



Pima County Regional Wastewater Reclamation Department

**EFFLUENT GENERATION AND  
UTILIZATION REPORT  
2010**



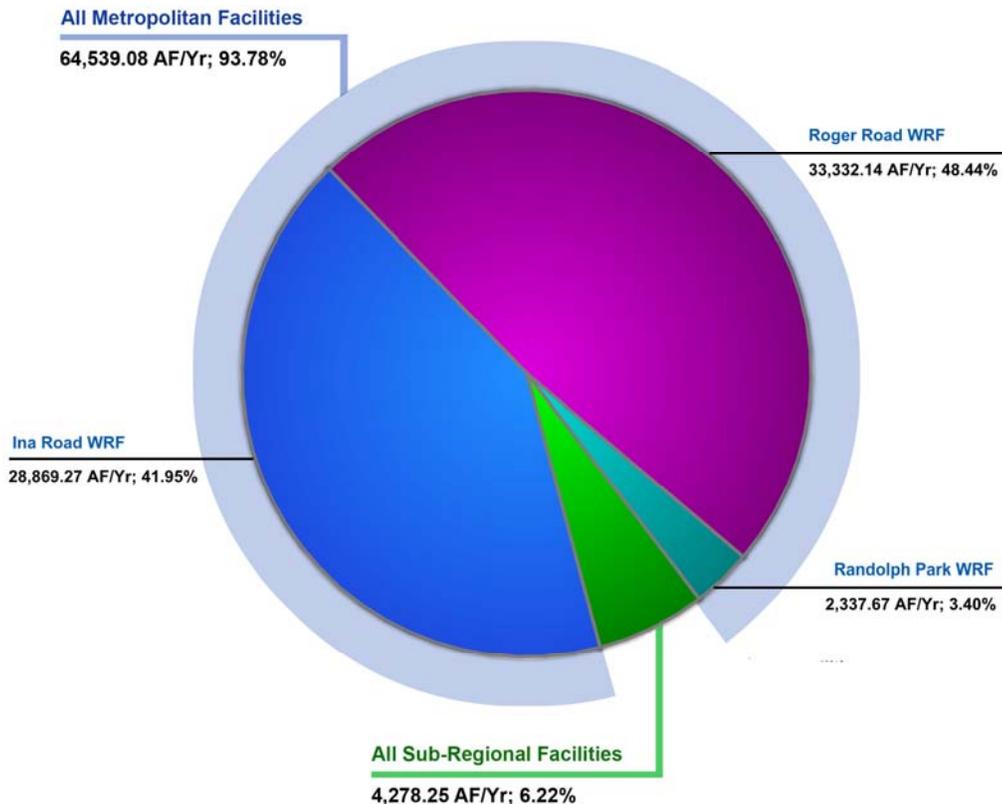
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## I. Executive Summary

The Pima County Regional Wastewater Reclamation Department (RWRD) is dedicated to the goal of protecting public health and the environment in a sustainable manner for the benefit of our current citizens and future generations. RWRD meets this commitment through the significant usage of reclaimed water for groundwater recharge, reuse, and environmental restoration throughout the community. Our activities in this regard aid in mitigating demand on potable water systems thereby sustaining groundwater levels and preserving green infrastructure throughout our community.

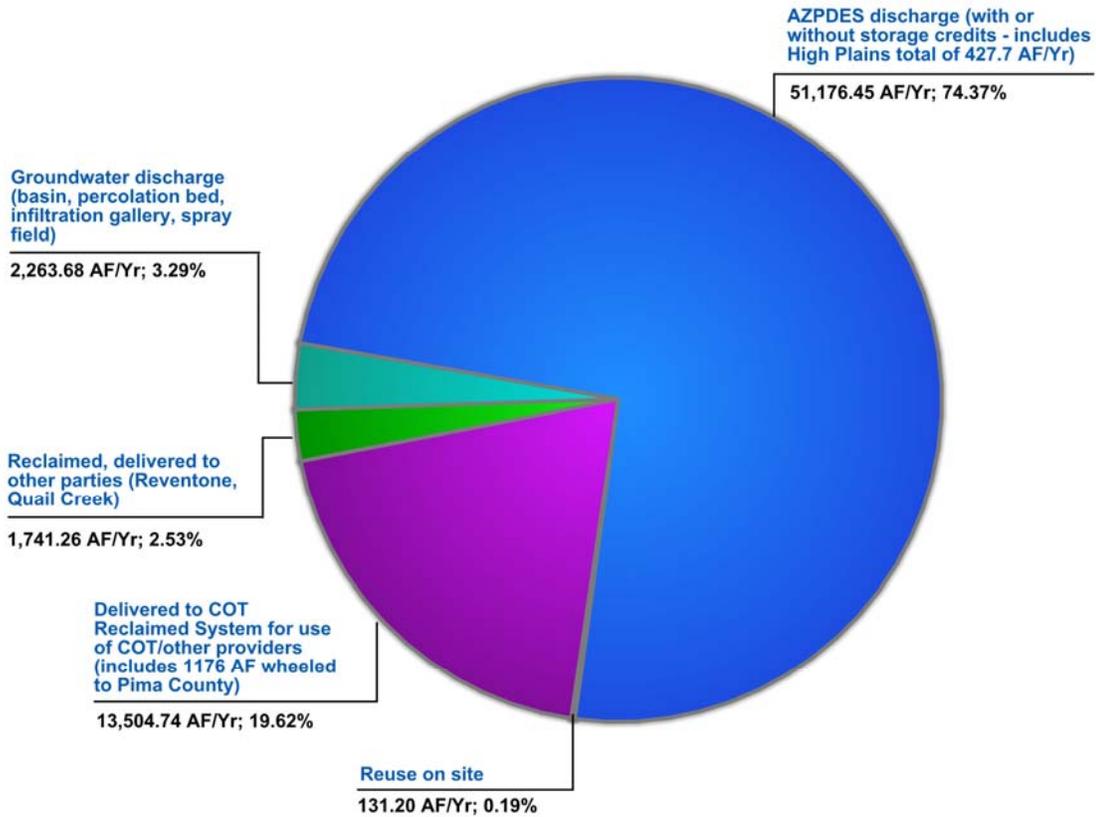
RWRD operates 11 treatment facilities, and this report provides a narrative description of the different wastewater treatment processes used at each facility along with the quantity of wastewater received and the amount of effluent produced. During calendar year 2010, RWRD facilities treated wastewater to produce a total of 68,817 acre-feet (AF) of effluent. Figure 1 shows the contributions to total effluent generation in 2010 by RWRD facilities. Ina Road Wastewater Reclamation Facility (WRF), Roger Road WRF and Randolph Park WRF represent the metropolitan facilities identified by the 1979 Intergovernmental Agreement (IGA) between the City of Tucson and Pima County. Metropolitan facilities generated the majority of effluent with total production at 64,539 AF. Non-metropolitan, sub-regional facilities produced the remaining portion, totaling 4,278 AF.



**Figure 1:** Production of Effluent by Pima County RWRD Facilities for 2010

**I. Executive Summary (Continued)**

Figure 2 illustrates the various modes of delivery or discharge for the total metropolitan and non-metropolitan effluent. RWRD delivered an appreciable portion of its total effluent volume, consisting of 13,505 AF or nearly 20%, to the City of Tucson's Reclaimed Water System. In addition, direct delivery of reclaimed water by RWRD to other parties accounted for 1,741 AF. Reuse for landscape, construction, or dust control at WRF sites utilized 131 AF. Direct discharge to groundwater using various means, such as percolation beds and recharge basins, accounted for 2,264 AF. The balance of effluent, or 51,176 AF, was released through surface water discharge under the authorization of Arizona Pollution Discharge Elimination System (AZPDES) permits.

