# 2019 EFFLUENT GENERATION AND USE REPORT

PIMA COUNTY

WASTEWATER RECLAMATION

**Prepared by:**

James DuBois & James Brown,
Permit & Regulatory Compliance Officers
Kimberly Baeza, Principal Hydrologist

**Pima County RWRD**
**Compliance & Regulatory Affairs Office**
(520) 724-6200


PIMA COUNTY
WASTEWATER RECLAMATION

# TABLE OF CONTENTS

**I. Executive Summary ..... 1**

**II. Benefits of Effluent/Reclaimed Water as a Resource ..... 5**

**III. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities ..... 6**

A. Metropolitan Facilities ..... 6

1. Tres Rios Wastewater Reclamation Facility ..... 6
2. Agua Nueva Wastewater Reclamation Facility ..... 7
3. Randolph Park Wastewater Reclamation Facility ..... 8
4. Metropolitan Facilities Summary Table ..... 9
5. Metropolitan Facilities Historical Data ..... 9
6. Metropolitan Facilities Map ..... 13

B. Non-Metropolitan Sub-Regional Facilities ..... 14

1. Arivaca Junction Wastewater Reclamation Facility ..... 14
2. Avra Valley Wastewater Reclamation Facility ..... 14
3. Corona de Tucson Wastewater Reclamation Facility ..... 15
4. Green Valley Wastewater Reclamation Facility ..... 16
5. Mt. Lemmon Wastewater Reclamation Facility ..... 16
6. Pima County Fairgrounds Wastewater Reclamation Facility ..... 17
7. Sub-Regional Facilities Summary ..... 18
8. Summary Table of All Facilities ..... 19
9. Non-Metropolitan Facilities Map ..... 20

**IV. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge) ..... 21**

A. Reclaimed Water Wheeled Through Tucson Water Reclaimed System ..... 21
B. Environmental Restoration with Reclaimed Water ..... 24
C. Underground Storage (Groundwater Recharge) of Effluent ..... 26
D. Summary of Use or Distribution of Pima County's Metropolitan Effluent Allotment ..... 29

**V. Effluent Entitlements ..... 30**

A. 1979 Intergovernmental Agreement, Resolution No. 1979 - 78 ..... 30
B. Southern Arizona Water Rights Settlement Act (SAWRSA) ..... 30
C. City of Tucson-Pima County Supplemental Intergovernmental Agreement Relating to Effluent, Resolution No. 2000-28 ..... 31
D. Conservation Effluent Pool Agreement ..... 31
E. Intergovernmental Agreement between the COT and PC for Treating Effluent and Wheeling Reclaimed Water (Wheeling Agreement), Resolution No. 2003-286 ..... 32
F. Intergovernmental Agreement-Permitting and Operating Managed In-Channel Recharge of Effluent in the Santa Cruz River Channel (Managed Recharge IGA 2003) ..... 32

**VI. Effluent Generation and Use in the Tucson Active Management Area (TAMA) ..... 32**

**VII. Glossary of Terms & Acronyms ..... 35**

## 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 manner sustainable and beneficial to current citizens and future generations. RWRD meets this commitment through the significant use of reclaimed water for groundwater recharge, reuse, and environmental restoration. Our activities in this regard aid in mitigating demand on potable water systems, thereby sustaining groundwater levels and preserving green infrastructure throughout our community.

During 2019, RWRD operated eight 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 2019, RWRD facilities treated wastewater to produce a total of 61,683 acre-feet (AF) of effluent. Figure 1 shows the contributions to total effluent generation in 2019 by RWRD facilities. Tres Rios (formerly known as Ina Rd) Wastewater Reclamation Facility (WRF), Agua Nueva WRF (replacement facility for the closed Roger Road WRF), and Randolph Park WRF (not operated in 2019) represent the current metropolitan facilities identified by the 1979 Intergovernmental Agreement (IGA) and 2000 Supplemental IGA between the City of Tucson (COT) and Pima County (PC). Metropolitan facilities generated the majority of effluent with total production at 57,535 AF. Non-metropolitan, sub-regional facilities produced the remaining portion, totaling 4,148 AF.

