 field and chemistry (non-pesticide) parameters during the reporting period, during which, 197 (8.3%) results were greater than the RWQVs. Electrical conductivity and total dissolved solids (TDS) accounted for 52 and 67 of these

[3] Water Quality Limits were taken from a Central Valley Regional Water Quality Control Board letter to the Westside Coalition, dated 30 September 2005. Water quality limits for cadmium, copper, lead, nickel and zinc are calculated from equations provided by the Central Valley Regional Water Quality Control Board.

exceedances (respectively). E. coli and Fecal coliform results accounted for 24 and 33 of these exceedances (respectively), 3 for total suspended solids (TSS), 7 for dissolved oxygen (DO), and 4 for pH, and 2 for boron. The RWQV for cadmium, copper, lead, nickel, and zinc are dependant on site water hardness and is a calculated value. During this reporting period, 2 exceedances for copper were measured and 1 for zinc. All three of these occurred during Rain Event 7.

- **Pesticide exceedences.** The Westside Coalition tested for more than 1,900 pesticides during the reporting period. These analyses resulted in 44 detections, of which, 13 (<1%) were greater than established RWQVs. Of the 13 exceedances, 7 were caused by legacy pesticides (either DDT or DDE), which are not currently in use, with the remaining 6 exceedances caused by chlorpyrifos. Although data provided by the county Agricultural Commissioners indicated that the majority of chlorpyrifos applications occurred during the fall, 14 of the 16 detections and 4 of the 6 RWQV exceedances were measured in the winter (Event 52 and Rain Event 7). See **Attachment 5.**

SECTION 7: ACTIONS TAKEN TO ADDRESS WATER QUALITY IMPACTS

1. Reporting and Outreach:

Outreach included regular updates at the monthly meeting of the Westside Coalition and at regular board meetings of the West Stanislaus Resource Conservation District. Presentations to these groups focused on providing updates and results of BMP studies undertaken in this project. Additional outreach meeting were held per the attached tabulation shown in **Table 9**. At each meeting, the latest information on the BMP studies conducted in this grant as well as other BMPs applicable to managing sediment and pesticide runoff were provided.

Table 9: Outreach Meetings

Date	Group	Location	Description	Approximate Attendance
12/3/2008	Westley Landonwer Meeting	Westley	Provded information on water quality exceedences, best management practices and funding opportunities	20
12/4/2008	Newman Landowner Meeting	Newman	Provded information on water quality exceedences, best management practices and funding opportunities	6
1/21/2009	El Solyo Water District	Vernalis	Met with Board to review membership, drainage issues and BMP's	8
3/12/2009	SLCC Salt Sl. Meet	Dos Palos	Met re Salt Sl Lorsban exceedances	20
3/24/2009	CCID Landowners Meeting	Firebaugh	Dos Palos Area Update	100
3/25/2009	CCID Landowners Meeting	Los Banos	Los Banos Area Update	175
3/26/2009	CCID Landowners Meeting	Gustine	Patterson Area Update	175

BMP publications continued to be developed and distributed. Through the funding of Westside Coalition, CURES, pesticide manufacturers and grant programs from the State of California the "Grower Handbook: Management Practices for Protecting Water Quality" is updated and made available for distribution.

2. Management Plan Activities:

The Westside Coalition began the process of developing a management plan in the winter of 2007. Although the management plan was not in place during this reporting period, the Westside Coalition began implementation of some of its components.

- **Management Practice Survey:** A focused watershed plan was included within the management plan, which focused on addressing the specific issues of a small number of subwatersheds at a time. The first focused watersheds will be Hospital and Ingram Creeks. Management practice survey forms were circulated to all of the growers within these two subwatersheds to determine the current operational practices. Approximately 90% of the surveys have been returned and the Westside Coalition is in contact with the remaining growers.
- **Pesticide Use Data:** The Westside Coalition has been in contact with the Agricultural Commissioners of Fresno, Merced, and Stanislaus counties to obtain recent pesticide use data for those regions of the Coalition. This data has been used to correlate application timing and cropping patterns with detections in the various waterbodies and to track overall trends of pesticide use patterns. The Westside Coalition will use this data to help identify regions where pesticide discharges into the water ways could be occurring.
- **Management Practice Funding Assistance:** The Westside Coalition has developed a funding assistance program to help growers construct and maintain tailwater sedimentation ponds and return systems within the Coalition. The Coalition is also assisting some of its member districts in obtaining funds to construct larger-scale regional tailwater collection and return projects.
- **Regional Tailwater Return Systems:** As was reported in prior monitoring reports, a number of regional tailwater ponds and recirculation systems have been constructed recently in the Patterson Subarea of the Westside Coalition (most recently the Northside Recovery System and the Westley Tailwater Pond). These systems have shown significant impact in improving water quality in the receiving waterbody, but also increased water management flexibility. Two additional tailwater return system projects have been identified in the Ingram and Hospital Creek watershed areas, and potential funding programs for these are being sought.
- **Conversion to high efficiency irrigation systems:** Drip and micro-sprinkler irrigation systems virtually eliminate tailwater discharges as well as providing some advantages in the applications of chemicals that can reduce impacts to water quality. Several of the districts within the Westside Coalition have implemented grant and loan programs that to assist growers in upgrading their irrigation systems. During the 2008 irrigation season more than 2000 acres of high efficiency irrigation systems came on line. In addition approximately 8,000 acres in the Dos Palos subarea was converted from field crops to almonds and pomegranates, all using drip or micro-spray irrigation.

The dry conditions combined with pumping restrictions placed on the pump stations that feed the California Aqueduct and Delta-Mendota Canal have severely reduced the agricultural water supply. Central Valley Project (CVP) water allocations for South-of-Delta contractors have been reduced to 10% for the 2009 irrigation season.

3. Monitoring Results:

Data gathered since the inception of the monitoring program has allowed the Westside Coalition to identify problem areas and issues. Details of sites exhibiting significant toxicity during this monitoring period are included in **Attachment 2** and all results that exceeded RWQVs are included in **Attachment 5**. This information, along with results from previous years will be used as talking points during upcoming grower meetings to outline the problem issues and sites. The

Management Plan and Focused Watershed Plan also outline approaches that will be implemented to address the highlighted issues. A number of preliminary conclusions can be made from the data collected so far:

- **Sediment Toxicity:** Sediment toxicity tests were performed on 11 samples in September (Event 48). The results of these tests were similar to previous sediment toxicity results in that sites which showed significant toxicity had a fairly consistent history of toxic results since the beginning of the program. Samples from Hospital Creek, Ingram Creek, and Westley Wasteway all measured severe toxicity and all had shown toxic results in the past. Blewett Drain sediment had not been tested prior to this event, however the crops and farming practices in the Blewett Drain watershed are similar to Hospital and Ingram Creeks and the results are not surprising. Del Puerto Creek measured a moderate level of toxicity and had shown toxic results in the past. Measurements from Newman Wasteway, Los Banos Creek at China Camp Road, and Poso Slough showed toxicity that was statistically significant, but relatively minor in magnitude (>70% survival). Sediment samples from Hospital Creek, Ingram Creek, Blewett Drain, and Westley Wasteway were tested for a variety of pesticides as well as total organic carbon (TOC). Results from Blewett Drain and Hospital Creek measured elevated levels of bifethrin (0.26 mg/kg and 0.78 mg/kg, respectively) along with fenvalerate in the Blewett Drain sample (0.53 mg/kg), which probably explains the toxicity at those sites. Pesticide results from the Ingram Creek and Westley Wasteway samples did not measure any pesticide at a level that would explain toxicity. The Westside Coalition believes the best way to reduce sediment toxicity will be through the management of sediment discharges at the farm level. Sedimentation ponds and tailwater return ponds, along with grower awareness of the issue will likely reduce the amount of sediment load leaving the farm and depositing in the waterways. The Coalition's Management Plan and Focused Watershed Plan include management approaches to address sediment toxicity.

- **Aquatic Toxicity:** During this reporting period, 5 samples indicated significant toxicity to *Ceriodaphnia dubia*. **Attachment 2** provides monitoring results for all of the sites that measured significant toxicity, including a discussion of the TIE and dilution series findings. Only one sample measured toxicity at a level that required follow-up testing (Hospital Creek during Rain Event 7 – 0% survival) and two results that were statistically significant were relatively minor in magnitude (San Joaquin River at Sack Dam – 75% survival, and Turner Slough – 80% survival, both during Rain Event 7). Insecticides were detected in two of the samples at levels that could explain the toxicity (Mud Slough in Event 48 and Hospital Creek in Rain Event 7), but the cause of toxicity in the remaining 3 samples is not apparent.

- **Pesticide Analyses:** During this reporting period, a total of 10 different pesticides were detected (44 detections, total) with 13 exceedances of the established RWQV. Six of the exceedances were caused by chlopyrifos, 6 by DDE and 1 by DDT. Toxicity could be linked to chlopyrifos exceedances in 2 samples (Mud Slough during Event 48 – 0.098µg/L and Hospital Creek during Rain Event 7 – 0.57µg/L). No toxicity was observed in any of the other samples exceeding the chlopyrifos WRQV. See **Attachment 2**.

- **General Chemistry and Field Observations:** The monitoring results during this reporting period indicated similar issues as in previous reports and no significant changes compared to the 2007/08 non-irrigation season. EC/TDS measured the largest number of exceedances for this reporting period (52 and 67 exceedances, respectively), which is not surprising given the very dry hydrologic year. Bacteria continues to be a leading source of exceedances (24 for E. Coli and 33 for Fecal Coliform during this period). Other constituent exceedances include TSS (3 exceedances), pH (4 exceedances), DO (7 exceedances) and Boron (2 exceedances). Cadmium, copper, lead, nickel, and zinc results were compared to the calculated RWQV (based on site water hardness). During Rain Event 7, copper exceeded the RWQV twice, and zinc once. No other metals exceeded the RWQV. With many of these constituents, the source of the exceedance is neither clear nor easily traceable, and often can be found in the source water itself (such as the San Joaquin River at Sack Dam).

