

# CHAPTER 10. RECYCLED WATER

*10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier.*

## PARTICIPATING AGENCIES

*10633. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.*

Table 10-1 lists the agencies involved in recycled water planning and use within the City's water service area. Also shown in Table 10-1 are the roles of each agency as related to wastewater and recycled water.

**Table 10-1. Agencies Participating in Recycled Water Activities (DWR Table 32)**

Agency Name	Recycled Water Roles
City of Fresno	Designated sewage agency for the local metropolitan area Operates the Regional Wastewater Reclamation Facility (RWRF)
City of Clovis	Purchases wastewater capacity in the RWRF collection system to convey flow to the RWRF
Fresno Irrigation District (FID)	Receives a portion of the percolated treated wastewater effluent for distribution through their own canal systems for irrigation purposes within their service area

## EXISTING WASTEWATER COLLECTION AND TREATMENT SYSTEMS AND RECYCLED WATER USE

### Wastewater Collection and Treatment Systems

*10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*

*(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.*

### Existing Wastewater Collection Systems

The City of Fresno wastewater collection system conveys wastewater by gravity pipelines to the Fresno/Clovis Regional Wastewater Reclamation Facility (RWRF) located southwest of the City. This collection system also conveys wastewater from the City of Clovis, Pinedale Public Utility District, and the Pinedale County Water District. The City of Clovis has four collection system connections.

There are several large formerly unsewered areas within the City's SOI that have been slowly connected to the RWRf collection system. These areas include Old Figarden, Mayfair, and Sunnyside (much of which remains unsewered), and an area on Clovis Avenue between Belmont and McKinley. The Fort Washington Area in the northern portion of the City remains unsewered. The area of remaining unsewered land included in the Sunnyside and Fort Washington Area totals approximately 830 acres.

The Draft Wastewater Collection System Master Plan (2004 Plan) summarizes the planned collection system facilities and improvements to the existing system. The City is projecting new growth to occur in primarily two areas: the North Growth Area (NGA) and the Southeast Growth Area (SEGA).

- The NGA will be served by constructing a satellite wastewater treatment plant which is anticipated to be operational in 2008. This plant will have an initial capacity of 0.71 mgd. Solids from the plant will be discharged into the City's collection system via a new 1.3 mgd lift station and force main. The treated wastewater will be used to meet non-potable landscape irrigation in the local area (e.g., Copper River golf course) (see additional discussion below).
- For the SEGA, a satellite treatment plant has also been discussed, but has been shown to be cost-prohibitive in recent studies. However, as a result of the Metro Plan Update, the City will be preparing a Recycled Water Distribution Master Plan to identify potential future recycled water use areas within the Southeast Growth Area, other future growth areas, and other areas within the City, as well as plan for the recycled water infrastructure required to serve these areas.

The City of Clovis has built a satellite treatment plant that treats 2.8 mgd of wastewater that was formerly discharged to the Fowler Trunk Sewer Main. The City of Clovis is planning to expand the capacity of this new treatment facility to 8.4 mgd in the near future. Because the North Trunk intercepts the Fowler Trunk, this will reduce the City of Clovis' flow to the RWRf. Solids from this plant will be handled on-site.

### Existing Wastewater Treatment Systems

#### *Regional Wastewater Reclamation Facility*

The Fresno-Clovis RWRf has a treatment capacity of approximately 80 mgd (annual monthly average daily discharge flow). It provides secondary wastewater treatment with effluent disposal to a combination of percolation ponds and irrigation reuse. The facility consists of a headworks followed by primary settling and the secondary activated sludge biological treatment processes. The facility has the capability of incorporating the old trickling filter plant into the process to augment the activated sludge process.

Secondary effluent is discharged into a canal system feeding a series of percolation ponds. Local farmers utilize a portion of the effluent for direct re-use on agricultural land. The City also reclaims a significant portion of this previously recharged effluent by extracting incidentally recharged groundwater and delivering it to FID. FID then delivers this water downstream to customers during the irrigation season.

The City is currently in the process of upgrading the organic treatment capacity of the RWRf. The upgrades will be completed in mid-2009 and will provide greater flexibility in responding to the treatment challenges specific to the Fresno-Clovis wastewater composition. Challenges pertain to the fact that a large component of the Fresno-Clovis wastewater is comprised of industrial effluent. This requires a treatment facility with the capability of responding with a variety of treatment alternatives to deal with this impact.

Table 10-2 presents the projected quantity of wastewater collected and treated at the RWRf, and the quantity available for recycled water use. As shown, the City currently uses most of the treated effluent for direct use on farmland and incidental percolation to groundwater. In the future, by 2025, as part of the Metro Plan Update, the City is planning to provide tertiary treatment at the RWRf and/or at other satellite wastewater treatment plants to supply tertiary treated recycled water for landscape irrigation in new growth areas and existing landscaped areas throughout the City's service area.