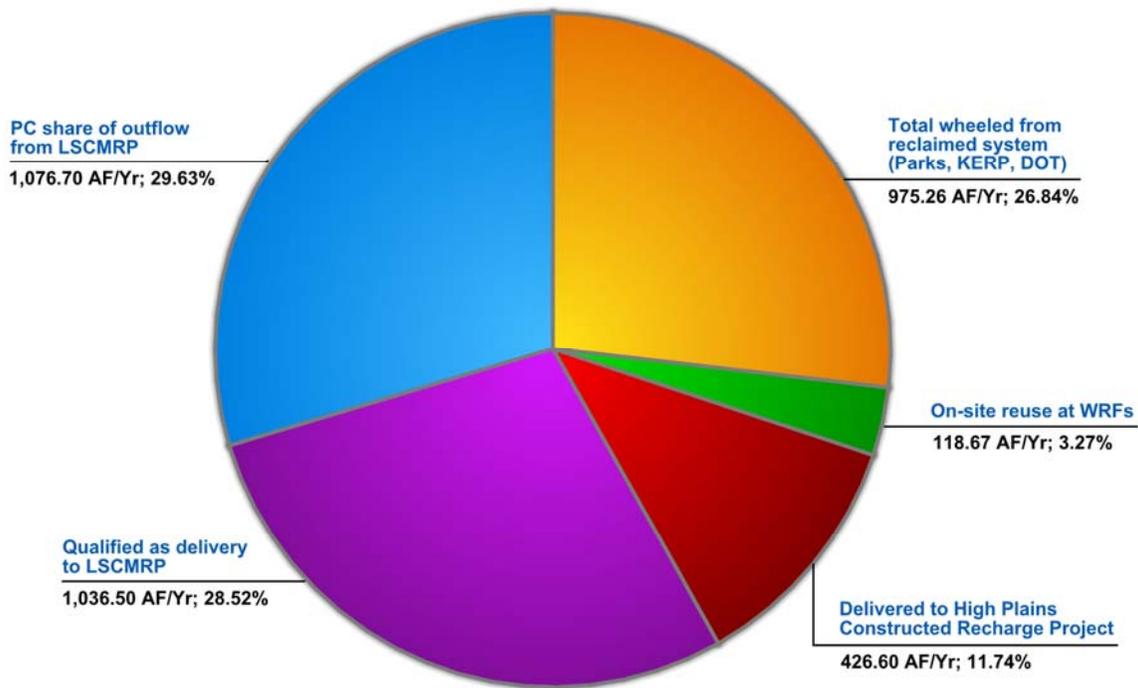


**Figure 2:** Effluent from All Pima County RWRD Facilities by Type of Discharge, Delivery, or Use for 2010

The 1979 IGA and subsequent agreements govern effluent entitlement from the metropolitan facilities, and this report describes how Pima County's share of the effluent entitlement was used. In 2010, the effluent allocation formula designated the fixed amount of 28,200 AF for the Bureau of Reclamation to manage under Southern Arizona Water Rights Settlement Act (SAWRSA). Of the remaining portion, 32,705 AF were accorded to the City of Tucson and other water providers, while Pima County retained 3,634 AF.

**I. Executive Summary (Continued)**

Figure 3 shows the manner in which Pima County’s share of metropolitan effluent was distributed in 2010. Reuse, either on-site at the WRFs or wheeled through the Reclaimed Water System, accounted for approximately 30% of the total. RWRD used 40% of its metropolitan effluent to serve as water delivery to underground storage facilities recharging the aquifer. Outflow from the storage reach on the Santa Cruz River comprised 1,077 AF, making up 30% of Pima County’s allocation.



**Figure 3:** Distribution of Pima County’s Share of Metropolitan Effluent in 2010

As a result of groundwater recharge project activities in 2010, Pima County will receive credit to its long-term storage account for 1085.3 AF of effluent. This volume includes 396.2<sup>1</sup> AF of underground storage credits for its share of effluent discharged into the Lower Santa Cruz Managed Recharge Project and 411.5 AF for effluent diverted off-channel into the High Plains Effluent Recharge Project. Pima County received an additional 277.6 AF of underground storage credits for its non-metropolitan effluent recharged at the Corona de Tucson WRF.

<sup>1</sup> These 2010 credits include 42.1 AF as a correction for the 2009 allocation. This compensates for an error in calculation of Pima County’s reuse volume for that prior year.

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities**

**A. Metropolitan Facilities**

**1. Ina Road Water Wastewater Reclamation Facility**

The Ina Road WRF, RWRD's largest facility, is located in the northwestern part of the Tucson basin and serves Oro Valley, Marana and the northwest portions of Tucson. The original facility was constructed in 1979 as a 25 Million Gallons per Day (MGD), Class B, high-purity oxygen activated sludge process. Capacity at this facility was increased in 2006 with the addition of a 12.5 MGD, Biological Nutrient Removal Activated Sludge process producing Class B+ effluent, thereby increasing the overall combined plant capacity to 37.5 MGD. In 2010, ADEQ re-rated the BNR capacity to 18.0 MGD, and the APP now reflects a total capacity of 43 MGD. This facility uses chlorination to disinfect and dechlorinates prior to discharge.

The Ina Road facility discharges into the Santa Cruz River under authorization of an AZPDES permit. On-site irrigation and dust control occurs in accordance with a Type II Reuse general permit. Effluent discharged into the Santa Cruz River is conveyed to the Lower Santa Cruz Managed Recharge Project (LSCMRP) which extends along the river channel from Cortaro Road to Trico Road. Groundwater storage credits are issued from the Arizona Department of Water Resources (ADWR) for half of the effluent that reaches the water table. Credits are apportioned among participants in the LSCMRP in accordance with IGAs that recognize each party's entitlement.

Ina Road WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			28,982.23	9,443.89	25.87
<b>Process Water</b>	<i>Used in industrial process at WRF, not included in effluent total used for allocations</i>		95.48	31.11	0.09
<b>Effluent Usage</b>	AZPDES discharge	<i>Outfall to Santa Cruz River, some available for credits, see chart x</i>	28,821.21	9,391.42	25.73
	Reuse on-site	<i>Construction and dust control</i>	48.06	15.66	0.04
<b>Effluent Total</b>	<i>Used for calculation of effluent allocations</i>		28,869.27	9,407.08	25.77

**2. Roger Road Wastewater Reclamation Facility**

The Roger Road WRF is located on the west side of Tucson and serves the greater Tucson metropolitan area. This plant has consistently produced the most effluent over the years, and its current capacity is 41 MGD. It produces Class B reclaimed water utilizing chlorination for disinfection. While some effluent is used for on-site irrigation, about one-third of the effluent is delivered to the COT for use in their reclaimed water system and for groundwater recharge. Remaining effluent is then dechlorinated prior to discharge into the Santa Cruz River under the authorization of an AZPDES permit. A portion of the effluent is also used to convey biosolids to Ina Road WRF for further processing.

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**A. Metropolitan Facilities (Continued)**

**2. Roger Road Wastewater Reclamation Facility (Continued)**

Roger Road WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			35,279.07	11,495.72	31.50
<b>Process Water</b>	<i>Used in biosolids flush water and other industrial processes at WRF, not included in effluent total used for allocations</i>		211.66	68.97	0.19
<b>Effluent Usage</b>	AZPDES discharge	<i>Outfall to Santa Cruz River, some available for credits, see chart x</i>	22,094.46	7,199.50	19.72
	Delivered reclaimed water	<i>Input to COT reclaimed system</i>	11,167.37	3,638.90	9.97
	Reuse on-site	<i>Irrigation at WRF</i>	70.31	22.91	0.06
<b>Effluent Total</b>	<i>Used for calculation of effluent allocations</i>		33,332.14	10,861.31	29.76

**3. Randolph Park Wastewater Reclamation Facility**

The Randolph Park WRF is located in midtown Tucson at the City-owned Randolph Park. This is a 3.0 MGD membrane bioreactor facility and utilizes ultraviolet light disinfection system. This facility produces Class A effluent that is delivered directly into the COT's Reclaimed Water System.