SECTION 8: COMMUNICATION REPORTS

Exceedance reports were submitted to the Central Valley Regional Water Quality Control Board in response to monitoring results for the reporting period. These reports are included in **Appendix B.**

Follow-up included reporting statistically significant toxic events and exceedences of water quality values to the overlying districts, PCA's and to individual Coalition participants. The districts would then communicate with the affected growers to notify them that there is a problem. Meetings are then to be organized at the Coalition level as required to inform landowners, operators, PCA's, chemical applicators and others on monitoring results and likely best management measures that could be undertaken to minimize these problems (See **Table 9**).

SECTION 9: CONCLUSIONS AND RECOMMENDATIONS

The Westside Coalition's monitoring program has identified constituents of concern (see **Attachments 2** and **5** and **Table 8**). The Westside Coalition had developed a Management Plan and Focused Watershed Plan to address the water quality concerns discovered by previous monitoring. Implementation of these plans has begun.

DELTA MENDOTA CANAL
WATER QUALITY DATA (TDS)

July, 2010

DATE	HDWRKS	HDWRKS AVG	CK 13	CK. 13 AVG	CK 20	CK 20 AVG	CK 21	CK. 21 AVG	CFS @13	CFS @POOL
1	190	190	192	192	243	243	241	241	3050	2450
2	169	180	182	187	216	230	209	225	2900	2300
3	161	173	179	184	206	222	200	217	2750	2150
4	163	171	164	179	207	218	203	213	2750	2150
5	169	170	161	176	188	212	185	208	2850	2250
6	163	169	165	174	184	207	180	203	3030	2350
7	159	168	163	172	185	204	180	200	3350	2650
8	169	168	159	171	188	202	180	197	3350	2650
9	194	171	163	170	182	200	179	195	3500	2800
10	175	171	171	170	185	198	179	194	3500	2800
11	187	173	171	170	196	198	185	193	3350	2650
12	150	171	172	170	188	197	191	193	3150	2500
13	173	171	174	170	196	197	199	193	3150	2500
14	168	171	172	171	197	197	194	193	3500	2800
15	166	170	171	171	191	197	186	193	3700	2900
16	156	170	169	171	202	197	185	192	3700	2900
17	154	169	167	170	183	196	189	192	3400	2600
18	161	168	165	170	195	196	190	192	3100	2300
19	160	168	172	170	188	196	183	191	3100	2400
20	153	167	180	171	194	196	184	191	3100	2400
21	152	166	171	171	206	196	194	191	3100	2400
22	167	166	165	170	197	196	194	191	3400	2600
23	156	166	181	171	189	196	184	191	3500	2700
24	156	165	177	171	199	196	187	191	3600	2800
25	151	165	182	172	182	195	191	191	3000	2200
26	158	165	171	172	206	196	209	192	2950	2300
27	161	164	194	172	205	196	203	192	3150	2450
28	162	164	193	173	214	197	199	192	3350	2600
29	159	164	207	174	215	197	201	193	3350	2600
30	161	164	200	175	221	198	208	193	3170	2450
31	161	164	206	176	223	199	217	194	2970	2250
								AVE	3220	2511

0 READING INDICATES STATION OUT OF SERVICE

Exhibit A

Del Puerto WATER District

P.O. Box 1596 • Patterson, CA 95363-1596

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Guidelines Concerning Anticipated District Action Regarding Conversion of Agricultural Lands to Municipal and/or Industrial Purposes

A. Introduction

The guidelines which follow are premised in part on the following findings:

1. Del Puerto Water District ("District") was formed to serve agricultural lands within its boundaries.

2. The District's Water Supply Contract with the Bureau of Reclamation expires on February 28, 2030, is renewable under mutually agreed to terms for an additional 25 years, and may be subject to legal challenge.

3. The District is subject to ongoing shortages of supplies under the terms of its Water Supply Contract, which shortages have been increased dramatically within the last 15 years and are likely to continue to be imposed in the future as a result of new regulatory constraints.

3. The Water Supply Contract of the District is the sole source of water supply available to and administered by the District.

4. Over one-half of the District's lands are planted to permanent crops which need an adequate and reliable water supply every year in order to survive.

5. Certain lands within the District may in the future be developed to urban (municipal and industrial) purposes.

6. The District does not want to incur either the cost or liability associated with providing water supplies for urban uses.

7. The District cannot guarantee the reliability of water supplies needed for urban uses, therefore in whole or in part (as described below in the guidelines), lands converted to urban uses must be capable of being served from sources other than the District.

8. In order to avoid potential conflicts over competing water supplies and governance issues, in general, as lands urbanize they should be detached from the District and annexed to a responsible public agency which is willing and able to supply water for urban uses for such lands.

9. The District is in need of additional water supplies to supply the agricultural lands which remain in the District after certain lands are detached and urbanized.

10. It is recognized that in certain areas of the District, there may not be water supplies available to serve lands converted to urban uses other than from the District. Therefore, to the extent the owners of such lands have historically paid District charges and have been allocated a portion of the District's water supply and have put such water to reasonable and beneficial use, the owners of such lands to be urbanized which do not have alternative supplies should be allowed to convert a portion of the District's supplies to urban uses, provided that such conversions do not adversely affect other District landowners.

B. Guidelines

Based on the foregoing findings, the District Board of Directors approves the following guidelines. These guidelines will be used for future District decisions regarding proposals for conversion of District lands to urban uses, on a case-by-case basis. These are only guidelines and any actions herein contemplated are subject to execution of formal agreements approved by the District's Board of Directors. These guidelines are subject to modification by the District's Board of Directors in the future as conditions warrant.

1. As lands are converted to urban uses, they will be detached from the District and annexed to another public agency (such as a city or special district) which is responsible for providing domestic service to such lands at no cost to the District (subject to paragraph 6, below). In cooperation with LAFCO and other public agencies, arrangements will be made with the owners of such lands scheduled for urban development who wish to continue to keep lands and agricultural production pending urban conversion, to continue to receive agricultural water service from the District until such time as the urban conversion takes place.

2. The District will not become a retailer of water service to urban uses.

3. In those instances where lands to be converted to urban uses do not have an alternative water supply adequate to accommodate the needs of the urban use (such as groundwater being available), the District will consider the assignment of a portion of the District's Water Supply Contract with the Bureau of Reclamation to the public agency assuming responsibility for providing an urban water supply , not to exceed that portion of the District's water supply which has historically been allocated to such lands and put to reasonable and beneficial use. The developer or urban supplier pay all costs associated with such assignment. In those instances where there is an alternative supply capable of supplying substantially all the needs of the urban development, the District will not assign a portion of the Water Supply Contract but rather reallocate such supply for other uses within the District.

4. In those instances where there is an assignment of a portion of the District's Water Supply Contract as provided in the immediately preceding paragraph, the

assignment will provide, among other things, that (a) the assigned water supply, regardless of any future Bureau policies, will have the same priority in times of shortage as irrigation supplies; (b) all unpaid capital and any O&M deficits associated with such assigned supply shall be assumed by the assignee urban water supplier and the District will be held harmless from any of those or similar costs associated with that water supply subsequently levied by the Bureau of Reclamation or other agencies.

5. As an additional requirement of any assignment of the District water supply, financial compensation shall be provided to the District to continue to pay all of the fixed costs of the District's operations associated with the subject property after the size of the District and the number of acres paying such fixed costs has been reduced by detachment.

6. In those instances where lands to be converted to urban uses do not have an alternative water supply adequate to accommodate the needs of the urban use, and no public agency exists or can reasonably be formed to assume responsibility for providing an urban water supply, the landowner/developer may petition the District's Board of Directors to convert a portion of the District's water supply which has historically been allocated to and been put to reasonable and beneficial use on such lands for urban purposes, and not be subject to the conversion/assignment/detachment process described above. Said water to be delivered on a wholesale basis canalside from the Delta-Mendota Canal under the terms of separate agreement.

7. The District will not allow water users to permanently transfer allocations of the District's water supply from one acre of land to another, sometimes referred to as "strip and stacking."

8. Conversion to urban uses within the District should occur in areas immediately adjoining other urban areas within or adjoining the District. In those instances where developers wish to pursue isolated urban development within the District, in order for the District to cooperate in the conversion in accordance with these guidelines, any adverse impacts associated with the urban conversion on remaining agricultural uses surrounding such an urban area must be fully mitigated.

9. The District will entertain other proposals from District landowners or public agencies which improve the supply and reliability for remaining agricultural uses within the District on a case-by-case basis.

Approved October 19, 2005

Revised and Adopted 1/16/2002

~DEL PUERTO WATER DISTRICT~

Rules and Regulations for Water Service

I. WATER APPLICATION & CERTIFICATION REQUIREMENTS

As a pre-condition to the receipt of water, each landowner and each lessee where applicable (herein called "landowner/wateruser") is required to submit to the District, on an annual basis, a fully executed:

A. DISTRICT WATER APPLICATION

Each landowner/wateruser must agree in writing to subscribe to and be bound by these Rules and Regulations and to provide payment to the District of all sums necessary for the purchase and delivery of his/her pro rata share of the District's Water Supply; and

B. CERTIFICATE OF LANDHOLDING FORM(S)

Each landowner/wateruser must provide the District with the appropriate Bureau of Reclamation form(s) describing the District lands to be irrigated with this water and indicating his/her compliance with the provisions of applicable Reclamation law.

II. WATER ALLOTMENTS

The District water supply is allocated on an equal-share-per-irrigable-acre basis regardless of cropping pattern.

III. WATER YEAR

The District's water year runs from March 1 of each year through February 28 of the following year.

IV. WATER PURCHASE OBLIGATION

A. PAYMENT FOR ALLOCATED WATER

Water which the District acquires from the Bureau of Reclamation which is made part of the annual allotment shall be paid for by the applicable landowner/wateruser, at rates annually established by the Board of Directors, following the billing procedures set in Article V below.

B. OTHER WATER SUPPLIES, TRANSFERS AND STORAGE

The Board may acquire other water supplies, may provide for the annual transfer of water allocated to each landowner, and may provide for transportation and/or storage of water obtained from other sources, including groundwater. Such additional supplies, annual transfers and transportation/storage shall be provided for by the District under separate annual policies. Any landowner/wateruser interested in such policies should obtain a copy from the District.