#### *North Fresno Wastewater Reclamation Facilities (WRF) Satellite Plant*

The North Fresno WRF was recently built to serve the Copper River development and golf course in the northern part of Fresno. The permitted capacity of the plant is 0.71 mgd (average monthly flow) and 1.08 mgd (maximum daily flow). The plant is master planned for expansion to 1.25 mgd average monthly flow at buildout.

Beginning in 2008, disinfected tertiary recycled water from the North Fresno WRF will be used to irrigate the Copper River Golf Course. The golf course is within the City Limits of Fresno. Until now, the golf course has been irrigated almost exclusively with surface water provided by FID, with apparently a minimal amount from an agricultural well.

During wet weather months, recycled water in excess of turf demands will be dechlorinated and sent to a nearby percolation basin owned by FMFCD, and used to irrigate landscaped areas within the basin. As shown in Table 10-2, Projected recycled water use for the North Fresno WRF ranges from about 750 af/yr to about 1,000 af/yr at buildout.

As shown in Table 10-3, no wastewater from the RWRf is currently discharged to surface water. However, some is lost to evaporation from the incidental percolation ponds. This non-discharge operation is anticipated to continue into the future.

**Table 10-2. Wastewater Collected and Treated (DWR Table 33)<sup>(a)</sup>**

	Treatment Level	Wastewater Collected and Treated and Available for Recycled Water Use, af/yr					
		2005	2010	2015	2020	2025	2030
<b>Wastewater Collected and Treated at RWRf</b>							
Combined Inflow to RWRf from Fresno and Clovis	Untreated	78,400	95,400	105,100	109,000	120,300	127,700
Outflow from RWRf:	Undisinfected Secondary						
Fresno Portion		68,200	85,100	93,700	100,700	107,300	113,900
Clovis Portion		10,200	10,300	11,400	12,200	13,000	13,800
<b>Wastewater Collected and Treated at North Fresno WRF</b>							
Outflow from North Fresno WRF	Tertiary	0	750	1,000	1,000	1,000	1,000
<b>Total Fresno Wastewater Outflow</b>		<b>68,200</b>	<b>85,850</b>	<b>94,700</b>	<b>101,700</b>	<b>108,300</b>	<b>114,900</b>
<b>Quantity Available for Recycled Water Use within Fresno</b>							
Fresno Portion from RWRf	Undisinfected Secondary <sup>(b)</sup>	65,300	81,000	89,100	95,600	77,700	83,900
	Tertiary <sup>(c)</sup>	0	0	0	0	24,000	24,000
From North Fresno WRF	Tertiary	0	750	1,000	1,000	1,000	1,000
<b>Total<sup>(d)</sup></b>		<b>65,300</b>	<b>81,750</b>	<b>90,100</b>	<b>96,600</b>	<b>102,700</b>	<b>108,900</b>

- (a) Based on Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007, updated to take into account the City’s future water supply plan as being developed under Phase 2 of the Metro Plan Update.
- (b) To be used for direct use on farmland or sent to incidental percolation ponds.
- (c) The tertiary treatment may be provided at the RWRf and/or other satellite wastewater treatment plants.
- (d) Does not include evaporation from RWRf percolation ponds (see Table 10-3).

**Table 10-3. Disposal of Wastewater (Non-Recycled) (DWR Table 34)<sup>(a)</sup>**

Method of Disposal	Treatment Level	Wastewater Disposal (Non-Recycled), af/yr					
		2005	2010	2015	2020	2025	2030
Discharged to Surface Water	Undisinfected Secondary	0	0	0	0	0	0
Evaporation from Percolation Ponds		2,900	4,100	4,600	5,100	5,600	6,000
<b>Total</b>		<b>2,900</b>	<b>4,100</b>	<b>4,600</b>	<b>5,100</b>	<b>5,600</b>	<b>6,000</b>

- (a) Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007.

**Current Recycled Water Use**

10633. (c) A description of the recycled water currently being used in the supplier’s service, including, but not limited to, the type, place, and quantity of use.

(e) ...a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

The total quantity of wastewater treated at the RWRf, except for what is lost to evaporation in the incidental percolation ponds (see Table 10-3), is currently used to either directly irrigate City of Fresno and privately owned farmland, or is sent to the incidental percolation basins. A portion of the treated wastewater effluent which incidentally percolates to the groundwater basin is pumped from the groundwater basin and discharged into the FID canal system. Evaporation from the surface of these percolation ponds accounts for the balance of the wastewater effluent (see Table 10-3). Table 10-4 summarizes the current uses of the City’s portion of the RWRf treated effluent.