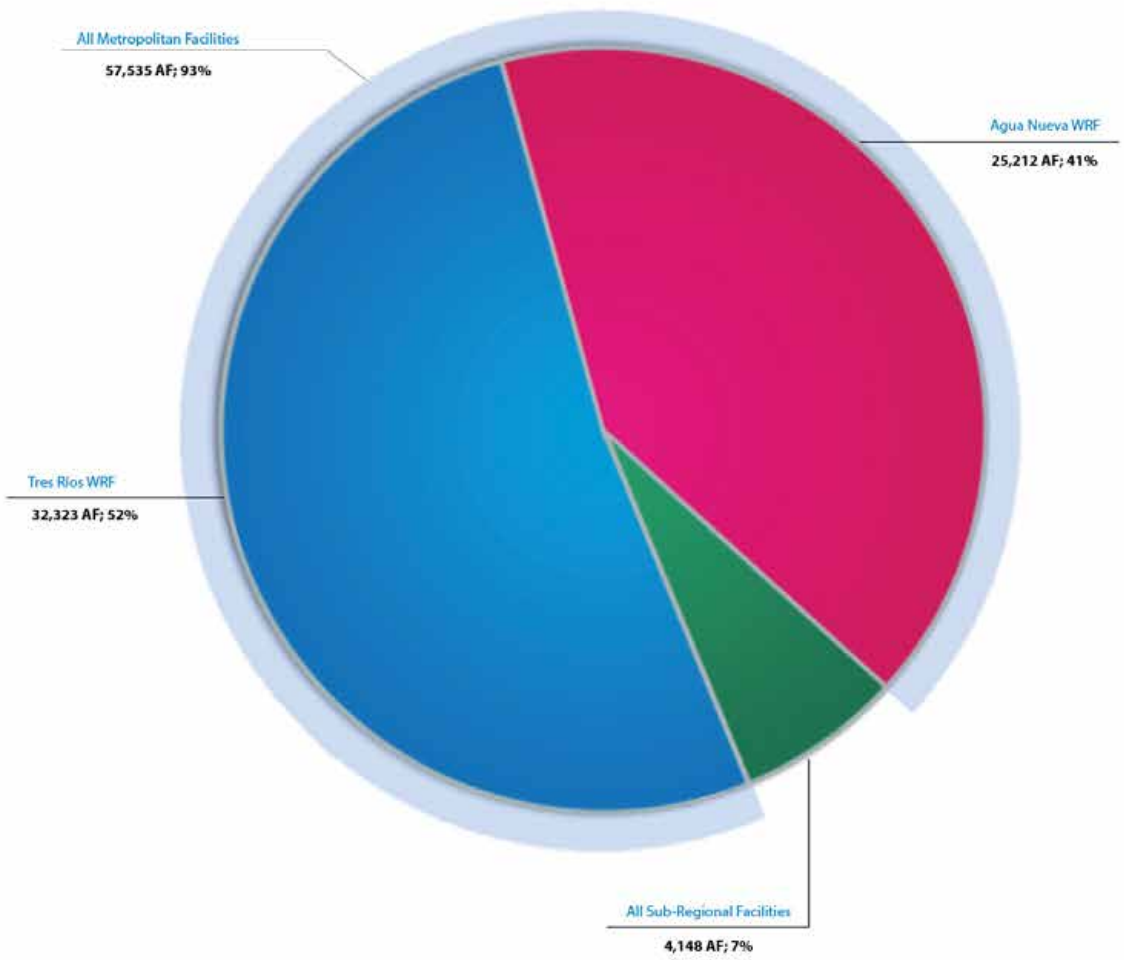



**Figure 1:** 2019 Effluent Production by Pima County RWRD Facilities – Total Volume Shown is 61,683 Acre- Feet

## 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 the total effluent volume, consisting of 14,255 AF, or more than 23%, to the City of Tucson's Reclaimed Water System. In addition, direct delivery of reclaimed water by RWRD to other parties accounted for 1,470 AF. Reuse for landscape, construction, or dust control at WRF sites utilized 75 AF. Direct discharge to groundwater using various means, such as percolation beds and recharge basins, accounted for 2,677 AF. The balance of effluent, or 43,205 AF, was released through surface water discharge under the authorization of Arizona Pollution Discharge Elimination System (AZPDES) permits.

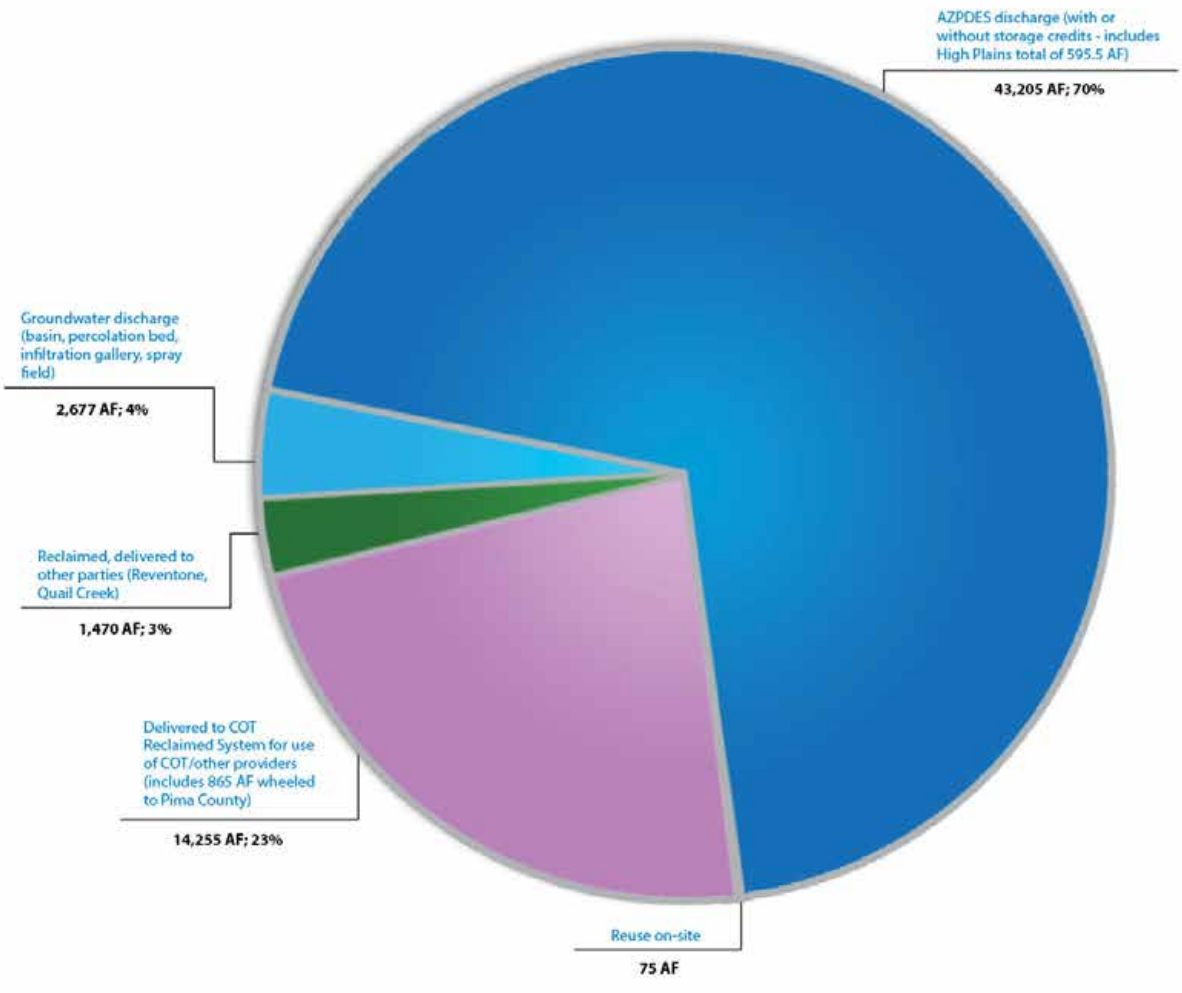



**Figure 2:** Effluent from all Pima County RWRD Facilities by Type of Discharge, Delivery, or Use for 2019

## I. Executive Summary *(Continued)*

Figure 3 illustrates how 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 2019, 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). No effluent was used for the Conservation Effluent Pool. Of the remaining portion, 26,401 AF were accorded to the City of Tucson and other water providers, while Pima County retained 2,933 AF.