The District will maintain a standard policy, subject to revision at any time, which addresses the District's criteria for a landowner proposing to enact a long-term transfer under the auspices of the Central Valley Project Improvement Act.

C. COST ADJUSTMENTS

The District will bill for services provided under "A" and "B" above based on the best available information then available to the District. There may be adjustments in such rates and charges subsequent in the year and/or in the following year when the actual costs of the District become known.

V. BILLING PROCEDURES

A billing form is mailed the first of February detailing the Water Availability Charge in accordance with the rate set by the Board of Directors of the District. A second billing form is mailed in mid-February setting forth the water allotment for each parcel, the cost per acre-foot, the total cost of Allocated Water and the Water Cost Prepayment obligation. No water will be delivered until both the Water Availability Charge and the Water Cost Prepayment have been paid.

A. WATER AVAILABILITY CHARGE

- The District's General and Administrative Budget is funded through a Water Availability Charge that is calculated on a per-acre basis and charged to all irrigable lands within the District including non-irrigated acreage and acreage irrigated from privately owned wells.
- The rate for the Water Availability Charge is established annually by the Board of Directors.
- The Water Availability Charge is billed on February 1 and becomes delinquent on March 1 of each year.
- Should the Water Availability Charge become 30-days delinquent, the current year's water allocation is forfeited. In addition to other remedies available to the District, the delinquent amount shall constitute a lien against the property, which must be cleared prior to receiving any future water service from the District.

B. ALLOCATED WATER

- The District will allot to its users the water supplies allocated to it under its contract with the Bureau of Reclamation based on the Bureau's February 15th Water Supply Forecast Announcement. This allotment will be revised as necessary to reflect changes in contract supplies made available to the District by the Bureau.
- Water so allotted will be called "Allocated Water".
- Prior to March 30th, the user may elect to reduce his/her Allocated Water supply for the current water year. The reduced allocation shall become the user's "Allocated Water" for the remainder of the water year.

C. WATER COST PREPAYMENT

- A Water Cost Prepayment, equal to 25% of the total cost of the Allocated Water is due prior to its delivery or no later than March 30th.
- The first 75% of Allocated Water will be charged based on actual monthly water use and billed to the user by the 10th of the month following its use.
- Payment for Allocated Water must be received within 30 days of the billing date (i.e. before the end of the next billing cycle) to avoid interruption in service.
- The Water Cost Prepayment will be applied toward the last 25% of Allocated Water use after 75% of the user's Allocated Water has been delivered and paid for.
- A Water Cost Prepayment may be applied prior to taking delivery of and paying for 75% of a user's Allocated Water, but only after the user provides the District with appropriate written notification that the user is finished irrigating for the year and wishes to forego all unused water remaining in their account. Upon such notification, the user's Water Cost Prepayment will be applied against any balances due and any remaining credit will be refunded. Users exercising this option must do so with the understanding that any subsequent request for water from current year supplies will be subject to the terms and availability of Additional Supplies and must be paid for in advance.

D. ADDITIONAL WATER

- "Additional Water" is water that a water user requests in addition to his Allocated Water supply.
- The District will attempt to meet all user requests for Additional Water.
- The Board of Directors shall establish an annual policy regarding the cost, apportionment, transferability and billing and payment terms for Additional Water.

E. LANDOWNER RESPONSIBILITY

- While a reasonable effort will be made by the District to collect from tenants, unpaid water tolls shall remain the responsibility of the landowner. District management shall make an effort to notify landowners that tenants have unpaid water tolls within 15 days of any delinquency.
- Property with unpaid water tolls shall be subject to discontinuation of water deliveries until such time as these debts are cleared or payment arrangements have been made. In addition to other remedies available to the District, unpaid Water Availability Charges and water tolls shall constitute a lien on the land.

F. OVERUSE

- There is no provision for overuse of available supplies.

- In the event of any overuse, the landowner/wateruser will either be charged the cost to the District associated with purchasing an additional supply to cover the overuse (to the extent that any such supplies are available to the District) or have his/her supply in the subsequent year reduced by a like amount.

VI. WATER DELIVERY / SHUTOFF PROCEDURE

- All orders for water must be placed at least one day prior to the day of delivery. Since orders for water must be reported prior to 11:00 A.M. each day, it may be necessary to delay orders received after that hour an additional day. Orders for Saturday, Sunday or Monday must be received before 11:00 A.M. on Friday.
- When ordering, each landowner/wateruser must provide the District with the following information:

1. Name and account number of the water user
2. Turnout location (e.g. 19.18 Left)
3. Amount of water wanted (in cubic feet per second)
4. Date and time wanted
5. Which pump, if applicable (e.g. "A", "B" or "C")

- Shutoff information must be provided in the same manner a day in advance.
- All orders must be cleared through the District office. Those taking water without ordering are subject to unannounced shutoffs.

A. LOCKS AND LOCKING MECHANISMS

- Under no circumstances are the Bureau of Reclamation chains and/or padlocks to be cut, tampered with or subverted in any way. Offenders are liable for damages, subject to fines, possible prosecution for damage to government property and unannounced shutoffs.
- All pump well panel boxes must be equipped with an operational locking device maintained by the user.

B. OPERATION OF TURNOUT GATES

After an order has been placed and a gate unlocked, the user may operate the turnout gate. However, under no circumstances are these gates to be tampered with beyond the tolerances set by the locking nuts that determine normal opening and closing. Leaking gates should be reported to the District offices immediately so that repairs can be made as soon as possible.

C. SPRAY WATER ORDERS

Orders for spray water either through a turnout or by pumping water over the lining of the canal must be cleared through the District office. The District charges a minimum one (1) acre-foot per order.

VII. WATER MEASUREMENT

A. MEASURING DEVICES

The District's water use is determined by Bureau of Reclamation metering devices installed at each turnout. On turnouts serving more than one user, the District requires that the landowners provide, at their expense, an appropriate location for the installation of a District installed and maintained metering device(s) for each landowner/wateruser. As of December 1, 2001, additional meter sites required as a result of parcel subdivision and/or property sales and the cost to install, maintain and replace such new meters will be borne by the landowner/wateruser served thereby.

B. WATER USE DETERMINATIONS

In the case of a failure in such District measuring devices, it is the responsibility of the landowner/wateruser to notify the District immediately and to provide the District with an accurate determination of the amount of water used but not measured. The landowners/waterusers of a Bureau of Reclamation turnout serving more than one landowner/wateruser must account for the total water use at a turnout as measured by the Bureau of Reclamation meter. In the event of a dispute, the District reserves the right to shut off water service from the turnout until a settlement is reached.

VIII. WATER CONSERVATION

The District shall encourage all prudent and responsible water conservation measures by its landowners/waterusers and will cooperate to the extent possible in studies and efforts to

conserve the available water supply. Landowners/waterusers are responsible for use of water on their property and shall not use water in a wasteful manner.

IX. USE OF BUREAU OPERATING ROADS / RIGHTS OF WAY

Canalside and wasteway operating roads are owned by the Bureau of Reclamation. Permission to use these roads is subject to Bureau of Reclamation approval and is granted only at one's own risk. Any use of lands within the Bureau of Reclamation rights-of-way is subject to prior approval and conditions.

X. USE OF FARM CHEMICALS

Under no circumstances are farm chemicals allowed on Bureau of Reclamation roads, rights-of-way or installations.

XI. ANNUAL CROP REPORTS

Each landowner/wateruser shall provide the District with an annual crop report in order to assist the District in compiling its annual crop report for the Bureau of Reclamation.

XII. DISTRICT LIABILITY

Neither the District, nor its directors, officers, employees nor agents will be liable for any damages arising out of the inability of the District to provide sufficient water to landowners/waterusers. Furthermore, landowners/waterusers shall indemnify, hold harmless and defend the District and its directors, officers, employees, and agents from any damage, injury or death arising out of or relating to landowners/waterusers use of water provided by the District once it is delivered to the landowners/waterusers.

XIII. ENFORCEMENT OF RULES AND REGULATIONS

The General Manager of the District is authorized to perform all acts necessary and proper to enforce these Rules and Regulations. Failure of a landowner/wateruser to comply with any of these Rules and Regulations shall be sufficient cause for termination of water service, and water service will not again be furnished to such landowner/wateruser until full compliance has been made with all the requirements as herein set forth; PROVIDED, HOWEVER, that the landowner/wateruser in no way be relieved of any responsibility for payment of any charge or obligations by reason of such termination of water service. When it is practicable to do so, advance notice of any such termination of water service will be furnished to landowner/wateruser. In no event shall any liability accrue against the District or any of its officers, agents or employees, for damage, direct or indirect, arising from such terminations of water service. Non-enforcement of any provision of these Rules and Regulations does not constitute a waiver of the District's right of enforcement at any time.

XIV. APPEALS

In the event a landowner/wateruser disagrees with a decision made by the General Manager in carrying out the enforcement of these Rules and Regulations, he/she shall have the right of appeal to the Board. Appeals should be submitted in writing no less than five (5) days prior to a regular meeting of the Board in order to be considered at that meeting, and shall specifically set forth the decision being appealed and shall give the reasons for said appeal. Decisions of the Board of Directors shall be final.

XV. EFFECTIVE DATE AND AMENDMENTS

These Rules and Regulation shall become effective March 1, 2002, and may be added to amended or repealed at any time by resolution of the Board of the District.

Del Puerto WATER District

P. O. Box 1596 • Patterson, CA 95363 (209) 892-4470 • FAX: (209) 892-4469

Important Memo to Water Users

The current Rules and Regulations regarding the District's Water Cost Prepayment read as follows:

V. (B). WATER COST PREPAYMENT

- The District will allocate water supplies based on the Bureau of Reclamation's February 15th Water Supply Forecast Announcement. This allocation will be revised as necessary to reflect changes made by the Bureau.
- A Water Cost Prepayment, equal to 25% of the cost of the total water allocation will be due prior to delivery of current year Water Supplies and no later than March 30th.
- Prior to March 30th, the user may elect to reduce his/her allocation for the current water year. The remaining ("unneeded") allocation becomes a District supply available for remarketing as Additional Water.
- The Water Cost Prepayment will be applied toward water costs incurred after 75% of the user's water allocation has been delivered and paid for.