**Table 10-4. Current (2005) Recycled Water Uses (DWR Table 35a)**

Type of Use	Treatment Level	2005 Recycled Water Use <sup>(a)</sup> , af/yr	
Agriculture (Direct Use on Fresno or Private Farmland)	Undisinfected Secondary	7,400	
Landscape Irrigation		0	
Wildlife Habitat		0	
Wetlands		0	
Industrial		0	
Incidental Percolation Ponds		24,500	33,400
Percolated Treated Effluent Extracted for Irrigation Purposes (Pumped Groundwater)			
Percolated Treated Effluent (Net Addition to Groundwater)			
Total Percolated Treated Effluent			
Total			65,300

<sup>(a)</sup> Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007.

As noted previously, the City did not prepare a 2000 UWMP. Therefore, no projections for 2005 recycled water use were previously made. Furthermore, the City’s previous UWMPs, prepared in 1986 and 1993, did not discuss the future use of recycled water. Table 10-5 indicates that no previous projections for recycled water use were made in the City’s previous UWMPs.

**Table 10-5. Recycled Water Uses—2000 Projection Compared with 2005 Actual (DWR Table 37)**

Type of Use	2000 Projection for 2005, af/yr	2005 Actual Recycled Water Use <sup>(a)</sup> , af/yr	
Agriculture (Direct Use on Fresno or Private Farmland)	No previous projections were made for 2005 recycled water use (no UWMP was prepared in 2000)	7,400	
Landscape Irrigation		0	
Wildlife Habitat		0	
Wetlands		0	
Industrial		0	
Incidental Percolation Ponds		24,500	
Percolated Treated Effluent Extracted for Irrigation Purposes (Pumped Groundwater)			
Percolated Treated Effluent (Net Addition to Groundwater)			<u>33,400</u>
Total Percolated Treated Effluent			57,900
<b>Total</b>			<b>65,300</b>

<sup>(b)</sup> Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007.

**POTENTIAL AND PROJECTED RECYCLED WATER USE**

10633 (d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier’s service area at the end of 5, 10, 15 and 20 years

Table 10-6 provides a summary of the potential future recycled water uses by the City. These potential future recycled water uses are consistent with the City’s future plans to expand use of recycled water for landscape irrigation in new growth areas and throughout the City service area. These potential recycled water uses are based on the City’s new North Fresno WRF (scheduled to be on-line in 2008) and the City’s future water supply plan, as being developed for the Metro Plan Update. As described in Chapter 4, the City’s future water supply plan includes a recycled water supply for landscape irrigation starting in 2025. It is assumed that recycled water will be used in the Southeast Growth Area, and eventually other portions of the City, for landscape irrigation purposes and other non-potable uses.

In the next few years, the City will prepare a Recycled Water Distribution Master Plan to identify potential future recycled water use areas within the Southeast Growth Area, other future growth areas, and other areas within the City, as well as plan for the recycled water infrastructure required to serve these areas. In addition, the City will begin plans to provide the future tertiary treatment facilities required to meet these potential future landscape irrigation demands (see additional discussion below).

**Table 10-6. Potential Recycled Water Uses (DWR Table 35b)<sup>(a,b)</sup>**

Method of Disposal	Treatment Level	Potential Recycled Water Use, af/yr				
		2010	2015	2020	2025	2030
Agriculture (Recycled on Fresno or Private Farmland)	Undisinfected Secondary	7,600	7,600	7,600	7,600	7,600
Wildlife Habitat		0	0	0	0	0
Wetlands		0	0	0	0	0
Industrial		0	0	0	0	0
Incidental Percolation Ponds						
Percolated Treated Effluent Extracted for Irrigation Purposes (Pumped Groundwater)		24,500	24,500	24,500	24,500	24,500
Percolated Treated Effluent (Net Addition to Groundwater)		<u>48,900</u>	<u>57,000</u>	<u>63,500</u>	<u>45,600</u>	<u>51,800</u>
Total Percolated Treated Effluent		73,400	81,500	88,000	70,100	76,300
Landscape Irrigation	Tertiary					
Southeast Growth Area and Other Areas in the City		0	0	0	24,000	24,000
Copper River Golf Course (North Fresno WRF)		<u>750</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
Total Landscape Irrigation		750	1,000	1,000	25,000	25,000
<b>Total</b>		<b>81,750</b>	<b>90,100</b>	<b>96,600</b>	<b>102,700</b>	<b>108,900</b>

<sup>(a)</sup> Based on Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007, updated to take into account the City's future water supply plan as being developed under Phase 2 of the Metro Plan Update.

<sup>(b)</sup> Based on City of Fresno portion of RWRf Outflow and North Fresno WRF outflow only. City of Clovis portion of RWRf outflow not included.

Based on this potential future recycled water use, Table 10-7 provides a summary of the projected future recycled water use by the City.