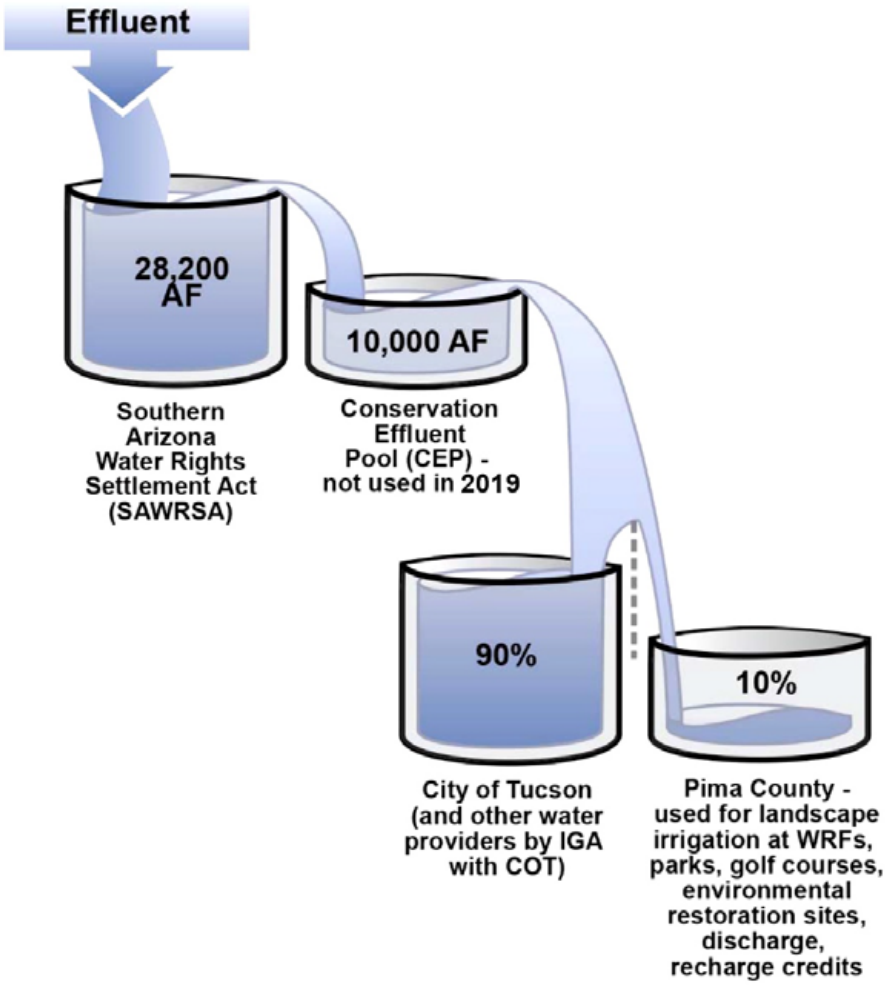



**Figure 3:** Effluent Entitlement from the Metropolitan Facilities

## I. Executive Summary *(Continued)*

Figure 4 shows the manner in which Pima County's share of metropolitan effluent was distributed in 2019. Reuse, either on-site at the WRFs or wheeled through the Reclaimed Water System (RWS), accounted for approximately 33% of the total. Pima County used 58% of its metropolitan effluent to serve as water delivery to underground storage facilities recharging the aquifer: the Lower Santa Cruz Managed Recharge Project (LSCMRP) and the Marana High Plains Constructed Recharge Project. Pima County's portion of the outflow from the storage reach on the Santa Cruz River comprised 260 AF, making up 9% of Pima County's total metropolitan effluent allocation.

As a result of groundwater recharge project activities in 2019, Pima County will receive credit to its long-term storage accounts for 3,184.06 AF of effluent. This volume includes 694.17 AF of underground storage credits for its share of effluent discharged into the Lower Santa Cruz Managed Recharge Project and 587.2 AF for effluent diverted off-channel into the High Plains Effluent Recharge Project. Pima County received an additional 394.94 AF of underground storage credits for its non-metropolitan effluent recharged at the Corona de Tucson WRF, and 1507.75 AF of underground storage credits at the Avra Valley WRF.

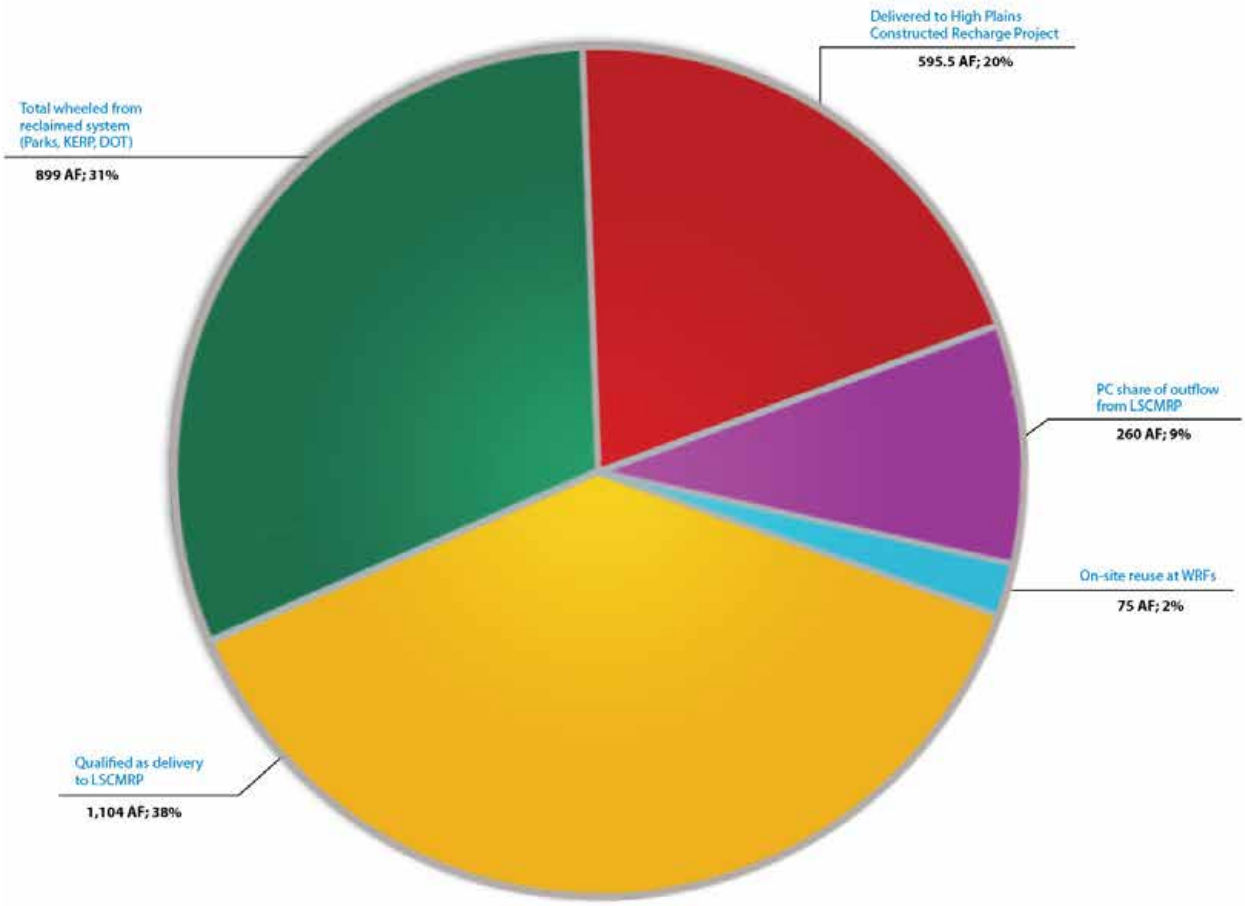



**Figure 4:** Distribution of Pima County's Share of Metropolitan Effluent in 2019

## II. Benefits of Effluent/Reclaimed Water as a Resource

Reclaimed water is a vital, locally generated, renewable resource and a key component in Pima County's available water resources. Reclaimed water, as defined in A.R.S. §49-201(32), is water that has been treated or processed by a wastewater treatment plant. This water resource is regarded by a growing number of people as "recycled water" but is also sometimes referred to simply as "effluent." In 1989, the Arizona Supreme Court refused to characterize effluent as either surface water or groundwater, choosing instead to characterize it as "nothing more than sewerage effluent." This decision kept this part of the water supply from being regulated in the same manner as waters of the state. The Court held that local governments do not "own" the effluent, but have the right to put it to a beneficial use. Wastewater, treated to suitable reuse standards to protect public health as established by the Arizona Department of Environmental Quality (ADEQ), makes up a growing and increasingly important portion of Arizona's water supply.