In response to a number of questions and requests from customers, the District has developed and adopted the following policy addendum regarding the application and refundability of these Water Cost Prepayments.

- Regardless of whether or not a user has taken delivery of and paid for 75% of his water allocation,

  IF, A USER:
  1) has finished irrigating for the year,
  2) does not plan on using any Carryover Water in the next water year, and
  3) provides a request in writing to the District;

  THEN, THE DISTRICT WILL:
  1) apply the user's Water Cost Prepayment to clear the final balance due, and
  2) refund any remaining credit balance.

  THIS, WITH THE UNDERSTANDING THAT:
  1) any unused water in the user's account is returned to the District for remarketing, and
  2) any subsequent request for water from this user during the water year:
     a) will be subject to the availability of Additional Supplies,
     b) will be delivered at the Additional Supplies Rate, and
     c) must be paid for in advance.

If you would like to take advantage of this policy and request an "early application" of your Water Cost Prepayment to your outstanding balance and/or apply for a refund, please provide the District with a written request to this effect.

You are reminded that there are no charges for unused water remaining in a user's account and that any credit balances left on account with the District are fully applicable towards the subsequent year's obligations.

QUESTIONS? CONTACT US AT (209) 892-4470.

Del Puerto WATER District

P. O. Box 1596 • Patterson, CA 95363 (209) 892-4470 • FAX: (209) 892-4469

April 1, 1997

Dear Landowner/Water User:

This following policy, adopted by the Board of Directors for implementation beginning with the 1997-98 water year, describes the method the District uses to implement and enforce its Rules and Regulations regarding payment of monthly water charges. It also addresses the timing of and notifications required prior to placing a lien on property for unpaid water tolls.

The current Rules & Regulations of the District state:

> Allocated Water is charged based on actual monthly water use and is billed to the user by the 10th of the month following its use. Payment must be received within 30 days of the billing date (i.e. before the end of the next billing cycle) to avoid interruption in service.

Payment and Collections Policy

If payment is not received within 30 days of billing...

- When an invoice is 30 days old (at the end of the next billing cycle), along with the current month's invoice, a 15-day Notice of Delinquency will be enclosed advising the water user that he/she is subject to shut off of water deliveries in 15 days if the delinquent amount is not paid in full.

If payment is not received within 45 days of billing...

- At the end of the 15-day warning period (about the 25th of the month), a 5-Day Notice of Pending Lock Up will be sent to the water user (with a copy to the landowner) advising that water deliveries will end in 5 days.

If payment is not received in 50 days of billing...

- At the end of the 5-day shutoff period (the end of the month), water deliveries to the user will be shutoff by the San Luis & Delta Mendota Water Authority in the presence of the District Watermaster. The turnout or user's canal gate will be locked and the meter(s) read. A Notice of Lock Up is then sent to the landowner with a copy provided to the user.

  Note: Payment to reestablish water deliveries may be made with either certified funds or a check but water deliveries will not be made until the required funds have cleared the bank.

If payment is not received in 60 days of billing...

- If at the end of the next (the third) billing cycle the account is still not current, a 15-day Notice of Lien will be sent to the landowner. The full amount due on this account will be included in this notice.

If payment is not received in 75 days of billing...

- 15 days after the Notice of Lien has been sent, a lien is recorded on the subject property. The lien must be satisfied and all other current due amounts must be paid in full prior to release of the lien and re-establishment of water deliveries to the property.

If a water user has allowed a delinquency to go to Lock Up in a single water year...

- A subsequent failure by such a user to pay an invoice within the required 30-day term will result in an immediate 5-day Notice of Pending Lock Up being issued, followed by Notice of Lock Up and 15-day Notice of Lien at the end of the 5-day notice.

Del Puerto WATER District

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SUPPLEMENT TO RULES & REGULATIONS FOR WATER SERVICE

WHEREAS, the District Board of Directors on January 25th, 1995 adopted Rules and Regulations for water service as authorized by Water Code § 35423 and this policy supplements such Rules and Regulations; and

WHEREAS, it is the intent of District policy to avoid any adverse effects resulting from utilization of its water supplies; and

WHEREAS, as provided at XII of the Rules and Regulations, the District assumes no liability once water is delivered to a water user, including any detrimental impact on neighboring districts and/or their users, but encourages cooperation among districts and users and requests appropriate mitigation of demonstrable adverse impacts; and

WHEREAS, it is in the best interest of all that water be fully beneficially used to the extent practical, which in particular instances may include reuse of water, including reuse in adjoining districts; and

WHEREAS, other districts in the area have established a standard of 900 mg/l of Total Suspended Solids (TSS) as a maximum for receiving water into their distribution systems; and

WHEREAS, the District is committed to work with its landowners and water users to assist in the implementation of appropriate on-farm sediment reduction practices;

THEREFORE, the Board of Directors adopts the following to supplement its Rules and Regulation with regard to water leaving District boundaries and directly entering another district's distribution system:

1. The standard for water leaving the District to another district's distribution system shall be no higher than 900 mg/l of Total Suspended Solids (TSS).

2. Periodic monitoring of TSS shall be made of such waters under District auspices to determine if this standard is being met.

3. If the standard is not being met, the water user(s) shall be notified and any needed alteration(s) required to meet this standard shall be made immediately.

4. If the water user(s) fails or refuses to make the necessary alterations within 24 hours of notification, the Manager may order the curtailment of deliveries to the lands from which it appears such water is originating.

Exhibit C

Adopted 12/19/2007

Del Puerto WATER District

P. O. Box 1596 • Patterson, CA 95363 (209) 892-4470 • FAX: (209) 892-4469

2008-2009
SURFACE WATER TRANSFER POLICY
FOR SUPPLIES ALLOCATED UNDER DISTRICT CONTRACT

WHEREAS, it is the District's intent to serve and protect the agricultural water supply interests of its landowners, and

WHEREAS, it is the District's responsibility to use all proper methods to accomplish the most reasonable and beneficial use of its contractual surface water supplies, and

WHEREAS, the District desires to manage water transfers so that there are no unreasonable impacts on the water supplies, operations, and financial condition of the District, or on its water users within the District's service area, and

WHEREAS, the District allocates its Bureau-allotted contractual surface water supplies to eligible District lands on an equal-share-per-irrigable-acre basis, and

WHEREAS, each water user is best able to determine where use of these allocated surface water supplies are most beneficial to his/her operation, and

WHEREAS, it is the intent of the District to prevent profiteering on contractual surface water supplies, and

WHEREAS, it is the intent of the District to develop additional supplies for the benefit of its in-District water users, and

WHEREAS, Water Code Section 382 provides that the District may transfer water that is surplus to the in-District needs of the water users of the District and/or water that is voluntarily foregone for in-District use during the period of the transfer by a water user of the District;

THEREFORE, the Board of Directors has adopted the following policy statements with regard to intra- and inter-District transfers of allocated surface water supplies during the 2008-2009 water year:

All unused and/or unsubscribed surface water allocations revert to the District for remarketing as Additional Supplies for the primary benefit of its in-District water users.

(Over)

➢ The District will allow transfers of Bureau-allocated surface water supply between parcels of land within the District where the supply has been allocated to lands that are within the same Landholding.

➢ "Landholding" shall mean eligible irrigable land that is owned and/or operated under a lease by an individual or legal entity or another legal entity that includes that same individual or legal entity.

➢ The District will allow transfers of Bureau-allocated surface water supply between parcels of land in the District and parcels of land in other CVP-contracted districts where the supply is associated with lands that are within the same Landholding, provided further that the Landholder is a current user of water in the District.

➢ All transfers must take place during the water year in which the water was allocated. Transfers of water rescheduled into a subsequent water year are subject to the terms of the Bureau of Reclamation's current Rescheduling Guidelines.

➢ The transferring Landholder/Water User will pay the current District Rate for transferred supplies, less any rate components that the District is not required to pay on transferred supplies, plus any incremental charges assessed by the Bureau of Reclamation for use of additional facilities to effectuate the transfer.

➢ In any year when Additional Supplies are insufficient to meet all in-District demand, available Additional Supplies will be ratably allocated to those who have requested Additional Supplies based on each Landholder's total irrigable District acreage, less any acreage from which Bureau-allocated supplies have been transferred outside of the District.

➢ Additional Supplies allocated to a District Landholder are for in-District use and may not be transferred out of the District.