**Table 10-7. Projected Recycled Water Uses (DWR Table 36)<sup>(a,b)</sup>**

Method of Disposal	Treatment Level	Potential Recycled Water Use, af/yr				
		2010	2015	2020	2025	2030
Agriculture (Recycled on Fresno or Private Farmland)	Undisinfected Secondary	7,600	7,600	7,600	7,600	7,600
Wildlife Habitat		0	0	0	0	0
Wetlands		0	0	0	0	0
Industrial		0	0	0	0	0
Incidental Percolation Ponds						
Percolated Treated Effluent Extracted for Irrigation Purposes (Pumped Groundwater)		24,500	24,500	24,500	24,500	24,500
Percolated Treated Effluent (Net Addition to Groundwater)		<u>48,900</u>	<u>57,000</u>	<u>63,500</u>	<u>45,600</u>	<u>51,800</u>
Total Percolated Treated Effluent		73,400	81,500	88,000	70,100	76,300
Landscape Irrigation	Tertiary					
Southeast Growth Area and Other Areas in the City		0	0	0	24,000	24,000
Copper River Golf Course (North Fresno WRF)		<u>750</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
Total Landscape Irrigation		750	1,000	1,000	25,000	25,000
<b>Total</b>		<b>81,750</b>	<b>90,100</b>	<b>96,600</b>	<b>102,700</b>	<b>108,900</b>

- (a) Based on Table 6-6, City of Fresno Metro Plan Update Final Report dated December 2007, updated to take into account the City's future water supply plan as being developed under Phase 2 of the Metro Plan Update.
- (b) Based on City of Fresno portion of RWRF Outflow and North Fresno WRF outflow only. City of Clovis portion of RWRF outflow not included.

**METHODS TO ENCOURAGE RECYCLED WATER USE**

10633 (f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

As described above, the majority of the future use of recycled water is currently projected to be generally consistent with current recycled water uses (e.g., direct use on farmland and sent to incidental percolation basins). However, as a result of the City’s on-going Metro Plan Update, the City will prepare a Recycled Water Distribution Master Plan to identify potential future recycled water use areas within the Southeast Growth Area, other future growth areas, and areas within the City, as well as plan for the recycled water infrastructure required to serve these areas. To encourage and support future recycled water use, the City will consider the following future policies with regard to recycled water use:

- Require new developments City-wide to install purple pipe for recycled water use on parks, common areas, roadway medians, etc.
- Look for opportunities to install purple pipe near existing landscaped areas (e.g., parks, sports fields) (i.e., piggyback on other pipeline installation/replacement projects)
- Work with FID and/or others to develop an agreement to better use the percolated treated effluent from the RWRF
- Further develop partnerships with FID, Clovis, and others to maximize available water resources
- Allow new development to create “new” supplies by participation in the implementation of recycled water facilities
- Fund and adopt the required Recycled Water Master Plan by 2010
- Provide additional staff and program-specific financial resources required to implement/manage the future recycled water use program

Table 10-8 provides a summary of future methods to encourage future recycled water use.

**Table 10-8. Methods to Encourage Recycled Water Use (DWR Table 38)**

Actions	Acre-feet of Recycled Water Use to Result from this Action				
	2010	2015	2020	2025	2030
Implement future policies to require installation of purple pipe in Southeast Growth Area and other future growth areas to allow for landscape irrigation with recycled water	0	0	0	24,000	24,000
Financial Incentives	Not needed				
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>24,000</b>	<b>24,000</b>

## OPTIMIZING THE USE OF RECYCLED WATER

*10633 (g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculation uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.*

The RWRF Master Plan includes a schedule of additional infrastructure required to the year 2025, based on projected wastewater flows and load increases. The current (2006) average day annual flow (ADAF) is approximately 72.4 mgd. The projected ADAF for 2015 is 96.0 mgd and for 2025 is 112.5 mgd.

If needed in the future, the current RWRF Master Plan allows for possible future tertiary treatment facilities, namely filtration and disinfection. Although no such facilities are currently required, the infrastructure and piping layout plan provided in the RWRF Master Plan does make provision for such possible new facilities in case of new regulations or demand from a future end-user (i.e., landscape irrigation with recycled water in the Southeast Growth Area as described above). These future treatment facilities would be modular in case only a portion of the effluent needs to undergo tertiary treatment. Such facilities would facilitate the increased use of treated wastewater that meets recycled water standards and the particular needs of end-users. This RWRF Master Plan will be updated in the future as needed to support the production of future tertiary-treated recycled water supplies required as part of the City's future water supply plan.

In addition, as described above, the City is planning to prepare a Recycled Water Distribution Master Plan to identify potential future recycled water use areas within the Southeast Growth Area, other future growth areas, and other areas within the City, as well as plan for the recycled water infrastructure required to serve these areas. The City plans to complete this Master Plan by 2010.