Pima County has legislative authority under ARS §11-264 to construct and operate the regional wastewater system in Pima County. As such, the County is the major producer of effluent/reclaimed water in eastern Pima County.

Effluent/reclaimed water is generally used for three purposes:

- direct reuse
- environmental enhancement
- aquifer replenishment

Pima County uses its highly treated reclaimed water, much of it delivered through Tucson Water's Reclaimed Water System, to irrigate County parks, turf facilities and other landscape vegetation, to provide water for construction and dust control, and to sustain vegetation for environmental restoration projects. Using reclaimed water instead of potable supply for these purposes preserves our groundwater for the future. An additional use of the County's effluent/reclaimed water entitlement is long-term storage in underground storage (recharge) facilities. In this manner, reclaimed water is "banked" for future use and serves to replenish the aquifer until it is recovered.

# III. Effluent Generated at Regional and Sub-Regional Wastewater Reclamation Facilities

## A. Metropolitan Facilities

### 1. Tres Rios Wastewater Reclamation Facility

In recognition of the substantial reconfiguration and expansion at the Ina Road facility, it was renamed the Tres Rios WRF in 2013. 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 Gallon per Day (MGD), High-Purity Oxygen (HPO), and 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, thereby increasing the overall combined plant capacity to 37.5 MGD. Completion of RWRD's Regional Optimization Master Plan allowed an increase in capacity to 50 MGD. A new plant interconnect pipeline between Agua Nueva WRF and Tres Rios WRF allows additional sewage flow to be diverted to the Tres Rios Facility. Other modifications included the following components:

- Expansion of preliminary and primary treatment facilities
- New 25 MGD west train using 5-stage Bardenpho process to replace the HPO process
- Replacement of Biological Nutrient Removal Activated Sludge process with a Bardenpho process train
- New aeration tanks and secondary clarifiers for each train
- New chlorine contact basins with chemical feed and mixing equipment
- Additional biosolids processing facilities with new sludge thickening, anaerobic digestion, digested sludge thickening/dewatering, and final product storage and load-out facilities.

The addition of the Bardenpho process achieves compliance with regulatory requirements to reduce total nitrogen concentrations to 8 mg/L, or less. This facility uses chlorination to disinfect and is permitted (mid-2016) for producing Class A+ reclaimed water. Effluent undergoes dechlorination prior to discharge.

The Tres Rios facility discharges into the Santa Cruz River under authorization of an AZPDES permit. Effluent discharged into the Santa Cruz River flows into the Lower Santa Cruz Managed Recharge Project (LSCMRP) which extends along the river channel from Ina Road to Trico Road. Beginning in February 2019, groundwater storage credits are issued from the Arizona Department of Water Resources (ADWR) for 95% of the effluent that reaches the water table. Prior to that, ADWR credited only 50% of discharges into in-stream underground storage facilities. Credits are apportioned among participants in the LSCMRP in accordance with IGAs that recognize each party's entitlement.

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

### A. Metropolitan Facilities (Continued)

#### 1. Tres Rios Wastewater Reclamation Facility (Continued)

| 2019 Tres Rios WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 33,569.91 | 10,938.79 | 29.97 |
| | | | | | |
| **Process Water** | *Used in industrial process at WRF, not included in effluent total used for allocations* | | 2,510.88 | 818.17 | 2.24 |
| | | | | | |
| **Effluent Usage** | AZPDES discharge | *Outfall to Santa Cruz River, some available for storage credits* | 32,284.28 | 10,519.86 | 28.82 |
| | Reuse on-site | *N. and S. Irrigation* | 2.32 | 0.76 | 0.00 |
| | Reclaimed, delivered to other parties | *Fill stand and Tucson Sports Park* | 36.74 | 11.97 | 0.03 |
| **Effluent Total** | Used for calculation of effluent allocations | | 32,323.34 | 10,532.59 | 28.86 |

#### 2. Agua Nueva Wastewater Reclamation Facility

The Agua Nueva WRF is located west of I-10 just south of El Camino del Cerro. This facility was built to replace the Roger Road WRF and began discharging in December 2013. It services a population of approximately 500,000 people in the City of Tucson and has a capacity of 32 MGD. Similar to the Tres Rios upgrade, this new treatment facility utilizes a 5-stage Bardenpho treatment process to achieve nutrient removal.

The effluent produced at this facility in 2019 met A+ reclaimed water standards; however, until early 2020 it was classified as Class B+. Disinfection is achieved using chlorination. After de-chlorination, it also meets AZPDES permit standards for the Santa Cruz River, as well as numeric Aquifer Water Quality Standards (AWQS). An average of nearly 13 MGD of the total effluent produced was sent to the City of Tucson Reclaimed Water System in 2019. A small percentage of treated effluent is reused for irrigation onsite, at the adjacent Pima County Water Campus, and to maintain wildlife ponds at the former Roger Road facility. The remaining portion of the effluent is discharged to the same outfall previously used by the Roger Rd WRF in the Santa Cruz River at an average rate of 9.75 MGD. Some of the treated wastewater becomes process water used in transporting biosolids pumped by pipeline to the Tres Rios WRF. In 2020, biosolids at Tres Rios are treated and transported for disposal off-site; in 2019 and prior years they were used in agricultural land application and mine reclamation.

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

### A. Metropolitan Facilities (Continued)

#### 2. Agua Nueva Wastewater Reclamation Facility (Continued)

| 2019 Agua Nueva WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 26,763.67 | 8,720.97 | 23.89 |
| | | | | | |
| **Process Water** | *Used in biosolids flush water and other industrial processes at WRF, not included in effluent total used for allocations* | | 1,098.97 | 358.10 | 0.98 |
| | | | | | |
| **Effluent Usage** | AZPDES discharge | *Outfall to Santa Cruz River, some available for storage credits* | 10,920.50 | 3,558.46 | 9.75 |
| | Delivered reclaimed water | *Input to COT reclaimed system* | 14,255.40 | 4,645.14 | 12.73 |
| | Reuse on-site | *Irrigation at WRF, CLC Irrigation and RR Pond* | 35.71 | 11.64 | 0.03 |
| **Effluent Total** | Used for calculation of effluent allocations | | 25,211.61 | 8,215.23 | 22.51 |

#### 3. Randolph Park Wastewater Reclamation Facility

The Randolph Park WRF is located in midtown Tucson at the City-owned Randolph Park. This is a 3.5 MGD membrane bioreactor facility and utilizes an ultraviolet light disinfection system. This facility produces Class A effluent that is delivered directly into the COT's Reclaimed Water System.