A significant feature of the Randolph Park WRF is that it is considered a "scalping" plant. RWRD can control reclaimed water production by limiting influent taken from the sewer collection system. Periodically, Tucson Water will request a reduction of output at Randolph in order to manage their Reclaimed System. In 2011, no such requests for flow reduction were received by RWRD.

Under the 2000 Supplemental IGA and a 2003 Wheeling Agreement approved by COT and Pima County, the County agreed to deliver to the City an average of 1,000 AFY of reclaimed water during an initial delivery period. The balance of reclaimed water produced at Randolph may be put to public use by the County. Pima County's reclaimed water used under this arrangement is delivered by Tucson Water at a special Wheeling Rate based on system O&M costs. In FY2010 wheeling was billed at \$84.58 per AF; in FY 2011 it has been billed at \$71.33 per AF.

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**A. Metropolitan Facilities (Continued)**

**3. Randolph Park Wastewater Reclamation Facility (Continued)**

Randolph Park WRF					
Description		AFY	MG/Year	MGD Average	
<b>Influent</b>		2,738.75	892.42	2.44	
<b>Process Water</b>	<i>Used in biosolids flush water and other industrial processes at WRF, not included in effluent total used for allocations</i>	9.60	3.13	0.01	
	Delivered reclaimed water	<i>Input to COT reclaimed system</i>	2,337.37	761.63	2.09
	Reuse on-site	<i>Irrigation at WRF</i>	0.30	0.10	0.00
<b>Effluent Total</b>	<i>Used for calculation of effluent allocations</i>	2,337.67	761.73	2.09	

**4. Metropolitan Facilities Summary Table**

Metropolitan Facilities - Overall Usage							
Description	Ina Road WRF	Roger Road WRF	Randolph Park WRF	All Facilities			
	AFY			AFY	MG/Yr	MGD	
<b>Influent Total</b>	28,982.23	35,279.07	2,738.75	67,000.05	21,832.03	59.81	
<b>Process Water Total</b>	95.48	211.66	9.60	316.74	103.21	0.28	
Effluent Usage	AZPDES Discharge	28,821.21	22,094.46	0.00	50,915.67	16,590.92	45.45
	Delivered to COT Reclaimed Water System	0.00	11,167.37	2,337.37	13,504.74	4,400.53	12.06
	Reuse on-site	48.06	70.31	0.30	118.67	38.67	0.11
<b>Effluent Total</b>	28,869.27	33,332.14	2,337.67	64,539.08	21,030.12	57.62	

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**A. Metropolitan Facilities (Continued)**

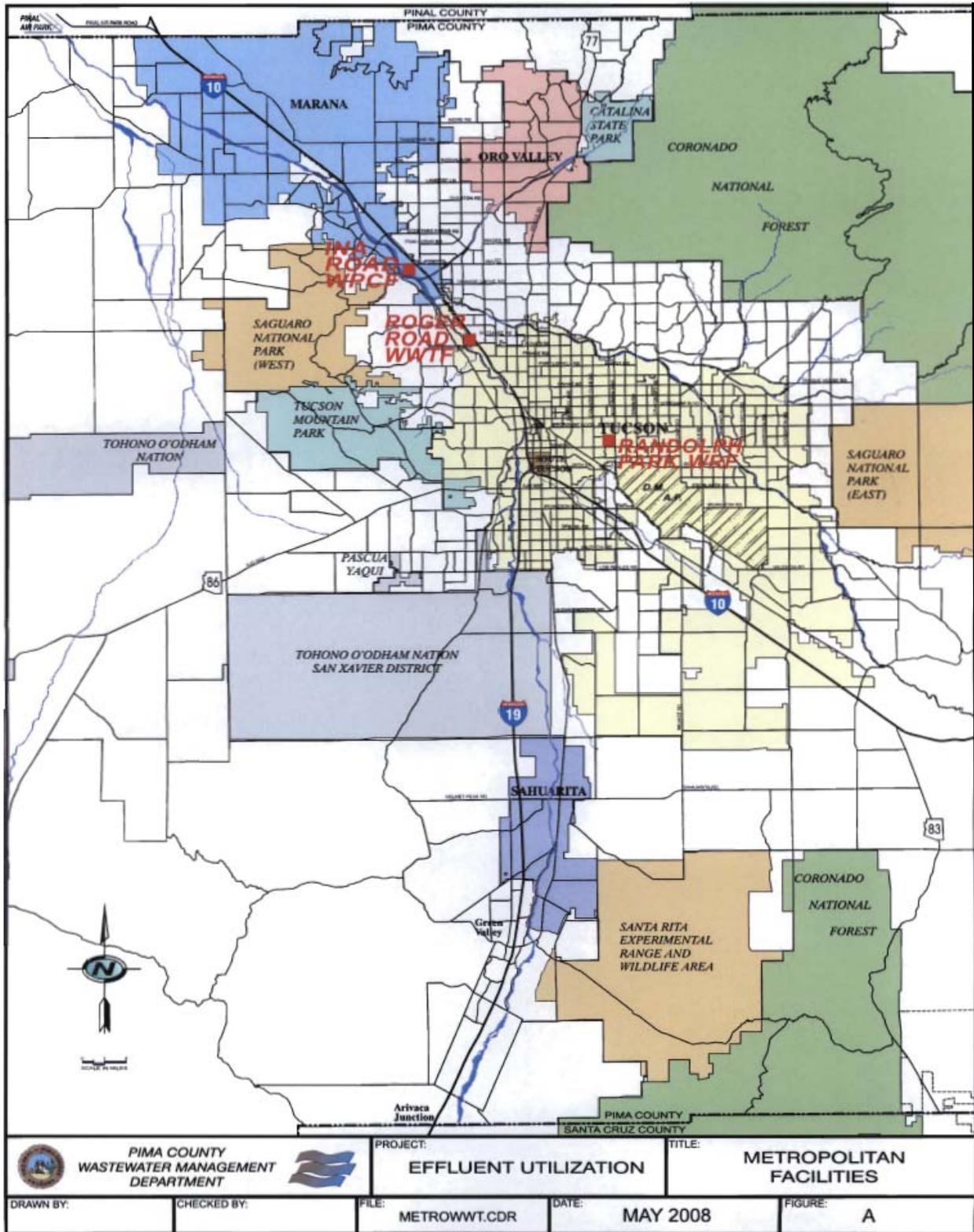
**5. Metropolitan Facilities Historical Data**