Exhibit D

Del Puerto WATER District

2008-2009 WATER RATES

BUREAU COST-OF-SERVICE RATES:	Irrigation Water
Capital Rate:	$12.43
Bureau O&M Rates:	
Water Marketing/Storage	$13.78
Total Bureau Cost-of-Service Rate	$26.21
BUREAU RESTORATION FUND RATE:	+
Restoration Fund Rate	$8.79
	+
TRINITY PUD ASSESSMENT:	
Trinity PUD Assessment (for 2009 payment)	$0.07
AUTHORITY O&M RATES:	+
Conveyance & Conveyance Pumping	$8.07
	+
ADDITIONAL WATER COSTS	
DMC-Aqueduct Intertie Rate Component **($167,000/YR)**	$3.39
	=
TOTAL COST OF WATER TO THE DISTRICT	**$46.53**
DISTRICT RATE STABILIZATION FUND SUPPORT	+
Application of District Funds in Support of Rates	**($1.53)**
	−
2008-2009 DISTRICT WATER RATE (BASIC)	**$45.00**
2008-2009 PER ACRE CHARGE	**$15.00/AC**

Exhibit E

Del Puerto Water District

P. O. Box 1596
Patterson, CA 95363-1596
Ph (209) 892-4470 Fax (209) 892-4469

Statement

DATE
4/7/2008

BILL TO

S & F FARMS
3500 SHIELLS ROAD
NEWMAN, CA 95360

DUE DATE	AMOUNT DUE
5/7/2008	$4,605.41

DATE	DESCRIPTION	AMOUNT	BALANCE
02/29/2008	Balance forward		-21,009.88
03/01/2008	INV #23453.	22,455.00	1,445.12
03/01/2008	INV #23493.	2,404.49	3,849.61
03/01/2008	INV #23620.	23,512.50	27,362.11
03/01/2008	INV #23659.	2,520.00	29,882.11
03/19/2008	CREDMEM #23740.	-726.59	29,155.52
03/24/2008	PMT #39413. PMT	-29,882.11	-726.59
03/31/2008	INV #23833.	5,332.00	4,605.41

CURRENT	1-30 DAYS PAST DUE	31-60 DAYS PAST DUE	61-90 DAYS PAST DUE	OVER 90 DAYS PAST DUE	AMOUNT DUE
4,605.41	0.00	0.00	0.00	0.00	$4,605.41

Del Puerto Water District

P. O. Box 1596
Patterson, CA 95363-1596
Ph (209) 892-4470 Fax (209) 892-4469

Credit Memo

DATE	NUMBER
3/19/2008	23740

CUSTOMER	SHIP TO
S & F FARMS 3500 SHIELLS ROAD NEWMAN, CA 95360	DEL PUERTO WATER DISTRICT P. O. BOX 1596 PATTERSON, CA 95363-1596

P.O. NO.	REP	FOB	PROJECT

ITEM	DESCRIPTION	QTY	RATE	AMOUNT
Rescheduled	Carryover Water Charge Refund	-113	6.43	-726.59

Total $-726.59

Del Puerto Water District

P. O. Box 1596
Patterson, CA 95363-1596
Ph (209) 892-4470 Fax (209) 892-4469

INVOICE

DATE	NUMBER
3/31/2008	23833

BILL TO	MAIL TO
S & F FARMS 3500 SHIELLS ROAD NEWMAN, CA 95360	DEL PUERTO WATER DISTRICT P. O. BOX 1596 PATTERSON, CA 95363-1596

TERMS	DUE DATE
Net 30	4/30/2008

ITEM	DESCRIPTION	QTY/AF	RATE	AMOUNT
Carry Over I	Carryover Water Used in the Month of March 2008	124	43.00	5,332.00
			Total	$5,332.00

DEL PUERTO WATER DISTRICT

P. O. BOX 1596
PATTERSON, CA 95363
(209) 892-4470

2008-2009 Water Use Statement through the Month of

Mar-08

S & F Farms
3500 Shiells Rd.
Newman, CA 95360

2008-09 Landholdings	1497 ac
100% Allocation = 3.1 AF/AC	4641 af
Current Allocation	45%

2008-2009 WATER SUPPLIES	
Water Supply	Acre Feet
45% SWPP Supply	224
45%Contract Allotment	2,090
Carryover from 2007-08	1433
Returned to District	0
Transfers IN *	0
Additional Supplies	0
Reduced Allocation	0
TOTAL SUPPLY >	3,747

WATER SUPPLIES WATER USES	
Water Uses	Acre Feet
Used in District	124
Transfers OUT *	0
TOTAL USED >	124
Additional Supplies Used	0
Critical Supplies Used	
WATER LEFT >	3,623

MONTHLY USEAGE

TURN OUT #	METER SER. #	CURRENT READING	PRIOR READING	AMOUNT USED	DATE READ
53.41L	User meter	*017	005	15	3/31/2008
50.66L	See Attached Water Use Sheet			30	3/31/2008
54.01L 'A'	9421898	021	000	21	3/31/2008
54.01L 'C'	4428	507	473	34	3/31/2008
66.68L 'G'	See Attached Water Use Sheet			17	3/31/2008
66.73L	#20021915	013	013	0	3/31/2008
67.55L	8271	Out	Out	7	3/31/2008
			METER TOTALS	124	

2008-2009 Water Use Record

T.O. 50.66L	T.O. 53.41L	T.O. 54.01L"A"	T.O. 54.01L"C"	T.O. 66.68LG	T.O. 66.73L	T.O. 67.55L	MONTH	TOTAL USE
30	15	21	34	17	0	7	MAR	124
0	0	0	0	0	0	0	APR	0
0	0	0	0	0	0	0	MAY	0
0	0	0	0	0	0	0	JUN	0
0	0	0	0	0	0	0	JUL	0
0	0	0	0	0	0	0	AUG	0
0	0	0	0	0	0	0	SEP	0
0	0	0	0	0	0	0	OCT	0
0	0	0	0	0	0	0	NOV	0
0	0	0	0	0	0	0	DEC	0
0	0	0	0	0	0	0	JAN	0
0	0	0	0	0	0	0	FEB	0
30	15	21	34	17	0	7	TOTALS	124

COMMENTS

Acre Feet		* TRANSFER DETAIL		
IN	OUT	To/From	District	
0	0	< Total Transferred Supplies		

QUESTIONS REGARDING THIS STATEMENT MAY BE DIRECTED TO THE ADDRESS OR PHONE NUMBER ABOVE

DEL PUERTO WATER DISTRICT

2008-2009 Water Use Sheet Through the Month of

Mar-2008

S & F Farms
Water Use Sheet

The following information was used to determine water use at the turnout listed below:

TURN OUT 50.66L

	Authority Meter		Total Water Use by All Users at This Turn Out		Metered Water Use by Other Users at This Turn Out		Your Water Use at This Turn Out 50.66L	
START:	4864							
MAR	4904		40		10		30	MAR
APR	0		0		0		0	APR
MAY	0	G	0	M	0	E	0	MAY
JUN	0	I	0	I	0	Q	0	JUN
JUL	0	V	0	N	0	U	0	JUL
AUG	0	E	0	U	0	A	0	AUG
SEP	0	S	0	S	0	L	0	SEP
OCT	0		0		0	S	0	OCT
NOV	0		0		0		0	NOV
DEC	0		0		0		0	DEC
JAN	0		0		0		0	JAN
FEB	0		0		0		0	FEB
		Totals	40		10		30	

TURN OUT 66.68LG

	Authority Meter		Total Water Use by All Users at This Turn Out		Metered Water Use by Other Users at This Turn Out		Your Water Use at This Turn Out 66.68LG	
START:	464							
MAR	485		21		4		17	MAR
APR	0		0		0		0	APR
MAY	0	G	0	M	0	E	0	MAY
JUN	0	I	0	I	0	Q	0	JUN
JUL	0	V	0	N	0	U	0	JUL
AUG	0	E	0	U	0	A	0	AUG
SEP	0	S	0	S	0	L	0	SEP
OCT	0		0		0	S	0	OCT
NOV	0		0		0		0	NOV
DEC	0		0		0		0	DEC
JAN	0		0		0		0	JAN
FEB	0		0		0		0	FEB
		Totals	21		4		17	

2008-09 ADDITIONAL SUPPLIES REQUEST FORM

Exhibit F

The District's 2008-2009 Additional Supplies Program will be administered as explained below. Customers are asked to carefully review these guidelines as part of their planning for the management of water supplies for the year. The District has NO PROVISION for the delivery of Additional Supplies outside of those being made available through this Program. Each Customer is required to indicate their decision in the space provided below. Incomplete or unsigned forms WILL NOT be accepted.

ADMINISTRATION OF THE POOL:

* All 2008-2009 Additional Supplies secured by the District will be offered through this pool. The sign-up deadline for participation is **MAY 15, 2008.**
* The District has optioned a quanity of additional supply capable of increasing every user's total supply equivalent to a 65% allocation, if signed up for by the deadline. Any water that is not signed up for by **MAY 15** will be remarketed outside the District to recoup District costs.
* The District DOES NOT intend to create any other pools of Additional water for the 2008-09 water year.
* To ensure fairness, the District will prorate the requests based on irrigable acreage, adjusted for acreage associated with declared transfers out of the District. In the event that requests exceed the quantity available, customers will be notified in a timely manner of their allocated fair share.
* Incomplete request forms or requests not accompanied by the appropriate deposit will not be processed.

ALLOCATION & USES OF ADDITIONAL SUPPLIES WATER:

* Additional Supplies requests will be allocated to customer accounts, and thus made available for use, in two separate blocks. The first allocation, called FIRM ADDITIONAL SUPPLIES, will be allocated and available for use as of May 15, 2008. The second allocation, called CONTINGENT ADDITIONAL SUPPLIES, will be allocated upon receipt of the supply, which is currently expected to start in late July and continue through August and September. The blocks of water to be allocated are currently *estimated* to be 20% FIRM and 80% CONTINGENT, but will not officially be known until all requests are processed.
* Additional Supplies are not available for use until they are allocated into a Customers account. Customers are advised that until Additional Supplies Allocations are made, the ONLY source of water available is your 2008-09 Contract Supply.
* Additional Supplies are not available for transfer.

CONTINGENCIES & RISKS:

* All District supplies are subject to risks with respect to their deliverability. While the District believes the FIRM portion of the Additional Supplies Pool to be as guaranteed as our contract allocation, the Federal courts' ruling has placed a level of uncertainty on the availability of any source of supply UNTIL THE OPERATIONAL STATUS OF THE PUMPS IS DETERMINED, which is expected to be on week-to-week basis at best.
* Customers that do not respond by **MAY 15** will forfeit their abilities to participate in both the FIRM AND CONTINGENT portions of the pool.
* It is unknown at this time whether the District will be offered the opportunity to reschedule water into the 2009-2010 water year.

COST & PAYMENT TERMS:

* The cost of 2008-2009 Additional Supplies Water is set at $200.00 per delivered acre-foot.
* The cost includes a non-refundable premium portion of $ 155.00 per acre-foot, and the contract rate of $45.00 per acre-foot.
* The non-refundable premium will be due in two installments: $80.00 per acre-foot upon signup , and $75.00 per acre-foot by August 10, 2008. The contract rate of $45.00/AF will be billed as the water is used by the customer. Customers will not be eligible for delivery of additional supplies water unless the entire premium is paid in full.
* District management will make every attempt to minimize pool costs. In the event that pool receipts exceed pool costs, rebates of the premium may be available as account credits at the end of the year.