The Randolph Park WRF did not operate in 2019. In December 2014 the Randolph Park WRF was placed in temporary cessation by Pima County RWRD. This was done to realize some cost savings and to rely on the new metropolitan WRFs. Because reclaimed water was not produced by Randolph Park WRF, Pima County's effluent was wheeled through Tucson Water's Reclaimed Water System from Agua Nueva WRF.

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

### A. Metropolitan Facilities (Continued)

#### 4. Metropolitan Facilities Summary Table

| 2019 Metropolitan Facilities - Overall Usage | | | | | | |
|---|---|---|---|---|---|---|
| Description | | Tres Rios WRF | Agua Nueva WRF | All Facilities | | |
| | | AFY | | AFY | MG/Yr | MGD |
| **Influent Total** | | 33,569.91 | 26,763.67 | 60,333.58 | 19,659.76 | 53.86 |
| | | | | | | |
| **Process Water Total** | | 2,510.88 | 1,098.97 | 3,609.84 | 1,176.27 | 3.22 |
| | | | | | | |
| Effluent Usage | AZPDES Discharge | 32,284.28 | 10,920.50 | 43,204.78 | 14,078.32 | 38.57 |
| | Delivered to COT Reclaimed Water System | 0.00 | 14,255.40 | 14,255.40 | 4,645.14 | 12.73 |
| | Reuse on-site | 39.06 | 35.71 | 74.77 | 24.36 | 0.07 |
| **Effluent Total** | | 32,323.34 | 25,211.61 | 57,534.95 | 18,747.82 | 51.36 |

#### 5. Metropolitan Facilities Historic Data

| Year | Influent Received AF | Effluent Reused On-site at County WRFs AF | Effluent Discharged or Delivered to Reclaimed System AF | Effluent Total AF |
|---|---|---|---|---|
| **Metropolitan Facility Totals** | | | | |
| 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 |
| 2011 | 66,595.46 | 145.35 | 63,771.28 | 63,916.63 |
| 2012 | 65,211.30 | 163.15 | 61,229.49 | 61,392.64 |
| 2013 | 63,948.18 | 130.26 | 60,442.22 | 60,572.48 |
| 2014 | 63,551.06 | 68.22 | 62,051.69 | 62,119.91 |
| 2015 | 62,927.32 | 60.78 | 61,295.47 | 61,356.25 |
| 2016 | 62,588.46 | 67.10 | 60,588.66 | 60,655.76 |
| 2017 | 61,492.33 | 68.61 | 59,556.21 | 59,624.82 |
| 2018 | 59,674.68 | 69.14 | 56,410.93 | 56,480.07 |
| 2019 | 60,333.58 | 74.77 | 57,460.18 | 57,534.95 |

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

### A. Metropolitan Facilities (Continued)

#### 5. Metropolitan Facilities Historic Data (Continued)

| Year | Influent Received<br>AF | Effluent Reused On-site at County WRFs<br>AF | Effluent Discharged or Delivered to Reclaimed System<br>AF | Effluent Total<br>AF |
|---|---|---|---|---|
| **Tres Rios** | | | | |
| 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 | 8.0 | 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 |
| 2011 | 27,746.58 | 60.91 | 27,368.49 | 27,429.40 |
| 2012 | 25,227.94 | 56.91 | 24,390.54 | 24,447.45 |
| 2013 | 28,334.77 | 26.08 | 27,954.40 | 27,980.48 |
| 2014 | 36,292.58 | 9.71 | 35,995.70 | 36,005.41 |
| 2015 | 34,285.79 | 26.92 | 33,760.91 | 33,787.83 |
| 2016 | 34,514.80 | 22.32 | 33,678.13 | 33,700.45 |
| 2017 | 33,494.31 | 7.34 | 32,714.93 | 32,722.27 |
| 2018 | 31,830.98 | 6.60 | 29,812.50 | 29,819.10 |
| 2019 | 33,569.91 | 39.06 | 32,284.28 | 32,323.34 |
| **Roger Road** | | | | |
| 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 |
| 2011 | 36,327.65 | 84.23 | 34,258.96 | 34,343.19 |
| 2012 | 37,166.37 | 106.02 | 34,391.17 | 34,497.19 |
| 2013 | 32,700.14 | 103.35 | 29,907.98 | 30,011.33 |
| 2014 | 388.40 | 2.53 | 300.30 | 302.83 |
| 2015 | closed | closed | closed | closed |

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

### A. Metropolitan Facilities (Continued)

#### 5. Metropolitan Facilities Historic Data (Continued)

| Year | Influent Received<br>AF | Effluent Reused On-site at County WRFs<br>AF | Effluent Discharged or Delivered to Reclaimed System<br>AF | Effluent Total<br>AF |
|---|---|---|---|---|
| **Agua Nueva** | | | | |
| 2013 | 222.60 | 0.49 | 215.60 | 216.09 |
| 2014 | 24,252.07 | 55.78 | 23,488.06 | 23,543.84 |
| 2015 | 28,641.53 | 33.86 | 27,534.56 | 27,568.42 |
| 2016 | 28,073.66 | 44.78 | 26,910.53 | 26,955.31 |
| 2017 | 27,998.02 | 61.27 | 26,841.28 | 26,902.55 |
| 2018 | 27,843.70 | 62.54 | 26,598.43 | 26,660.97 |
| 2019 | 26,763.67 | 35.71 | 25,175.90 | 25,211.61 |
| **Randolph Park** | | | | |
| 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 |
| 2011 | 2,521.23 | 0.21 | 2,143.83 | 2,144.04 |
| 2012 | 2,816.99 | 0.22 | 2,447.78 | 2,448.00 |
| 2013 | 2,690.67 | 0.34 | 2,364.24 | 2,364.58 |
| 2014 | 2,618.01 | 0.20 | 2,267.63 | 2,267.83 |
| 2015-2019 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Metropolitan Facility Totals** | | | | |
| 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 |
| 2011 | 66,595.46 | 145.35 | 63,771.28 | 63,916.63 |
| 2012 | 65,211.30 | 163.15 | 61,229.49 | 61,392.64 |
| 2013 | 63,948.18 | 130.26 | 60,442.22 | 60,572.48 |
| 2014 | 63,551.06 | 68.22 | 62,051.69 | 62,119.91 |