**Historical Influent and Effluent Volumes by Metropolitan Treatment Facility**

Year	Influent Received AF	Effluent Reused On-site at County WRFs AF	Effluent Discharged or Delivered to Reclaimed System AF	Effluent Total AF
<b>Ina Road</b>				
2003	27,071.50	806.9	26,407.60	27,214.50
2004	28,714.70	605.6	27,925.50	28,531.10
2005	26,149.80	665.7	24,552.10	25,217.80
2006	25,854.40	613.2	24,968.10	25,581.30
2007	28,840.60	8	27,856.30	27,864.30
2008	32,192.00	22.2	31,545.70	31,567.90
2009	28,960.41	24.61	28,527.58	28,552.19
2010	28,982.23	48.06	28,821.21	28,869.27
<b>Roger Road</b>				
2003	41,991.90	119.7	40,862.20	40,981.90
2004	40,957.00	599	39,025.80	39,624.80
2005	43,239.00	13.6	42,311.50	42,325.10
2006	43,381.20	63	40,864.80	40,927.80
2007	40,730.70	60.1	37,763.20	37,823.30
2008	36,823.60	116.3	34,194.20	34,310.50
2009	37,542.80	107.73	35,339.57	35,447.30
2010	35,279.07	70.31	33,261.83	33,332.14
<b>Randolph Park</b>				
2003	1.4	1.4	0	1.4
2004	114.7	0	97.5	97.5
2005	1,579.60	408.4	1,055.90	1,464.30
2006	2,785.40	679.5	1,878.50	2,558.00
2007	2,866.50	0.5	2,610.40	2,610.90
2008	2,973.60	0.3	2,661.60	2,661.90
2009	2,649.11	235.31	2,176.30	2,176.65
2010	2,738.75	0.30	2,337.37	2,337.67
<b>Metropolitan Facility Totals</b>				
2003	69,064.80	927.9	67,269.90	68,197.80
2004	69,786.40	1,204.60	67,048.80	68,253.40
2005	70,968.40	1,087.70	67,919.50	69,007.20
2006	72,021.00	1,355.70	67,711.40	69,067.10
2007	72,437.80	68.6	68,229.90	68,298.50
2008	71,989.20	138.8	68,401.50	68,540.30
2009	69,152.32	367.65	66,043.45	66,411.10
2010	67,000.05	118.67	64,420.41	64,539.08

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**A. Metropolitan Facilities (Continued)**



**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities**

**1. Arivaca Junction Wastewater Reclamation Facility**

The Arivaca Junction WRF is located in the town of Amado, approximately 38 miles south of Tucson. It consists of a single, 3.2-acre, aerated lagoon with a permitted treatment capacity of 100,000 gallons per day (GPD). Chlorination is the method of disinfection. Effluent disposal is via evaporation, percolation through the base of the unlined pond, and reuse. Evaporation ranges from 7,000 to 14,000 GPD, while percolation is approximately 10,000 GPD. RWRD has a reuse agreement with Reventone Ranch to accept delivery of this facility's Class C reclaimed water for restricted agricultural use.

Arivaca Junction WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			67.32	21.94	0.06
<b>Process Water</b>	<i>Used in biosolids flush water and other industrial processes at WRF, not included in effluent total used for allocations</i>		0.00	0.00	0.00
<b>Effluent Usage</b>	Reclaimed, delivered to other parties	<i>Reventone Ranch</i>	28.71	9.36	0.03
	Groundwater Discharge	<i>Percolation through base of impoundment (estimated at 10,000 gallons per day)</i>	11.23	3.66	0.01
<b>Effluent Total</b>			39.94	13.01	0.04

**2. Avra Valley Wastewater Reclamation Facility**

The Avra Valley WRF is located on the west side of the Tucson Mountains, approximately 20 miles southwest of Tucson. The tertiary treatment facility has a permitted capacity of 4.0 MGD using two oxidation ditches for achieving nitrification and denitrification. It utilizes sand filtration, and UV treatment is the method of disinfection. Effluent produced at this facility can meet Class A+, but is permitted for Class B+ reclaimed quality. Effluent is discharged primarily by percolation through five recharge basins. Also, on-site reuse is possible for irrigation and dust control, and limited surface water discharge to Black Wash is covered under an AZDPES permit.

## II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)

### B. Non-Metropolitan Sub-Regional Facilities (Continued)

#### 2. Avra Valley Wastewater Reclamation Facility (Continued)

Avra Valley WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			1,235.84	402.70	1.10
<b>Process Water</b>	<i>Used in industrial processes at WRF, not included in effluent total used for allocations</i>		0.00	0.00	0.00
<b>Effluent Usage</b>	AZPDES Discharge	<i>Black Wash Spray Field</i>	0.00	0.00	0.00
	Groundwater Discharge	<i>Percolation beds and ponds - groundwater recharge without storage credit accrual</i>	1,343.23	437.69	1.20
	Reuse on-site	<i>Irrigation at WRF</i>	0.01	0.00	0.00
<b>Effluent Total</b>			1,343.24	437.70	1.20

#### 3. Corona de Tucson Wastewater Reclamation Facility

The Corona de Tucson WRF is located 22 miles southeast of Tucson. The facility consists of a recently constructed 1.0 MGD closed loop oxidation ditch for achieving both nitrification and denitrification. This facility is not classified for reuse. Effluent is disposed into percolation basins designed for groundwater recharge. Soil aquifer treatment (SAT) is the method of disinfection.

Corona de Tucson WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			284.34	92.65	0.25
<b>Process Water</b>	<i>Used in industrial processes at WRF, not included in effluent total used for allocations</i>		0.00	0.00	0.00
<b>Effluent Usage</b>	Groundwater Discharge	<i>Percolation beds and ponds - groundwater recharge with storage credit accrual</i>	281.34 <sup>1</sup>	91.67	0.25
<b>Effluent Total</b>			281.34	91.67	0.25

<sup>1</sup>A volume of 277.6 AF in storage credits was received for this recharge after subtracting evaporative losses.

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities (Continued)**

**4. Green Valley Wastewater Reclamation Facility**

The Green Valley WRF is located approximately 29 miles south of Tucson and serves the town of Green Valley. This facility is comprised of two treatment trains. The first consists of a 2.0 MGD oxidation ditch achieving nitrification and denitrification. Chlorination of this effluent produces Class A+ reclaimed water. The reclaimed water is delivered to Robson/Quail Creek for groundwater recharge. The second treatment train consists of a separate 2.1 MGD aerated lagoon, producing the equivalent of Class B reclaimed water. However, this stream is not classified for reuse in the Aquifer Protection Permit. Effluent from this portion of the facility is disposed of through percolation.

Green Valley WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			2,065.40	673.01	1.84
<b>Process Water</b>	<i>Used in industrial processes at WRF, not included in effluent total used for allocations</i>		0.00	0.00	0.00
<b>Effluent Usage</b>	Reclaimed, delivered to other parties	<i>Effluent from BNROD to Robson/ Quail Creek for groundwater recharge</i>	1,712.55	558.04	1.53
	Groundwater Discharge	<i>Percolation ponds (Lagoon Facility) - groundwater recharge without storage credit accrual</i>	611.94	199.40	0.55
<b>Effluent Total</b>			2,324.49	757.44	2.08

**5. Marana Wastewater Reclamation Facility**

The Marana WRF is located northwest of Tucson in the Town of Marana. This facility consists of a 0.5 MGD Biolac treatment process and four, 50,000 GPD, Smith and Loveless package treatment facilities. This facility is capable of treating a combined capacity of 0.7 MGD. With the addition of tertiary filtration and UV treatment in 2008, the plant is now capable of producing Class A+ reclaimed water. However, the facility remains permitted for Class B+ until demand for reclaimed water at this site justifies a permit change. Reclaimed water from this facility is used for landscape irrigation and is released to the riparian habitat of a tributary to the Santa Cruz River under an APP and AZPDES permit.

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities (Continued)**

**5. Marana Wastewater Reclamation Facility (Continued)**

Marana WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			292.30	95.25	0.26
<b>Process Water</b>	<i>Used in industrial processes at WRF, not included in effluent total used for allocations</i>		7.57	2.47	0.01
<b>Effluent Usage</b>	AZPDES Discharge	<i>Outfall to channel tributary to Santa Cruz River</i>	260.78	84.98	0.23
	Reuse on-site	<i>Irrigation on-site and in adjacent park</i>	12.52	4.08	0.01
<b>Effluent Total</b>			273.30	89.06	0.24

**6. Mt. Lemmon Wastewater Reclamation Facility**

The Mt. Lemmon WRF is located in the Town of Summerhaven in the Catalina Mountains. This facility operates under a special use permit issued by the United States Forest Service (USFS) that authorizes a treatment capacity of 17,000 gallons per day. This facility consists of a closed loop oxidation ditch for achieving both nitrification and denitrification. Effluent is disposed of through an off-site sprayfield, through a French drain, and through a surface water discharge to an unnamed tributary to the San Pedro River under an AZPDES permit. The facility currently is covered by an APP general permit, so a reclaimed water classification is not possible.