NOTE: In the unlikely event that the CONTINGENT ADDITIONAL SUPPLIES are not able to be allocated, the premium deposited on this portion of the pool will be refunded. If the CONTINGENT ADDITIONAL SUPPLIES are allocated but go unused in a customer's account, the premium remains NON-REFUNDABLE.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

By signing below, I hereby acknowledge that I have read the above stated guidelines for the 2008-09 Additional Supplies Program, and understand that the Program will be administered as set forth. I have attached a payment of $80.00 per acre-foot as the first installment of the non-refundable premium deposit, and understand that the $75.00 per acre-foot premium balance will be due by August 10 (or sooner depending on my scheduling needs). I further understand that I will be billed the District contract rate of $45.00 per acre-foot upon delivery of this water to my landholdings.

QUANTITY OF ADDITIONAL SUPPLIES REQUESTED ______________ AF

DECLAREDTRANSFERS OUT OF THE DISTRICT FOR THE 2008-09 WATER YEAR __________ AF

AUTHORIZED ACCOUNT SIGNATURE ______________________________

Exhibit G

Del Puerto Digest

Volume XXIII – January 2008

This time of year we find ourselves both reflecting back over the activities and outcomes of the current water year and planning and preparing for the year to come. In a year that provided only a 50% USBR allocation and an increasing level of operational and environmental challenges, the District has been able to meet all user requests for water supplies by way of supplemental water supply acquisitions, although the economic pressures of supply and demand made the ultimate costs somewhat unpleasant. Furthermore, the unpredictability of the availability of these supplemental supplies left us (and quite of few of our users) on the edge of our seats during July and August. All in all, we feel we successfully met the challenges provided by the 2007 water year, and hopefully have learned some things that will help to be better prepared for the challenges and opportunities that will face us in 2008. In this regard, we'd like to update you on several current operational and administrative issues of interest.

RESCHEDULING (CARRYOVER) OF 2007 WATER TO 2008:
The District has been provided with the Bureau's guidelines that direct the rescheduling of remaining 2007 contract water supplies stored in San Luis Reservoir, commonly known as "Carryover Water". Although subject to numerous conditions and dependent on some still unknown variables, the guidelines generally offer contractors whose remaining 2007 water supplies are considered to be stored in San Luis Reservoir the opportunity to request the use of these supplies beyond March 1, 2008, start of the new water year.

The guidelines authorize rescheduling of these remaining supplies subject to the following conditions:

- The initial target for the total quantity of rescheduled water that can be accommodated by all requesting Districts will be 150,000 acre-feet. Each requesting District will only be allowed their "fair-share" of this total based on their contract entitlements. As in the past, Del Puerto customers will be allowed to request that up to their entire remaining supply be rescheduled. However, if the total customer requests exceed the District's share of the 150,000 AF cap, the requests will need to be pro-rated based the customer's irrigable acreage in the District.
- The use of rescheduled water will be allowed until such time as San Luis Reservoir operations report a sustained 3-day draw down, which normally occurs sometime between March 31 and April 15.
- Rescheduled 2007 water may not be transferred to another district.

(Over)

- Requests for rescheduling must be submitted with the non-refundable rescheduling fee, which has been set at $6.43/acre-foot.

Customers can expect to receive a Carryover Water Request form soon after the January 31 meter readings are complete. Requests for carryover will be due by 5 p.m. February 19.

2008-2009 WATER RATES:

At its January meeting, the Board of Directors approved the Business Committee's recommendation that the base rate for the 2008-09 agricultural deliveries be set at $45 per acre foot, and that a per-acre Water Availability Charge of $15 per acre be assessed on all irrigable acres in the District. In recognition of the economic challenges facing water users and in anticipation of a very expensive market for supplemental supplies in the coming year, the Board's decision draws upon the District's Rate Stabilization Fund to offset the difference between the rate charged to water users and the cost the District pays to the Bureau and Water Authority for procuring and delivering our contract supply. Based on the current draft rates of these agencies and the forecast for a very limited supply scenario in the coming year, staff estimates this subsidy could end up being as much as $5 per acre foot of contract water delivered. Billing statements for the March 1, 2008 Water Cost Pre-payments and Water Availability Charges, as well as the 2008 Water Applications, will be mailed in mid-February.

2008-2009 SURFACE WATER TRANSFER POLICY:

After months of open discussion and consultation with legal counsel, the Board recently adopted its annual policy regarding the transfer of 2008-09 allocated surface water supplies. While the policy remains essentially the same as in previous years in that it provides for the transfer of water "from yourself to yourself", language has been added to ensure that transfers of water out of the District are either surplus to the in-district needs of District water users or are voluntarily foregone for in-district use by the user requesting the transfer. It also adds language that requires a transferor to be a current user of water in the District. A copy of the full policy is included with this newsletter for your review.

RECLAMATION REFORM ACT REPORTING (RRA):

RRA forms, along with landholding update forms from landholders with less than 240 irrigable acres, provide the basis for the District's annual update of its Landowner/Customer database and serve as the starting point for all water and financial accounting records maintained by the District. RRA forms establish water entitlements, classify lands as eligible for either non-full cost or full-cost water supplies, and ensure that the District's federal water supplies are distributed in compliance with Reclamation law. The RRA form filing requirements continue to apply to all Del Puerto Water District landowners and water users having west wide landholdings of more than 240 acres that receive Federal irrigation water. In 2005, the District purchased STORM21, a Bureau-approved database program capable of processing and generating the required RRA forms. STORM21 enables the District to easily assist our customers with the RRA form filing process. With customer-supplied information about landholdings including any changes, the District can now generate RRA forms for your review and signature(s) with a few simple clicks of the mouse-button. For those customers who have not already started their forms, we look forward to contact with you in the near future and a very efficient and timely completion of the 2008 RRA form filing process.

WATERSHED COALITION NEWS:

Included in this mailing is important information on Ag Waiver Watershed Coalition activities.

DROUGHT WORKSHOP:

Notice of a drought preparedness and planning workshop for growers, sponsored by the Agricultural Water Management Council, is also included. In addition to some valuable information regarding strategies for surviving the anticipated water shortage, the workshop offers 1 hour DPR continuing education credit and a complimentary lunch.

The Del Puerto Water District is Dedicated to Providing its Customers with an Adequate, Reliable and Affordable Water Supply

Exhibit H

Del Puerto WATER District
P.O. Box 1596 • Patterson, CA 95363-1596 Fax (209) 892-4469 • Phone (209) 892-4470

ANNUAL MEETING OF THE BOARD OF DIRECTORS WITH LANDOWNERS, WATER USERS AND INTERESTED PARTIES

Board of Directors
Division I - **WILLIAM KOSTER**
Division II - **GENE BAYS**, President
Division III - **PETER LUCICH**
Division IV - **FRED VOGEL**
Division V - **EARL PEREZ**, Vice President
Division VI - **TOM DOMPE**
Division VII - **JIM JASPER**

WHEN
WEDNESDAY, APRIL 16, 2008, 10:00 AM

WHERE
PATTERSON MASONIC TEMPLE
600 NORTH 6TH STREET
PATTERSON, CALIFORNIA 95363

• AGENDA •

I. **WELCOMING REMARKS** (Gene Bays - Board President)

II. **BOARD/STAFF INTRODUCTIONS** (Bill Harrison - General Manager)

III. **REVIEW OF MEETING AGENDA**

IV. **OPPORTUNITY FOR PUBLIC COMMENT**

V. **FINANCIAL REPORT** (Anthea Hansen – Assistant Manager)
1. 2008-2009 Budget Summary
2. 2008-2009 Water Rates and Charges
3. Special Funds Report

VI. **BUSINESSS REPORT** (Anthea)

VII. **WATER SUPPLY REPORT** (Bill)
1. 2007-2008 Water Supply Carryover Opportunity
2. 2008-2009 Contract Water Supply Allocation
3. 2008-2009 Additional Supplies Opportunities
4. 2008-2009 Surface Water Transfer Policy

VIII. **WATER OPERATIONS REPORT** (John Hansen – Field Operations Manager)
1. District Overview
2. Water Measurement
3. Water Orders

IX. **2008 WATER OPERATION CONSIDERATIONS** (Bill)
1. Demand Rationing Response Plan (Anthea)

X. **WESTSIDE SAN JOAQUIN RIVER WATERSHED COALITION REPORT** (John)

XI. **EXECUTIVE/LEGAL REPORT** (Bill)

XII. **ADJOURNMENT**

Del Puerto Water District
(209) 892-4470

Memo

To: Del Puerto Water District Water Users

From: District Staff

Date: 04/16/08

Re: Water Order Responsibilities

Of late we have experienced several days with circumstances of high winds and power outages (most likely related). Both causes have required certain of our customers to cease irrigating on their current water order schedule, the former by choice and the latter due to impossibility.

In both cases, the ceasing of water deliveries was noted by Water Authority staff and the respective turnouts were locked up, causing frustration and added workload for not only the water user, but staff of both the Authority and the District. In the case of all involved, avoiding this lockup would be optimum.

We would like to take this opportunity to remind our customers that it is our responsibility to notify the Water Authority of any changes to our daily schedule, thus making it incumbent on you to include the District in any management decisions you make regarding changes to your irrigation schedule, whether they be voluntary or involuntary. The Authority has over 150 turnouts to manage on a daily basis, and must stick to a very clear set of procedures in order to accomplish their daily tasks.

The general "Rule of Thumb" is that turnouts with "ON" water orders will actually be TAKING WATER. If they are not, there is a GREAT RISK that they will be LOCKED up, particularly in any case where the order is more than 72 hours old.

We at the District understand that your operations are affected by many factors, some uncontrollable, and are certain that better communication about your irrigation operations to the District will have assist you to manage through these types of situations.

We work at all times to give you the best customer service possible. Please help us by making communication of your water orders a priority.