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

### A. Metropolitan Facilities (Continued)

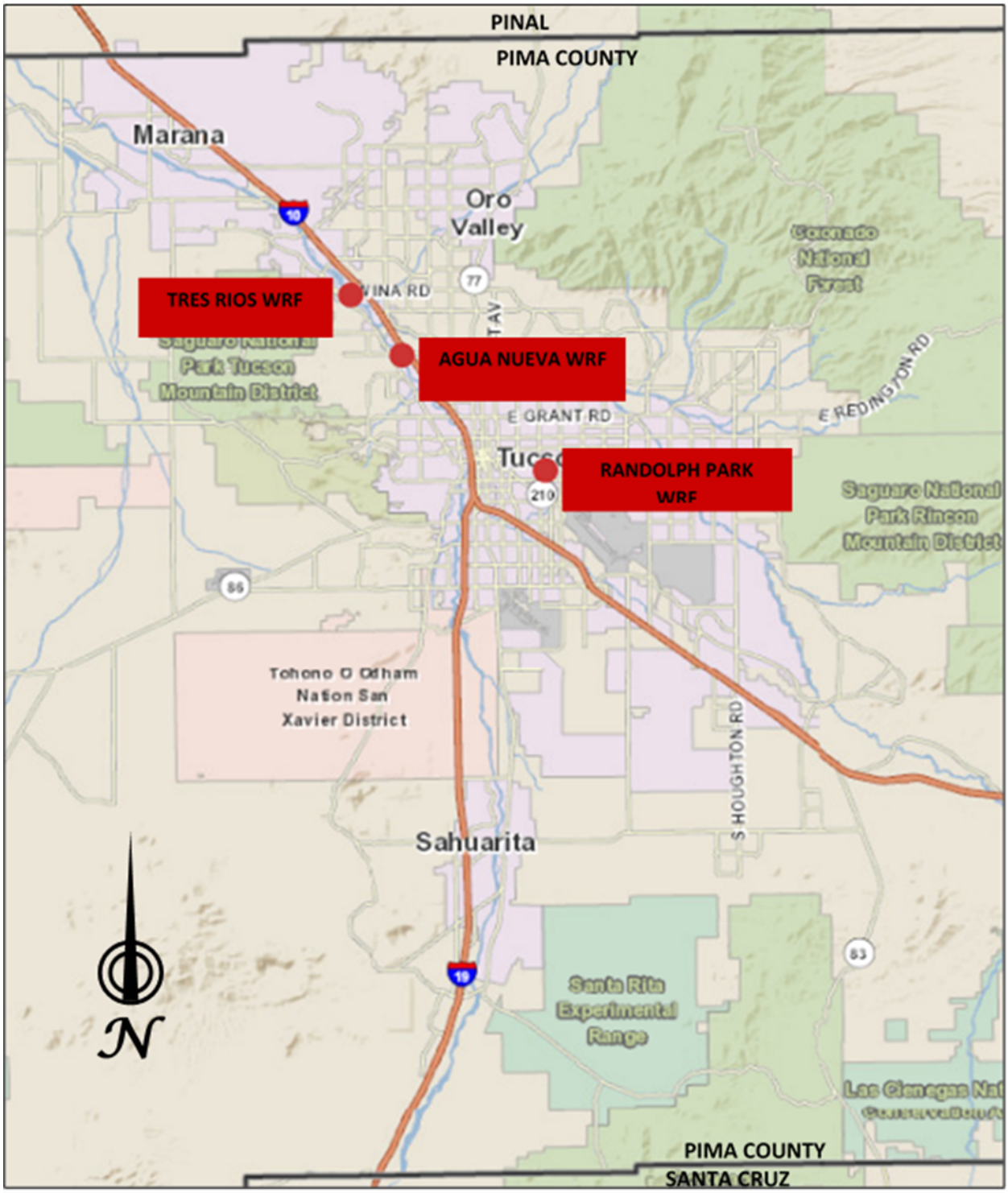
#### 5. Metropolitan Facilities Historic Data (Continued)

| Year | Influent Received<br>AF | Effluent Reused On-site at County WRFs<br>AF | Effluent Discharged or Delivered to Reclaimed System<br>AF | Effluent Total<br>AF |
|---|---|---|---|---|
| **Metropolitan Facility Totals** (Continued) | | | | |
| 2015 | 62,927.32 | 60.78 | 61,295.47 | 61,356.25 |
| 2016 | 62,588.46 | 67.10 | 60,588.66 | 60,655.76 |
| 2017 | 61,492.33 | 68.61 | 59,556.21 | 59,624.82 |
| 2018 | 59,674.68 | 69.14 | 56,410.93 | 56,480.07 |
| 2019 | 60,333.58 | 74.77 | 57,460.18 | 57,534.95 |

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

### A. Metropolitan Facilities (Continued)

#### 6. Metropolitan Facilities Map



## III. 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.

| 2019 Arivaca Junction WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 46.30 | 15.09 | 0.04 |
| | | | | | |
| **Process Water** | *Used in biosolids flush water and other industrial processes at WRF, not included in effluent total used for allocations* | | 0.00 | 0.00 | 0.00 |
| | | | | | |
| **Effluent Usage** | Reclaimed, delivered to other parties | *Reventone Ranch* | 23.74 | 7.73 | 0.02 |
| | Groundwater Discharge | *Percolation through base of impoundment (estimated at 10,000 gallons per day)* | 11.23 | 3.66 | 0.01 |
| | Reuse on-site | *Irrigation at WRF* | 0.04 | 0.01 | 0.00 |
| **Effluent Total** | | | 35.01 | 11.40 | 0.03 |

#### 2. Avra Valley Wastewater Reclamation Facility

The Avra Valley WRF is located on the west side of the Tucson Mountains, approximately 12 miles southwest of Tucson. The 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 basins permitted for groundwater recharge. 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.

## III. 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)

| 2019 Avra Valley WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 1,419.92 | 462.68 | 1.27 |
| | | | | | |
| **Process Water** | *Used in industrial processes at WRF, not included in effluent total used for allocations* | | 95.42 | 31.09 | 0.09 |
| | | | | | |
| **Effluent Usage** | AZPDES Discharge | *Black Wash Spray Field* | 0.00 | 0.00 | 0.00 |
| | Groundwater Discharge | *Percolation beds and ponds - groundwater recharge with storage credit accrual* | 1,541.75 | 502.38 | 1.38 |
| | Reuse on-site | *Irrigation at WRF* | 0.00 | 0.00 | 0.00 |
| **Effluent Total[1,2]** | | | 1,541.75 | 502.38 | 1.38 |

[1]A volume of 1,507.75 AF in storage credits was reported to ADWR for this recharge after subtracting evaporative losses of 34 AF (slight delivery volume discrepancy due to difference in number of significant figures in daily readings during 2019). [2]Measured influent was less than the effluent total owing to influent meter problems. New influent meter was installed in December 2019 to resolve this issue.

