

#### City of Fresno Department of Public Utilities

# Wastewater Management Division

#### Fresno/Clovis Regional Wastewater Reclamation Facility (RWRF) 5607 W. Jensen Ave. Fresno, CA 93706 559-621-5100



#### FRESNO-CLOVIS REGIONAL WASTEWATER RECLAMATION FACILITIES





- Located on over 3,300 acres southwest of Fresno. Provides wastewater treatment to the Cities of Fresno, Clovis, and unincorporated areas of the County of Fresno
- Designed capacity of 80 MGD. Currently receiving an average of 65 MGD. Serves a population of approximately 500,000.
- Waste Discharge Requirements Order No. 5-01-254

## **Treatment Highlights**







- The RWRF is a secondary activated sludge plant with common primary treatment followed by three secondary treatment trains.
- The original treatment train of 4 aeration basins and 4 clarifiers were constructed in the mid 70s.
- The next treatment train was completed in the late 90s.
- The latest treatment train was completed in 2010 as part of the \$104 million Organic Upgrade Project.

#### **Solids Treatment and Power Generation**



- The RWRF currently has 13 anaerobic digesters and 7 belt filter presses.
- Biosolids are hauled to a composting facility outside the County of Fresno.
- The RWRF has a 9 megawatt co-generation facility that captures the methane gas generated from the digestion process.

# **Disposal Ponds**



There are approximately 1,750 acres of land with ponds for effluent disposal.





# **Uses of Recycled Water**



- Direct reuse of final effluent provides irrigation to farmers of non food crops.
- The City leases land to farmers, specifically for farming of non food crops with effluent reuse rather than using agricultural wells.

## **Title 22 – Recycled Water Criteria**

#### • 22 CCR § 60304

(d) Recycled wastewater used for the surface irrigation of the following shall be at least undisinfected secondary recycled water:

- (1) Orchards
- (2) Vineyards
- (3) Non food bearing trees
- (4) Fodder and fiber crops and pasture
- (5) Seed crops not eaten by humans
- (6) Food crops than undergo commercial pathogen-destroying processes
- (7) Ornamental nursery stock and sod farms

Recycled water cannot come into contact with the edible portion of the crop (1, 2), cannot be for pasture for animals producing milk for human consumption (4). Irrigation has to occur 14 days prior to harvesting, retail or general public contact (3, 7).

# **Reclamation (Direct Reuse) Farming Sites**







On-site

#### **Agricultural Reuse**



- In 2013, 14% of Total Plant Flow was used to deliver secondary undisinfected effluent to onsite and offsite farmers.
- On-site direct reuse has increased by 49% between 2003 and 2013.





#### **Crop Yield with Effluent Reuse**



#### **2013 Direct Reuse Summary**

	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total ponding area (acre)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Ponds In use area (acre)	1172	1209	1147	1062	1074	1164	1050	1158	1062	1180	1234	1241
Dry ponds (acre)	578	541	603	688	676	586	700	592	688	570	516	509
Weighted percolation Rate (Inch/Day)	1.64	1.53	1.75	1.88	1.58	1.53	1.65	2.53	2.16	1.85	1.98	1.83
Monthly plant flow (AF)	5807	5186	5625	5503	5705	5603	5912	5981	5830	5996	5619	5680
Off/On site irrigation (AF)	135	136	721	943	848	1308	1479	1 <b>297</b>	1188	695	238	419
Total Effluent Delivery to ponds (AF)	5672	5050	4904	4560	4857	4296	4433	4684	4642	5301	5382	5261
Precipitation (Inch)	0.58	0.89	0.65	0.09	0.07	0.00	0.00	0.00	0.01	0.03	0.54	0.15
Precipitation Addition to in use ponds (AF)	57	90	62	8	6	0	0	0	1	3	56	16
Average pan evaporation loss (AF)	86	147	264	374	548	708	675	653	433	304	162	88
Percolation amount (AF)	5642	4993	4702	4195	4315	3587	3758	4031	4210	5000	5275	5189
Extraction wells Discharge to FID (AF)	0	1188	3664	2985	3831	2952	2893	2817	2993	2371	1160	3
On site extraction water use for Irrigation	0	0	70	59	97	146	148	106	95	54	49	0
Addition to the ground water (AF)	5642	3805	968	1151	387	489	717	1108	1122	2574	4066	5186

 During 2013, approximately 9,400 AF of effluent was provided to onsite and off-site farmers.

### **Network of Extraction Wells**



- Effluent disposal to ponds has over the years created an extensive mound under the pond area.
- The City has a contract with Fresno Irrigation District to discharge groundwater from extraction wells into Dry Creek and Houghton Canals
- Approximately 30,000 AF a year could be extracted for irrigation canals according to the FID agreement.

# **Network of Extraction Wells**

Dry Creek Canal



#### Houghton Canal









# Winery Stillage Site Monitoring

- RWRF owns and operates a former winery stillage disposal site, approximately 145 acres.
- Several years of Nitrogen accumulation in top 2 feet of soil due to stillage disposal since 1974. Disposal of stillage ceased in December 2003.
- TKN concentrations were estimated in excess of 2,500 mg/kg, decreasing at depths below two feet.



## **Reuse of Extraction Well Water**



N removal analysis based on tissue N and yield for the 5<sup>th</sup> cut of 2013

Basin	Acreage	% leaf N	% DM	D Wt. (T)	Lbs.N/Acre Removed
AB	34	3.79	80.3	27.1	19.4
CD	29	4.19	82.0	20.1	15.2
F	48	4.24	86.0	38.2	29.2

## Monitoring TN at Stillage Site

ESS WINERY WO#: Winery Bed



### **Future Direction**

- Determining Total N removal for all sites irrigated with effluent using soil and tissue analysis and according to type of crop.
- Continuing leasing land to farmers to keep direct reuse practice.
- Implementation of Recycled Water Master Plan:
  - RWRF's future 5 MGD tertiary treatment train to be completed by end of 2015
  - Recycled Water Ordinance in progress
  - Recycled water distribution system infrastructure in progress



# Questions?