Del Puerto WATER District
P.O. Box 1596 • Patterson, CA 95363-1596
Fax (209) 892-4469 • Phone (209) 892-4470

Emergency Water User Notice – READ IMMEDIATELY
May 29, 2008
Subject: CVP Water Delivery Rationing & Possible Allocation Reduction

Record dry Spring conditions combined with unseasonably high demands and delta pumping restrictions imposed to protect delta smelt have reduced CVP water supplies to critically low levels throughout the state, and very notably in San Luis Reservoir. The District has been advised that by next week the U.S. Bureau of Reclamation (USBR) will formally announce water delivery rationing extending through at least August 31. Delivery rationing caps are expected to be retroactive to May 27. This action is being required throughout the delta export service area to prevent the draining of San Luis Reservoir, which would cut off water deliveries to the San Felipe Division.

Based on a Delivery Rationing Plan developed by the San Luis & Delta-Mendota Water Authority in consultation with its member agencies and the USBR, the District will be given a maximum allowable usage during the rationing period. Deliveries during the rationing period may be further constrained by daily, weekly, or monthly scheduling to be determined by the USBR as conditions warrant.

An official declaration of the District's "capped" allowable delivery quantity is not yet available. In addition, the District has been advised that the USBR will likely reduce the current South of Delta CVP allocation, as their forecast does not support the delivery of a 45% supply. It is unknown at this time whether the final determination regarding an allocation reduction will be made concurrently with the imposition of a restricted delivery quantity. As soon as a final estimate of the District's allowable delivery quantity becomes available and has been analyzed, you will be advised as to the District's course(s) of action.

*****

The District's CVP water supplies have always been subject to allocation shortages under its contract. However, delivery rationing within the CVP is unprecedented. The District is monitoring the situation very closely, and once officially notified will implement its Delivery Rationing Response Plan. Deliveries will be rationed fairly and equitably at all times, and every effort possible will be taken to minimize impacts to its customers.

Water users are reminded that water orders must be placed accurately and as required by the District's Rules & Regulations. Inaccurate orders will be subject to unannounced shutoffs, as will the taking of water without first correctly placing an order. If you have placed an order and your situation changes, you must notify the District. Meter reading dates and times will be random and more frequent, leading to the possibility of Authority or District lockups at any given time.

The District will make every effort to advise its water users as information becomes available, and asks for your complete cooperation during this time of hardship for all.

DEL PUERTO WATER DISTRICT

DEMAND REDUCTION RESPONSE PLAN

Administrative and Field Procedures

Upon notification by the SLDMWA of a Bureau of Reclamation decision to implement a reduction (or "rationing") of Delta-Mendota Canal deliveries, the District will enact the following procedures:

1. Notify all Water Users via fax and/or email of the ordered reduction in deliveries.
2. Request that each Water User submit a water delivery schedule for the next 7 days within 24 hours.
3. Initiate field check to determine the current status of each District turnout (On/Off, Current user(s), and quantity being delivered).
4. Instruct the SLDMWA to lock all turnouts not in use or, after notification, turnouts/gates found to be taking water without an approved water order on file.
5. Input all water delivery requests from 7-day schedule into next-day scheduling worksheet.
6. Receive daily allocation of available supply (i.e. "targeted demand') from SLDMWA.
7. For users with continuous demand schedules at multiple turnouts, determine the maximum allowable daily flow based on each user's percentage share of the District's total allocation and work with those users to accurately apportion this supply among the various turnouts.
8. Confirm approvable water scheduling requests with users and work with users to adjust schedules as needed to meet target demand level.
9. Submit approved water orders to SLDMWA for next-day unlock and delivery.
10. Record and compare SLDMWA daily meter readings and approved water orders on a daily basis.
11. Read District-level meters at multi-user turnouts on a daily basis.
12. Initiate lock-up procedures for any user that exceeds his/her approved delivery schedule and/or takes water without an approved water order and notify them of the action taken and the need to reschedule their delivery request.

Congressional Briefing
On Potential Water Rationing

Monday, June 2, 10:30 a.m.

Los Banos Fairgrounds, Germino Building

Congressman Jim Costa has called a Congressional Briefing regarding potential water rationing or other actions that may be needed this year to address the dry hydrology, Delta pumping restrictions and San Luis Reservoir low point concerns.

The Bureau of Reclamation will provide an update on these matters and provide information on the Reclamation's plans for handling delivery-related restrictions, as necessary.

The briefing will be held on June 2, 2008, at 10:30 a.m. at the Germino Building located in the Los Banos Fairgrounds, 403 F Street, Los Banos (Germino Building can be accessed from 5th Street).

Please plan on attending this important meeting.

Del Puerto Water District
(209) 892-4470

Memo

To: Del Puerto Water District Water Users

From: District Staff

Date: 04/16/08

Re: Water Order Responsibilities

Of late we have experienced several days with circumstances of high winds and power outages (most likely related). Both causes have required certain of our customers to cease irrigating on their current water order schedule, the former by choice and the latter due to impossibility.

In both cases, the ceasing of water deliveries was noted by Water Authority staff and the respective turnouts were locked up, causing frustration and added workload for not only the water user, but staff of both the Authority and the District. In the case of all involved, avoiding this lockup would be optimum.

We would like to take this opportunity to remind our customers that it is our responsibility to notify the Water Authority of any changes to our daily schedule, thus making it incumbent on you to include the District in any management decisions you make regarding changes to your irrigation schedule, whether they be voluntary or involuntary. The Authority has over 150 turnouts to manage on a daily basis, and must stick to a very clear set of procedures in order to accomplish their daily tasks.

The general "Rule of Thumb" is that turnouts with "ON" water orders will actually be TAKING WATER. If they are not, there is a GREAT RISK that they will be LOCKED up, particularly in any case where the order is more than 72 hours old.

We at the District understand that your operations are affected by many factors, some uncontrollable, and are certain that better communication about your irrigation operations to the District will have assist you to manage through these types of situations.

We work at all times to give you the best customer service possible. Please help us by making communication of your water orders a priority.

Del Puerto WATER District

P.O. Box 1596 Patterson, CA 95363 Ph (209)892-4470 Fax (209)892-4469

IMPORTANT NOTICE & INFORMATION
REGARDING THE AVAILABILITY OF 2008 WATER SUPPLIES

Dear Water User:

At the Congressional briefing in Los Banos on June 2, the Bureau of Reclamation announced that it had reduced 2008 South of the Delta CVP Ag contract allocations from 45% down to 40%. Your Water Use Statement for the month of May reflects this reduction in your total available supply.

On June 3rd, prompted by pending actions proposed by the Bureau to restrict demands for CVP water between now and the end of the low point period in San Luis Reservoir, the District's Board of Directors took action to implement a rationing plan intended to address these delivery-related restrictions and eliminate the possible need for a total cessation of water deliveries later this summer.

Based on the Bureau's calculation of the total water supply that will be available to CVP Ag Service Contractors between May 28th and the end of August (the estimated time of low point in San Luis Reservoir), the District has concluded that it will be allowed to deliver only approximately 30,000 AF.

Your fair share of this estimated delivery capability based on the irrigable acres associated with your account is _____ AF. This is the total quantity of District water that you will be allowed to use through August 31 unless, of course, the remaining supply in your account is already less than this amount.

The District has no provision for overuse and once users have taken delivery of their fair share, their turnout(s) will be locked until the end of the rationing period at which point in time any supplies remaining in their account(s) will once again become available for delivery.

The District fully understands the hardship this situation presents to all of our customers. Your understanding and cooperation is greatly appreciated.

Please call the District if you have any questions about this matter.

Del Puerto WATER District

P.O. Box 1596 Patterson, CA 95363 Ph (209)892-4470 Fax (209)892-4469

June 20, 2008

Sample

Arambel, Jeff

433 Roxanne Drive

Patterson, CA 95363

COPY

RATIONING SITUATION UPDATE

District Staff is working diligently with all appropriate local, State and Federal agencies to keep informed of any circumstances affecting the current restriction on access to our USBR contract allocation. Because the information changes almost daily factual communication becomes all the more difficult. While most of the information provided in our previous notices remains the same, we would like to update you on several items:

1. Per a USBR letter to the District dated June 10, the official effective date of the restriction on capacity to access our contrac supply has been revised from May 28 to **June 1, 2008**. This is a positive change.
2. Also per same letter, the District was notified that the USBR's current calculation of the total water supply available fo delivery to the District between June 1st and the end of August (the estimated time of low point in San Luis Reservoir) is now 28,641 AF. This is a slight decrease from our original projection.
3. While transfers of supply between districts is being allowed, it is with the understanding that a transfer of water out of the District will result in a corresponding reduction in the requesting Water User's capacity, so as not to affect the fair share o capacity assigned to other District Users. It is our understanding that transfers made by other Districts are being handled in the same manner.
4. Releases from Shasta Reservoir have been subject to higher than anticipated losses North of the Delta, an occurance called "depletion". This results in less released water intended for South of Delta use actually making it to the pumping plants nea Tracy. This situation is being closely monitored, as it could negatively affect our access to supplies.
5. There is some indication that a mid-June analysis done by the agencies may support an slight increase to assigned delivery capacity for the Critical Month period. We are following this discussion very closely and will notify Users immediately i something materializes.
6. The District was able to allocate 18% of the requested 2008 Additional Supplies pool as FIRM in the month of May. While this does not increase capacity, it enables certain Users to continue using their assigned capacity when they might otherwise have run out of supply. It looks as if another small quantity of Additional Supplies may be available for allocation as FIRM in June, however this will not be certain until early July. The month-end Water Use Statements will reflect any allocation o Additional Supplies into User accounts.

****

This week the District did a complete meter reading and accounting for water use between June 1 and June 17. Provided below is the current estimated capacity assigned to the User named in this Notice, as well as the water supply available in the Use account to utilize that capacity. These numbers are representative of all known supply/use transactions as of June 17, except fo private well Pump-Ins, which will be accounted for at the end of each month.

Current Estimated Capacity Available to this User for the June-August Critical Month Period 411

Water Supply Available in this User's account as of June 17, 2008 678

The District fully understands the hardship this situation presents to all of our customers, and appreciates your continued cooperation during this difficult time. As always, please contact us with any questions or concerns.