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

The Corona de Tucson WRF is located 22 miles southeast of Tucson. The facility consists of two 0.5 MGD BNROD (oxidation ditch) treatment trains with closed loop reactors for achieving both nitrification and denitrification. This facility is not classified for reuse. Effluent is disposed into percolation basins designed and permitted for groundwater recharge. Recent changes include a new chlorine contact basin and sodium hypochlorite feed system which were added as the method of disinfection in 2016.

| 2019 Corona de Tucson WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 431.16 | 140.49 | 0.38 |
| | | | | | |
| **Process Water** | *Used in industrial processes at WRF, not included in effluent total used for allocations* | | 0.00 | 0.00 | 0.00 |
| | | | | | |
| **Effluent Usage** | Groundwater Discharge | *Percolation beds and ponds - groundwater recharge with storage credit accrual* | 395.23 | 128.79 | 0.35 |
| **Effluent Total[3]** | | | 395.23 | 128.79 | 0.35 |

[3]A volume of 394.97 AF in storage credits was reported to ADWR for this recharge after subtracting evaporative losses of 0.3 AF (slight delivery volume discrepancy due to difference in number of significant figures in daily readings during 2019).

## III. 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 21 miles south of Tucson and serves the town of Green Valley. This facility is comprised of two distinct treatment sequences. The first consists of a 2.0 MGD BNROD (oxidation ditch) achieving nitrification and denitrification. Sand filtration followed by chlorination of this effluent produces Class A+ reclaimed water. The reclaimed water is delivered to Robson/ Quail Creek for groundwater recharge. The other option for treatment at the facility can handle up to 2.1 MGD. It consists of two separate secondary aerated lagoons, two separate polishing ponds, and four percolation ponds. It produces the equivalent of Class B reclaimed water, but this stream is not classified for reuse in the Aquifer Protection Permit. Effluent from this portion of the facility is disposed of only through percolation. In 2016 an ADEQ permit amendment was issued to allow discharge of BNROD effluent into selected on-site percolation ponds.

| 2019 Green Valley WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 2,607.89 | 849.78 | 2.33 |
| | | | | | |
| **Process Water** | *Used in industrial processes at WRF, not included in effluent total used for allocations* | | 0.00 | 0.00 | 0.00 |
| | | | | | |
| **Effluent Usage** | Reclaimed, delivered to other parties | *Effluent from BNROD to Robson/ Quail Creek for groundwater recharge* | 1,446.66 | 471.40 | 1.29 |
| | Groundwater Discharge | *Percolation ponds (Lagoon Facility) - groundwater recharge without storage credit accrual* | 710.48 | 231.51 | 0.63 |
| **Effluent Total** | | | 2,157.14 | 702.91 | 1.93 |

#### 5. Mt. Lemmon Wastewater Reclamation Facility

The Mt. Lemmon WRF is located in the Village of Summerhaven in the Santa Catalina Mountains. This facility operates under a special use permit issued by the United States Forest Service (USFS), which authorizes a treatment capacity of 17,000 GPD. The facility consists of a closed loop BNROD (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 regulated by an APP general permit, so a reclaimed water classification is not possible. The spray application is to a restricted area of forest and is not regarded as reuse by ADEQ.

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

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

#### 5. Mt. Lemmon Wastewater Reclamation Facility (Continued)

| 2019 Mt. Lemmon WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 6.09 | 1.99 | 0.0054 |
| | | | | | |
| **Process Water** | *Used in industrial processes at WRF, not included in effluent total used for allocations* | | 0.00 | 0.00 | 0.0000 |
| | | | | | |
| **Effluent Usage** | Groundwater Discharge | *Discharge to spray field, drain, or AZPDES release to unnamed tributary to San Pedro River* | 4.83 | 1.58 | 0.0043 |
| **Effluent Total** | | | 4.83 | 1.58 | 0.0043 |

#### 6. 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. It uses stabilization lagoons and the effluent is disposed of through evaporation and percolation. The facility currently is regulated by an APP general permit, so a reclaimed water classification is not possible.

| 2019 Pima County Fairgrounds WRF | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Year | MGD Average |
| **Influent** | | | 13.64 | 4.44 | 0.0122 |
| | | | | | |
| **Effluent Usage** | Groundwater Discharge | *Percolation* | 13.64 | 4.44 | 0.0122 |

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

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

#### 7. Sub-Regional Facilities Summary

| 2019 Sub-Regional Facilities - Effluent Usage | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Description | | Arivaca | Avra Valley | Corona | Green Valley | Mt. Lemmon | Fair-grounds | All Facilities | | |
| | | AFY | | | | | | AFY | MG/Yr | MGD |
| **Influent Total** | | **46.30** | **1,419.92** | **431.16** | **2,607.89** | **6.09** | **13.64** | **4,525.00** | **1,474.48** | **4.04** |
| **Process Water Total** | | **0.00** | **95.42** | **0.00** | **0.00** | **0.00** | **0.00** | **95.42** | **31.09** | **0.09** |
| Effluent Usage | AZPDES Discharge | | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 |
| | Reclaimed, delivered to other parties | 23.74 | | | 1,446.66 | | | 1,470.40 | 479.13 | 1.31 |
| | Groundwater Discharge (basin, percolation bed, infiltration gallery, spray field) | 11.23 | 1,541.75 | 395.23 | 710.48 | 4.83 | 13.64 | 2,677.16 | 872.36 | 2.39 |
| | Reuse on-site | 0.04 | 0.00 | | | | | 0.04 | 0.01 | 0.00 |
| **Effluent Total** | | **35.01** | **1,541.75** | **395.23** | **2,157.14** | **4.83** | **13.64** | **4,147.60** | **1,351.50** | **3.70** |