Mt. Lemmon WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			3.45	1.12	0.0031
<b>Process Water</b>	<i>Used in industrial processes at WRF, not included in effluent total used for allocations</i>		0.00	0.00	0.0000
<b>Effluent Usage</b>	Groundwater Discharge	<i>Discharge to spray field, drain, or AZPDES release to unnamed tributary to San Pedro River</i>	3.33	1.09	0.0030
<b>Effluent Total</b>			3.33	1.09	0.0030

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities (Continued)**

7. Pima County Fairgrounds Wastewater Reclamation Facility

The PC Fairgrounds WRF is located approximately 18 miles southeast of Tucson and serves the fairgrounds complex. This facility has a permitted capacity of 20,000 GPD. This facility uses stabilization lagoons and effluent is disposed of through evaporation and percolation.

Pima County Fairgrounds WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			5.35	1.74	0.0048
<b>Effluent Usage</b>	Groundwater Discharge	<i>Drain Field</i>	5.35	1.74	0.0048

8. Rillito Vista Wastewater Reclamation Facility

The Rillito Vista WRF is located north of the Town of Marana. This facility consists of two, unlined, stabilization ponds with a maximum capacity of 20,000 GPD. This facility is designed for evaporation and percolation.

Rillito Vista WRF					
Description			AFY	MG/Year	MGD Average
<b>Influent</b>			7.26	2.37	0.0065
<b>Effluent Usage</b>	Groundwater Discharge	<i>Drain Field</i>	7.26	2.37	0.0065

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities (Continued)**

**9. Sub-Regional Facilities Summary**

Sub-Regional Facilities - Effluent Usage												
		Arivaca	Ava Valley	Corona	Green Valley	Marana	Mt. Lemmon	Fair-grounds	Rillito Vista	All Facilities		
Description		AFY							AFY	MG/Yr	MGD	
<b>Influent Total</b>		<b>67.32</b>	<b>1,235.84</b>	<b>284.34</b>	<b>2,065.40</b>	<b>292.30</b>	<b>3.45</b>	<b>5.35</b>	<b>7.26</b>	<b>3,961.26</b>	<b>1,290.78</b>	<b>3.54</b>
<b>Process Water Total</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>7.57</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>7.57</b>	<b>2.47</b>	<b>0.01</b>
Effluent Usage	AZPDES Discharge		0.00			260.78				260.78	84.98	0.23
	Reclaimed, delivered to other parties	28.71			1,712.55					1,741.26	567.39	1.55
	Groundwater Discharge (basin, percolation bed, infiltration gallery, spray field)	11.23	1,343.23	281.34	611.94		3.33	5.35	7.26	2,263.68	737.62	2.02
	Reuse on-site		0.01			12.52				12.53	4.08	0.01
<b>Effluent Total</b>		<b>39.94</b>	<b>1,343.24</b>	<b>281.34</b>	<b>2,324.49</b>	<b>273.30</b>	<b>3.33</b>	<b>5.35</b>	<b>7.26</b>	<b>4,278.25</b>	<b>1,394.07</b>	<b>3.82</b>

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

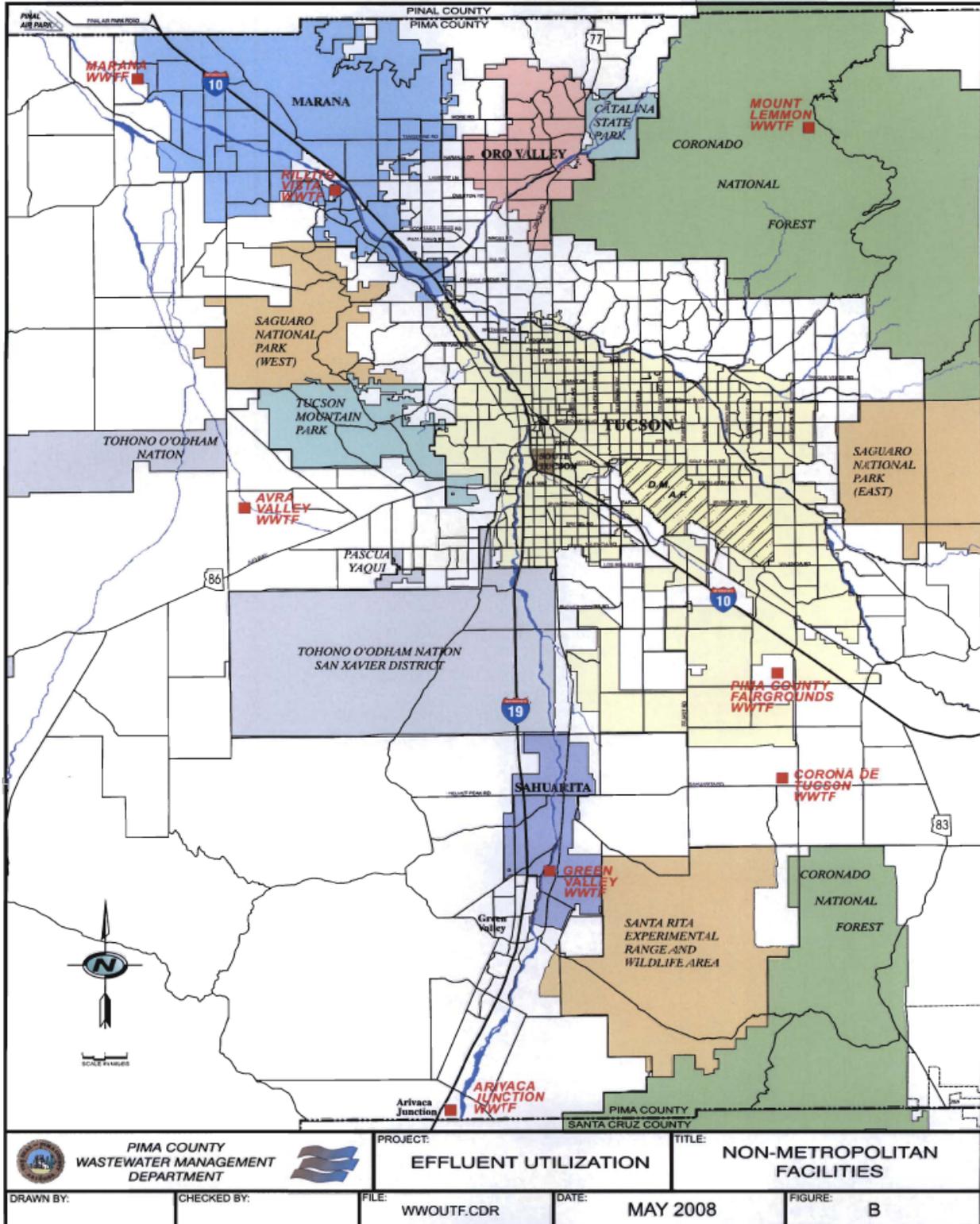
**B. Non-Metropolitan Sub-Regional Facilities (Continued)**