Del Puerto WATER District

P.O. Box 1596 Patterson, CA 95363

Ph (209)892-4470 Fax (209)892-4469

Sample

July 31, 2008

Liljenquist Modesto Co.
9200 Oakview Drive
Oakdale, CA 95361

URGENT COMMUNICATION TO ALL WATER USER'S

A variety of reasons and the culmination of certain efforts early this week caused the District to believe it may be possible to meet all of our Users' unrestricted needs through the month of August. This was confirmed by surveying all of our customers. Unless advised otherwise at some later point in time:

EFFECTIVE IMMEDIATELY
THERE WILL BE NO RESTRICTIONS
ON A CUSTOMER'S ACCESS TO WATER SUPPLIES
REMAINING IN THEIR ACCOUNT

Thank you to all who were able to respond on short notice to our Needs Survey

Questions regarding the June/July/August Critical Month situation or your account status may be directed to District Staff at (209) 892-4470.

Exhibit I

Del Puerto WATER District

P. O. Box 1596 • Patterson, CA 95363 Ph: (209) 892-4470 • Fax: (209) 892-4469

Announcing
Irrigation System Improvement Funds
For
Water Conservation
&
Drainage Reduction Projects

The District has received approval for an Agricultural Drain Program Loan from the State Water Resources Control Board. The purpose of the Loan Program is to provide low-interest money for irrigation system improvements which improve irrigation efficiency and reduce drainage.

Types of projects that may qualify for funding include:

- Sprinkler Systems
- Gated Pipe
- Drip & Micro Emission Systems
- Booster Pumps/Engines
- Backflush Recycling Systems
- Tailwater Recirculation Systems
- Sump/Ditch Lining Materials

If you have a project you would like to have considered for this program, please contact the District office at (209) 892-4470.

Funding for this project has been provided in full or in part through a contract with the State Water Resources Control Board (SWRCB) pursuant to Chapter 6.1 of Division 7 of the California Water Code (sections 13450 et seq.)

DEL PUERTO WATER DISTRICT

AGRICULTURAL DRAIN LOAN PROGRAM
SUMMARY GUIDELINES

The State Board has approved the District's application for a $5 million low-interest loan. The purpose of the Loan Program is to provide low-interest money for irrigation system improvements, thereby improving irrigation efficiency and reducing the amount of drainage entering down slope districts and/or returning to the San Joaquin River.

Several key aspects of the District's Loan Program are:

- A completed application, including system design blueprints and/or a list of the equipment needed, should be submitted along with a $500 application processing fee.
- Loan funds can be used for the purchase of equipment only. Any installation expenses must be arranged and paid for directly by the landowner/water user.
- All equipment must be purchased by the District through a competitive bidding process conducted by the District.
- Bids will be solicited for all equipment/materials on a case-by-case basis although requests for standardized categories of equipment/materials may be combined.
- Landowners must sign a Loan Application, an Equipment Lease Agreement and other related documents, including a recordable Memorandum of Lease. A lessee may co-sign these agreements, but the landowner is ultimately responsible for payment.
- Lease terms will be available for various lengths depending on type of project financed. Interest will be charged at 2.3% per year. All lease payments will be due on November 15 of each year following the entering of the lease and the delivery of the equipment.
- The District will not order materials until a deposit equal to 10% of the cost has been made and all documentation has been received, reviewed and approved.
- The District will retain ownership of all equipment for the term of lease agreement. Ownership will revert to the landowner/water user for a nominal price at the end of the repayment period to the District.
- Lessee's will be required to provide a certificate of insurance naming the District as an additional insured on all financed equipment.
- While the District hopes to be able to meet all funding requests, applications will be considered and funds will be made available on a first-come, first-served basis. The District's deadline for expenditure of all funds is three (3) years from the date of the contract.
- In order to spread the available funds out among District landowners, absent demonstration of special circumstances, the maximum total amount that can be borrowed by a landowner/water user for a given project will be $1,000 per acre.

Funding for this project has been provided in full or in part through a contract with the State Water Resources Control Board (SWRCB) pursuant to Chapter 6.1 of Division 7 of the California Water Code (sections 13450 et seq.)

DEL PUERTO WATER DISTRICT

AGRICULTURAL DRAIN LOAN PROGRAM
LEASE AGREEMENT TERM OPTIONS

Lease agreements executed as part of the District's Agricultural Drain Loan Program will include re-payment schedules based on the type of irrigation system improvement being financed as designated below. An Applicant may select a repayment term that best fits the needs of his/her operation, up to the maximum term allowed for the category being financed. All terms are subject to the Lease condition that the equipment being financed is kept IN USE during the life of the Lease.

CATEGORY OF IMPROVEMENT:

Sprinkler Systems	10 Years
Gated Pipe	7 Years
Drip and/or Micro Emission Systems (orchard)	10 Years
Sub-Surface Drip Systems (row crops) – dual option	
Drip Tape Portion of Project	4 Years
Balance of System Parts	4-10 Years
Booster Pumps/Engines (mobile only)	5 Years
Backflush Recycling Systems	5 Years
Tailwater Recirculation Systems	10 Years
Sump/Ditch Lining Materials	5 years

Funding for this project has been provided in full or in part through a contract with the State Water Resources Control Board (SWRCB) pursuant to Chapter 6.1 of Division 7 of the California Water Code (sections 13450 et seq.)

Del Puerto Water District

Agricultural Drain Loan Program (ADLP) Application

Applicant acknowledges that the consent of the recorded owner of the land will be required to complete the funding process.

Landowner'sName:_____

Address: _____

City/State/ZIP: _____ Telephone: _____

Applicant's Name (if different): _____

Address: _____

City/State/ZIP: _____

Number of Acres to Benefit: _____ Assessor Parcel Number(s): _____

Grade or Slope (%) _____ Land Capability Classification (Irrigated) from soil survey: _____

Existing System: _____ Existing Crop(s): _____

Total estimated cost of project (equipment costs only): $_____

Estimated Project Completion Date: _____

Requested term of loan: _____

Type of Improvement proposed: (check all that apply)

- Sprinkler System _____ ▪ Gated Pipe _____ ▪ Drip/Micro Emission System _____
- Booster Pump(s)/Engine(s) _____ ▪ Backflush Recycling System _____
- Tailwater Recirculation System _____ ▪ Sump/Ditch Lining Materials _____

Crops to be irrigated: _____

Estimated Efficiency Improvement: _____

Estimated AF/AC Reduction: _____

The undersigned acknowledges that he/she has been provided with a copy of the Del Puerto Water District's AGRICULTURAL DRAIN LOAN PROGRAM SU;MMARY GUIDELINES and understands that the guidelines set forth in that document govern the undersigned's involvement in this program. The Applicant acknowledges that he/she has read the AGRICULTURAL DRAIN LOAN PROGRAM SUMMARY GUIDELINES, agrees to be bound by the terms thereof and will further execute an Equipment Lease Agreement and related documents consistent with the Guidelines and as requested by the District.

I declare under penalty of perjury that the foregoing is true and correct. Executed this _____ day of _____, 20____, at _____, California.

_____ _____

Signature of Landowner *Signature of Tenant*

_____ _____

Print or Type Name of Landowner *Print or Type Name of Tenant*

For District Use Only:
Application #_____ Date Received: _____ Application Fee Received: _____ Check # _____

Funding for this project has been provided in full or in part through a contract with the State Water Resources Control Board (SWRCB) pursuant to Chapter 6.1 of Division 7 of the California Water Code (sections 13450 et seq.)

Exhibit J

NAME OF USER _____

TURNOUT _____ PUMP _____

ON ☐ OFF ☐ INC ☐ DEC ☐

Change of Head _____

Date _____

Time _____

REMARKS: _____

_____

_____

_____

Main Meter _____

User's Meter _____

ENTERED ☐ CALLED IN ☐

Del Puerto WATER District
P.O. Box 1596 Patterson, CA 95363-1596 Phone (209) 892-4470 • Fax (209) 892-4469

RESOLUTION
APPROVING AND AUTHORIZING SUBMITTAL OF THE DEL PUERTO WATER DISTRICT'S DRAFT WATER MANAGEMENT PLAN TO BE SUBMITTED TO THE BUREAU OF RECLAMATION FOR PUBLICATION AND REVIEW

Whereas, the Board of Directors of the Del Puerto Water District (the "Board" and "District" respectively) has reviewed a draft of a Water Management Plan ("Plan") for the District, a copy of which has been presented to the Board and is on file with the Secretary hereof; and

Whereas, the Board understands the purpose of this Plan is to promote the highest level of water use efficiency reasonably achievable by the District using the best available cost-effective technology and management practices; and

Whereas, Section 210 of the RRA requires Contractors to prepare and submit a Plan with definite goals, appropriate water conservation measures, and timetables and to submit revised plans every 5 years; and

Whereas, Section 3405 (e) of the CVPIA requires that the Secretary of the Interior establish Criteria to evaluate the Plan and specifies that the Plan identify Best Management Practices including, but not limited to, efficient water management practices developed according to California State law or reasonable alternatives; and

Whereas, the Board has determined that the Plan as drafted meets all of these requirements;

NOW, THEREFORE, BE IT RESOLVED AS FOLLOWS:

Section 1. The facts stated in the recitals above are true and correct and the Board so finds and determines.

Section 2. The Board approves of and adopts said draft Plan.

Section 3. The Secretary of the District is hereby authorized and directed to submit said Plan in substantially the form presented to the Board, said submittal to provide conclusive proof of such approval.

PASSED AND ADOPTED this 20th day of July, 2011 by the Board of Directors of the Del Puerto Water District by the following vote:

AYES:	**Bays, Koster, Perez, Dompe, and Lucich**
NOES:	**None**
ABSENT:	**Jasper and Vogel**

William D. Harrison, Secretary
DEL PUERTO WATER DISTRICT

****

I HEREBY CERTIFY that the foregoing is the resolution of said District as duly passed and adopted by the Del Puerto Water District, a public agency formed under the laws of the State of California, at a meeting of the Board of Directors thereof duly called and held at the office of the District on the 20th day of July 2011.

WITNESS my hand and seal of said Board of Directors this 28th day of July, 2011.

Secretary of the Board of Directors