10. Summary Table of All Facilities

<b>All Facilities - Effluent Usage</b>					
	Metropolitan	Sub-Regional	All Facilities		
Description	AFY		AFY	MG/Yr	MGD
<b>Influent Total</b>	<b>67,000.05</b>	<b>3,961.26</b>	<b>70,961.31</b>	<b>23,122.81</b>	<b>63.35</b>
<b>Process Water Total</b>	<b>316.74</b>	<b>7.57</b>	<b>324.31</b>	<b>105.68</b>	<b>0.29</b>
AZPDES Discharge	50,915.67	260.78	51,176.45	16,675.90	45.69
Delivered to COT Reclaimed System	13,504.74		13,504.74	4,400.53	12.06
Reclaimed, delivered to other parties		1,741.26	1,741.26	567.39	1.55
Groundwater Discharge		2,263.68	2,263.68	737.62	2.02
Reuse on-site	118.67	12.53	131.20	42.75	0.12
<b>Effluent Total</b>	<b>64,539.08</b>	<b>4,278.25</b>	<b>68,817.33</b>	<b>22,424.20</b>	<b>61.44</b>

**II. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities (Continued)**

**B. Non-Metropolitan Sub-Regional Facilities (Continued)**



**III. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge)**

**A. Reclaimed Water Wheeled Through Tucson Water Reclaimed System**

To take advantage of this renewable supply, Pima County reuses a substantial volume of its effluent for irrigation, construction and other purposes. Most of this reuse is conducted by the following three entities:

- Natural Resources, Parks and Recreation
- Department of Transportation
- Kino Sports Complex & Kino Environmental Restoration Project

The supply of reclaimed water at various County sites is Class A reclaimed water wheeled through the City of Tucson Reclaimed Water System and delivered in the amounts shown in the following tables.

<b>Natural Resources, Parks and Recreation</b>			
<b>2010 Monthly Reclaimed Water Use</b>			
<b>Month</b>	<b>Gallons</b>	<b>Ccf</b>	<b>AF</b>
January	13,103,626	17,517.0	40.2
February	2,487,273	3,325.0	7.6
March	10,628,322	14,208.0	32.6
April	17,266,535	23,082.0	53.0
May	23,417,018	31,304.0	71.9
June	35,313,288	47,207.0	108.4
July	35,630,462	47,631.0	109.3
August	28,412,509	37,982.0	87.2
September	27,315,865	36,516.0	83.8
October	23,711,003	31,697.0	72.8
November	26,491,512	35,414.0	81.3
December	18,818,743	25,157.0	57.8
<b>Total</b>	<b>262,596,156</b>	<b>351,040.0</b>	<b>805.9</b>

<b>Department of Transportation</b>			
<b>2010 Monthly Reclaimed Water Use</b>			
<b>Month</b>	<b>Gallons</b>	<b>Ccf</b>	<b>AF</b>
January	1,037,548	1,387.0	3.2
February	675,491	903.0	2.1
March	279,771	374.0	0.9
April	645,569	863.0	2.0
May	1,045,777	1,398.0	3.2
June	1,247,003	1,667.0	3.8
July	1,475,158	1,972.0	4.5
August	1,547,719	2,069.0	4.7
September	1,229,049	1,643.0	3.8
October	1,621,029	2,167.0	5.0
November	1,186,410	1,586.0	3.6
December	1,206,608	1,613.0	3.7
<b>Total</b>	<b>13,197,132</b>	<b>17,642.0</b>	<b>40.5</b>

**III. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge) (Continued)**

**A. Reclaimed Water Wheeled Through Tucson Water Reclaimed System (Continued)**

<b>Kino Sports Park &amp; KERP</b>			
<b>2010 Monthly Reclaimed Water Use</b>			
<b>Month</b>	<b>Gallons</b>	<b>Ccf</b>	<b>AF</b>
January	10,502,649	14,040.0	32.2
February	748	1.0	0.0
March	106,971	143.0	0.3
April	136,894	183.0	0.4
May	5,034,390	6,730.0	15.4
June	8,346,016	11,157.0	25.6
July	11,276,883	15,075.0	34.6
August	3,586,909	4,795.0	11.0
September	0	0.0	0.0
October	0	0.0	0.0
November	0	0.0	0.0
December	3,004,177	4,016.0	9.2
<b>Total</b>	<b>41,995,636</b>	<b>56,140.0</b>	<b>128.9</b>

<b>Historical Water Use at Kino Sports Park &amp; KERP</b>			
	<b>Reclaimed</b>		<b>Harvested Stormwater</b>
<b>Year</b>	<b>Ccf</b>	<b>AF</b>	<b>AF</b>
2003	156,042.8	358.2	87.00
2004	143,723.0	329.9	30.70
2005	78,493.0	180.2	64.90
2006	171,955.0	394.8	0.00
2007	69,389.0	159.3	65.95
2008	81,916.0	188.1	95.85
2009	163,725.0	375.9	0.00
<b>2010</b>	<b>56,140.0</b>	<b>128.9</b>	<b>88.53</b>

<b>Yearly Reclaimed Water Use by Pima County from Tucson Water's Reclaimed System</b>			
<b>Year</b>	<b>Gallons</b>	<b>Ccf</b>	<b>AF</b>
2003	69,573,993	93,006.9	213.5
2004	86,118,658	115,123.9	264.3
2005	74,349,631	99,391.0	228.2
2006	92,822,026	124,085.0	284.9
2007	295,588,987	395,145.0	907.1
2008	302,590,005	404,504.0	928.6
2009	418,643,532	559,645.0	1,284.8
<b>2010</b>	<b>317,788,925</b>	<b>424,822.0</b>	<b>975.3</b>

**III. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge) (Continued)**

**B. Environmental Restoration with Reclaimed Water**

As part of Pima County’s Sustainable Action Plan begun in FY `09, RWRD began tabulating the volume of effluent used for environmental restoration or riparian enhancement at various projects and sites. For some of the listed projects, riparian vegetation is one of the multiple benefits derived from operating a groundwater recharge project.

Environmental Restoration with Reclaimed Water			
Project Name	Volume in Acre Feet	Multibenefit Recharge Project?	Comments
Kino Environmental Restoration Project (KERP)	14.7		Reclaimed water was used at the site to support riparian vegetation on 10 different days because of dry conditions. Riparian vegetation at KERP is usually supported with harvested stormwater.
Lower Santa Cruz Managed Recharge Project	116.2	Yes	This volume represents Pima County’s share of the total evapotranspiration (ET) from the managed recharge project. The total ET was 1013.7 AF, and this volume is split among the participants in accordance with the allocation formula. E5
Marana WRF Discharge to Riparian Tributary	260.8		Discharge supports wetlands formed in tributary to Santa Cruz River.
Marana High Plains Effluent Recharge Project	13.8	Yes	Delivery of 427.71 AF was diverted from Santa Cruz River. Calculated evapotranspiration of 13.8 AF is the portion of the delivery volume that supports riparian vegetation.
Rillito Riparian/Swan Wetlands	15.6		Reclaimed water is being used for the establishment of plants that were installed as part of this ecosystem restoration project.
Roger Rd WRF Pond	24.0		This volume is used to support a riparian pond on-site.
Santa Cruz River- West Branch Wetlands	0.7		Small wetland area managed by PCRFCO.
<b>Annual Total</b>	<b>445.8</b>		

**III. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge) (Continued)**

**C. Underground Storage (Groundwater Recharge) of Effluent**

Pima County operates, or participates in operation of, three facilities designed to augment groundwater supply by recharging the aquifer. The source water for this recharge is wastewater effluent that has been treated to a high quality. Each recharge project operates under an Aquifer Protection Permit issued by ADEQ and an Underground Storage Facility Permit issued by ADWR.

Summary of Recharge Volumes For Calendar Year 2010 (AF)						
PROJECT	Delivery Volume	Evapo-transpiration	Contribution to Stream Diversions	Outflow	Cut to Aquifer	Recharge Credit
Lower Santa Cruz Managed Recharge Project (LSCMRP)	1,036.5	116.2	212.1	1,076.7	354.1	354.1
Correction for 2009 error in reuse calculation (LSCMRP)					42.1	42.1
Marana High Plains Effluent Recharge Project (MHPERP)	426.6	15.1				411.5
Corona de Tucson	281.5	3.9				277.6
<b>Total</b>	<b>1,744.6</b>	<b>135.2</b>	<b>212.1</b>	<b>1,076.7</b>	<b>396.2</b>	<b>1,085.3</b>

Long-term Storage Credit Summary			
Year	County Share of Metro Effluent	County Storage Credits	Cumulative Credits
	(AF)	(AF)	(AF)
2003	3,999.80	58.10	58.10
2004	4,005.30	449.30	507.40
2005	4,080.70	535.10	1,042.50
2006	4,086.70	532.30	1,574.80
2007	4,009.90	788.38	2,363.18
2008	4,034.00	1,025.89	3,389.07
2009	3,821.10	977.41	4,366.48
2010	3,633.91	1,085.31	5,451.79

**III. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge) (Continued)**

**D. Summary of Use or Distribution of Pima County's Metropolitan Effluent Allotment**

<b>Pima County Effluent Use Summary (10% Metropolitan Allotment)</b>					
		Description	AFY	MG/Yr	MGD
<b>Reuse</b>	<b>Reclaimed System</b>	Natural Resources, Parks and Recreation	805.88	262.60	0.72
		Department of Transportation	40.50	13.20	0.04
		Kino Sports Park & KERP	128.88	42.00	0.12
		System Loss	0.00	0.00	0.00
		<b>Total from Reclaimed System</b>	<b>975.26</b>	<b>317.79</b>	<b>0.87</b>
	Reuse on Metropolitan WRF sites			118.67	38.67
<b>Santa Cruz Releases</b>	Delivered to High Plains Constructed Recharge Project		426.60	139.01	0.38
	Qualified as Delivery to LSCMRP		1,036.50	337.74	0.93
	PC Share of Outflow from LSCMRP		1,076.70	350.84	0.96
<b>Effluent Total</b>			<b>3,633.73</b>	<b>1,184.05</b>	<b>3.24</b>

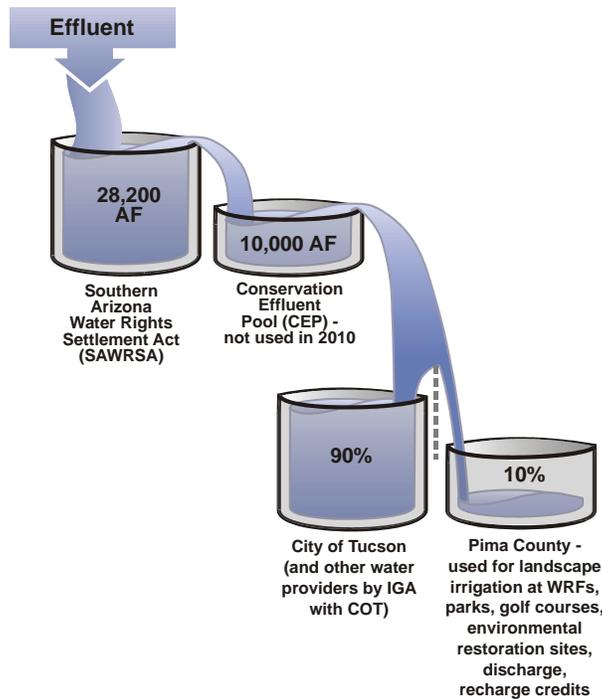
#### IV. Effluent Entitlements

The 1979 IGA and subsequent agreements govern effluent entitlement from the metropolitan facilities. In 2010 the total effluent produced was 66,411 AF. The effluent allocation formula designated the fixed amount of 28,200 AF for the Bureau of Reclamation to manage under Southern Arizona Water Rights Settlement Act (SAWRSA). Of the remaining portion, the City of Tucson and other water providers received 34,390 AF, while Pima County retained 3,821 AF.

Entitlement Calculations	Effluent Total (AF)
Total Effluent	64,539.1
SAWRSA	28,200.0
Total Less SAWRSA	36,339.1

Water Providers Factorial	0.9
PC Factorial	0.1

Entities Share	
-Water Providers (90%)	32,705.2
-PC (10%)	3,633.9



#### **IV. Effluent Entitlements (Continued)**

Allocation and use of effluent in Pima County are governed by a series of agreements and legal constraints. The key agreements are listed and described below:

##### **A. 1979 Intergovernmental Agreement, Resolution No. 1979 - 78**

The 1979 Intergovernmental Agreement, signed on June 26, 1979, was the original agreement between PC and the COT. This agreement assigned control of wastewater conveyance and treatment activities to PC RWRD. In exchange, the COT would receive 90% of all effluent produced at the RWRD metropolitan sites, which were limited to Ina Road WRF and Roger Road WRF.

##### **B. Southern Arizona Water Rights Settlement Act (SAWRSA)**

SAWRSA stands for the Southern Arizona Water Rights Settlement Act of 1982 (P.L. 97-293) and the subsequent Arizona Water Settlements Act (P.L. 108-451--12/10/2004). The Department of Interior, through U.S. Bureau of Reclamation, receives on behalf of the Tohono O'Odham Nation 28,200 acre-feet per year of secondary treated effluent from Tucson area wastewater treatment plants to assist in implementation of the settlement. Reclamation currently recharges this treated effluent in the Santa Cruz River and receives credit for 50% of the water recharged.

##### **C. City of Tucson - Pima County Supplemental Intergovernmental Agreement Relating to Effluent, Resolution No. 2000-28**

The 2000 Supplemental Intergovernmental Agreement signed on February 8, 2000, placed restrictions on how PC could use effluent. This agreement also exempted Sub-Regional treatment facilities from the City control, identified the need for reopening the Randolph Park WRF, and provided an avenue for the County to deliver County effluent to County facilities. This supplemental agreement also established a Conservation Effluent Pool for use with riparian habitat projects and identified how the Southern Arizona Water Rights Settlement Act (SAWRSA) volumes are to be treated in determining effluent allocations.

##### **D. Conservation Effluent Pool Agreement**

The Conservation Effluent Pool (CEP), which is a specific quantity of effluent that can be used for conservation projects, was identified in the 2000 Supplemental Intergovernmental Agreement. No CEP water can be used until the CEP agreement is approved by both the City and County and until the administrative procedures identified in the agreement are in place. The CEP agreement was approved by the Board of Supervisors in December 2010 and was approved by the City of Tucson's Mayor and Council in January 2011. The CEP administrative procedures will establish the process for considering CEP requests, address how allocations and apportionments will be made, require an accounting of quantities used, address how CEP water will be delivered and scheduled, and require project status reporting.

**IV. Effluent Entitlements (Continued)**

**E. Intergovernmental Agreement between the COT and PC for Treating Effluent and Wheeling Reclaimed Water (Wheeling Agreement), Resolution No. 2003-286**

The Wheeling Agreement, signed December 16, 2003, governs reclaimed water transactions between RWRD (the effluent provider), COT (the distributor and a reclaimed water user) and other County facilities (reclaimed water users). Effluent enters the system at the COT Sweetwater Plant and through direct delivery from the Randolph Park WRF, where it is piped to various locations. The agreement governs the costs per acre-foot that will be charged to PC for distribution of PC effluent to County sites.

**F. Intergovernmental Agreement - Permitting and Operating Managed In-Channel Recharge of Effluent in the Santa Cruz River Channel (Managed Recharge IGA 2003)**

The Managed Recharge IGA 2003 governs the recharge of effluent and the associated groundwater storage credits made available from recharging effluent into LSCMRP (Lower Santa Cruz Managed Recharge Project) between the Ina Road WRF and Trico Road in Marana. Participants include the Town of Marana, Cortaro-Marana Irrigation District, Avra Valley Irrigation District, Metropolitan Domestic Water Improvement District, Flowing Wells Irrigation District, Oro Valley, PC, and the COT.

## V. Glossary of Terms & Acronyms

**Acre-foot (AF):** A measure of water volume. One acre-foot of water will cover one acre to a depth of one foot and equals 43,560 cubic feet or 325,851 gallons. An acre-foot of water meets the needs of three average Tucson families for one year.

**AFY:** Acre-feet per year.

**Aquifer Protection Permit (APP):** ADEQ's permit program to protect groundwater quality from discharging facilities.

**Arizona Department of Environmental Quality (ADEQ):** State agency responsible for groundwater quality protection, water quality standards, and wastewater reclamation and reuse permits.

**Arizona Department of Water Resources (ADWR):** State agency responsible for water management and administration of water-related programs within the State.

**Arizona Pollutant Discharge Elimination System (AZPDES):** Arizona's permit program to protect surface water quality. ADEQ holds NPDES primacy from EPA.

**BADCT - Best Available Demonstrated Control Technology –** the technical design standard applied by ADEQ in their APP program.

**Biolac®:** A proprietary design for wastewater treatment using low-loaded activated sludge technology, high-efficiency moving aeration chains that suspend submerged fine-bubble diffusers, and a simple basin construction.

**CCF:** A water billing unit that equals 100 cubic feet or 748 gallons – this is the typical measure of metering for water delivery volumes for residential and commercial customers.

**BNR - Biological Nutrient Removal.**

**BNRAS - Biological Nutrient Removal Activated Sludge.**

**BNROD - Biological Nutrient Removal Oxidation Ditch.**

**Class A Reclaimed Water:** Treated wastewater that has undergone secondary treatment, filtration and disinfection to a level that is essentially pathogen-free. The "A" designation established by ADEQ is suitable for outdoor irrigation with unrestricted access and certain industrial uses.

**Class A+ Reclaimed Water:** Means wastewater that has undergone secondary treatment with nutrient reduction so that total nitrogen is less than 10 mg/l, followed by filtration and disinfection to a level that is essentially pathogen-free. The "A+" designation by ADEQ is suitable for "A" category uses without the need for liners, volume restrictions, and certain reporting requirements.

**Class B Reclaimed Water:** Treated wastewater that has undergone secondary treatment, and disinfection to meet the Partial Body Contact criteria. The "B" designation by ADEQ is suitable for outdoor irrigation with restricted access, construction, dust control, and livestock watering.

**Class B+ Reclaimed Water:** Treated wastewater that has undergone secondary treatment with nutrient reduction so that total nitrogen is less than 10 mg/l, followed by disinfection to be meet the Partial Body Contact criteria. The "B+" designation by ADEQ is suitable for "B" category uses without the need for liners, volume restrictions, and certain reporting requirements.

**Class C Reclaimed Water:** Treated wastewater that has undergone secondary treatment in a stabilization lagoon with aeration. This reclaimed water is suitable for livestock watering of non-dairy animals and irrigation of non-food crops.

**Conservation Effluent Pool (CEP):** Effluent set aside each year pursuant to an intergovernmental agreement between the City of Tucson and Pima County for use in riparian restoration projects.

**Constructed Recharge:** Replenishing the aquifer using a facility that is designed and constructed, in-channel, or off-channel, to store water underground pursuant to permits issued by ADWR.

**COT:** City of Tucson.

**Disinfection:** The treatment of water to inactivate, destroy, and/or remove disease-producing bacteria, viruses, and other microorganisms.

**Effluent:** Treated municipal wastewater.

**Environmental Restoration:** (also referred to as Riparian Restoration, Riparian Enhancement, or Habitat Restoration) Environmental restoration means enhancing existing ecosystems or creating new habitat. The goal of restoration is recovery of some functional characteristics of the ecosystem including plant communities and habitat structure. In most instances replication of historical ecosystems isn't possible, but enhancing vegetation can result in sustainable habitat that helps restore ecosystem function and its support for wildlife and increased biodiversity. Enhancements may also include erosion control, improved water quality and achieving a self-sustaining, functional flow regime.

## V. Glossary of Terms & Acronyms (Continued)

**ET:** Evapotranspiration, which accounts for water that is both evaporated and absorbed by plants and transpired into the atmosphere.

**GPD:** Gallons per day.

**Intergovernmental Agreement (IGA):** An agreement authorized by state statute between two or more governmental entities that provides for joint action or joint exercise of governmental powers.

**KERP:** Kino Environmental Restoration Project. The KERP basin is approximately 27 acres of watercourse and riparian habitat within the 120-acre Ajo Detention Basin.

**LSCMRP:** Lower Santa Cruz River Managed Recharge Project.

**Managed Recharge:** A facility that uses the unmodified natural channel of a stream to artificially recharge and store water underground in an aquifer pursuant to permits issued by ADWR.

**Metropolitan (or Metro) Wastewater Reclamation Facility:** This term refers to any of the three metropolitan wastewater reclamation facilities operated by RWRD: Ina Rd, Roger Rd, and Randolph Park.

**MG:** Million gallons.

**MGD:** Million gallons per day – one means of measuring discharge or flow volume.

**MHPERP:** Marana High Plains Effluent Recharge Project.

**Milligrams per Liter (mg/l):** A unit of measure of dissolved or suspended concentration within a fluid that equates to parts per million.

**PC:** Pima County.

**Recharge:** Water that replenishes an aquifer by surface infiltration or by other natural or induced means.

**Reclaimed Water:** Means water that has been treated or processed by a wastewater treatment plant (A.R.S. §49-201.31).

**Regional Wastewater Reclamation Facility:** This term refers to any of the three metropolitan wastewater reclamation facilities operated by RWRD: Ina Rd, Roger Rd, and Randolph Park.

**RFCD (or PCRFCFCD):** Pima County Regional Flood Control District.

**RWRD (or PCRWRD):** Pima County Regional Wastewater Reclamation Department.

**Riparian:** Pertaining to or situated on the bank of a body of water, especially a river.

**Soil-Aquifer Treatment:** Use of the physical, chemical, and/or microbiological properties of the soil and the aquifer to provide treatment of water introduced into the groundwater system.

**Southern Arizona Water Rights Settlement Act (SAWRSA):** 1982 federal legislation to settle water-rights claims of the Tohono O'odham Nation against City of Tucson and several other parties.

**Sub-regional:** A term used to describe the non-metropolitan wastewater reclamation facilities in Pima County. This group includes Arivaca Junction, Avra Valley, Corona de Tucson, Green Valley, Marana, Mount Lemmon, Pima County Fairgrounds, and Rillito Vista.

**Surface Water:** Water on the Earth's surface, such as in a stream, river, lake, or reservoir.

**Underground Storage:** Recharge of the groundwater in a manner that anticipates eventual recovery from the aquifer. In Arizona this usually involves establishing an account with ADWR for tracking short- or long-term storage credits.

**USBR:** United States Bureau of Reclamation.

**UV:** Ultra-Violet, which is a band of wavelengths of light that is useful in disinfecting wastewater.

**Water Harvesting:** The process of intercepting stormwater from a surface, such as a roof, parking area, or land surface, and putting it to beneficial use.

**Wheeled Water or Water Wheeling:** Water transferred between two agencies whereby one agency uses its system infrastructure to treat and/or convey water that is owned by the receiving agency.

**WRF:** Wastewater Reclamation Facility.