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

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

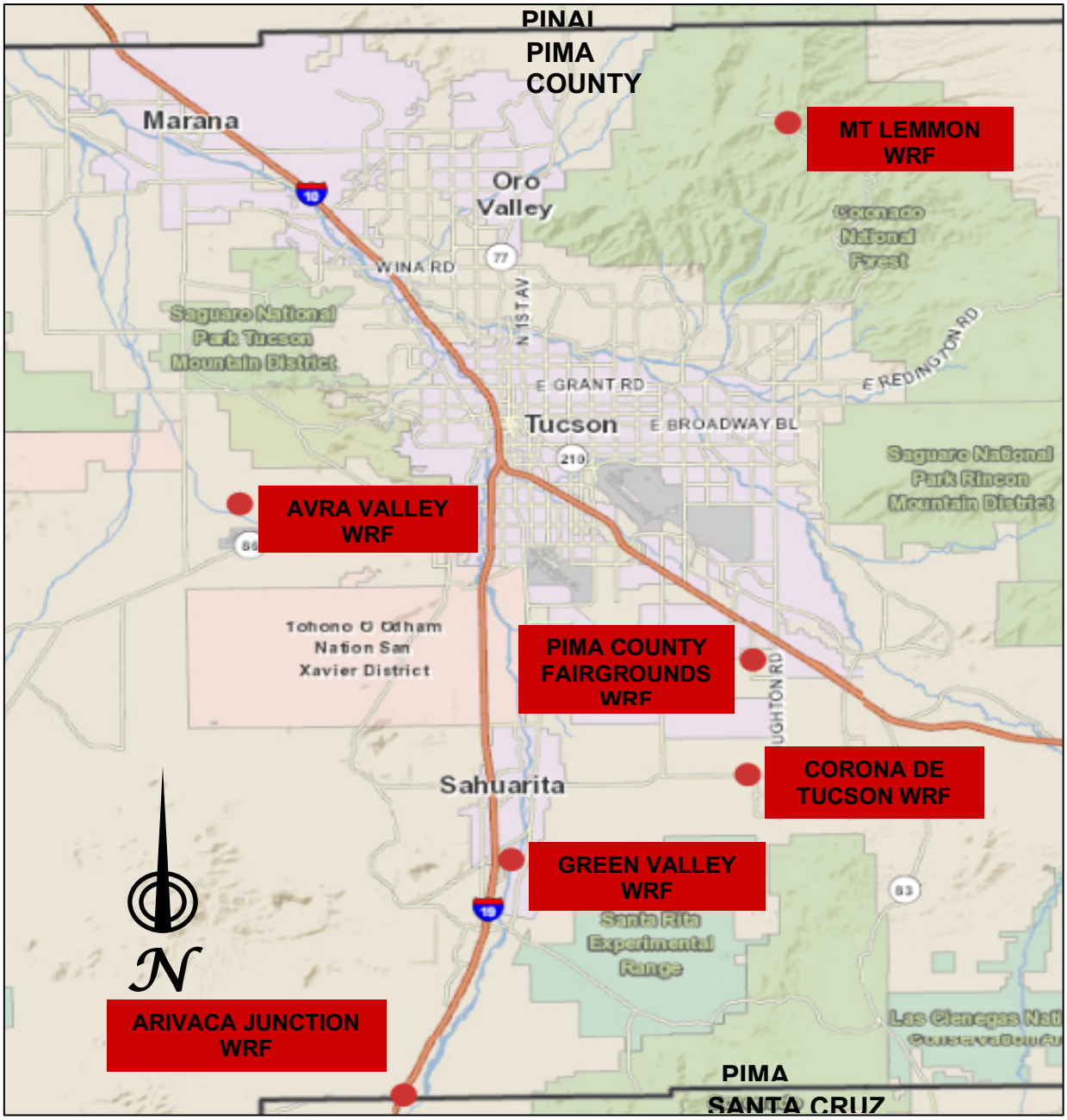
#### 8. Summary Table of All Facilities

| 2019 All Facilities - Effluent Usage | | | | | |
|---|---|---|---|---|---|
| Description | Metropolitan | Sub-Regional | All Facilities | | |
| | AFY | | AFY | MGY | MGD |
| **Influent Total** | **60,333.58** | **4,525.00** | **64,858.58** | **21,134.23** | **57.90** |
| | | | | | |
| **Process Water Total** | **3,609.84** | **95.42** | **3,705.27** | **1,207.36** | **3.31** |
| | | | | | |
| AZPDES Discharge | 43,204.78 | 0.00 | 43,204.78 | 14,078.32 | 38.57 |
| Delivered to COT Reclaimed System | 14,255.40 | | 14,255.40 | 4,645.14 | 12.73 |
| Reclaimed, delivered to other parties | | 1,470.40 | 1,470.40 | 479.13 | 1.31 |
| Groundwater Discharge | | 2,677.16 | 2,677.16 | 872.36 | 2.39 |
| Reuse on-site | 74.77 | 0.04 | 74.81 | 24.38 | 0.07 |
| **Effluent Total** | **57,534.95** | **4,147.60** | **61,682.55** | **20,099.32** | **55.07** |

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

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

#### 9. Non-Metropolitan Facilities Map



# IV. Reclaimed Water for Reuse, Environmental Restoration and Underground Storage (Groundwater Recharge)

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

To take advantage of effluent as a renewable water supply, Pima County reuses a substantial volume of its wastewater for irrigation, construction, environmental restoration and other purposes. Most of this reuse is conducted by the Natural Resources, Parks and Recreation Department, the Kino Sports Complex/Kino Environmental Restoration Project, and the Pima County Regional Flood Control District. Pima County Department of Transportation occasionally uses reclaimed water for certain projects, but used none in 2019. RWRD periodically draws on the reclaimed supply for sewer line flushing and construction use. The supply of reclaimed water for 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.

| Natural Resources, Parks and Recreation | | | |
|---|---|---|---|
| 2019 Monthly Reclaimed Water Use | | | |
| **Month** | **Gallons** | **Ccf** | **AF** |
| January | 5,652,281 | 7,556.0 | 17.35 |
| February | 5,543,813 | 7,411.0 | 17.01 |
| March | 8,028,094 | 10,732.0 | 24.64 |
| April | 15,400,894 | 20,588.0 | 47.26 |
| May | 26,373,319 | 35,256.0 | 80.94 |
| June | 29,297,455 | 39,165.0 | 89.91 |
| July | 30,880,332 | 41,281.0 | 94.77 |
| August | 38,214,982 | 51,086.0 | 117.28 |
| September | 28,754,369 | 38,439.0 | 88.24 |
| October | 15,768,187 | 21,079.0 | 48.39 |
| November | 6,326,275 | 8,457.0 | 19.41 |
| December | 17,232,873 | 23,037.0 | 52.89 |
| **Total** | **227,472,873** | **304,087.0** | **698.09** |

| Regional Flood Control District | | | |
|---|---|---|---|
| 2019 Monthly Reclaimed Water Use | | | |
| **Month** | **Gallons** | **Ccf** | **AF** |
| January | 265,558 | 355.0 | 0.81 |
| February | 197,486 | 264.0 | 0.61 |
| March | 172,800 | 231.0 | 0.53 |
| April | 442,847 | 592.0 | 1.36 |
| May | 661,278 | 884.0 | 2.03 |
| June | 577,496 | 772.0 | 1.77 |
| July | 530,369 | 709.0 | 1.63 |
| August | 556,551 | 744.0 | 1.71 |
| September | 624,623 | 835.0 | 1.92 |
| October | 423,397 | 566.0 | 1.30 |
| November | 290,244 | 388.0 | 0.89 |
| December | 332,883 | 445.0 | 1.02 |
| **Total** | **5,075,532** | **6,785.0** | **15.58** |

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

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

| Department of Transportation | | | |
|---|---|---|---|
| 2019 Monthly Reclaimed Water Use | | | |
| **Month** | **Gallons** | **Ccf** | **AF** |
| January | 0 | 0.0 | 0.00 |
| February | 0 | 0.0 | 0.00 |
| March | 0 | 0.0 | 0.00 |
| April | 0 | 0.0 | 0.00 |
| May | 0 | 0.0 | 0.00 |
| June | 0 | 0.0 | 0.00 |
| July | 0 | 0.0 | 0.00 |
| August | 0 | 0.0 | 0.00 |
| September | 0 | 0.0 | 0.00 |
| October | 0 | 0.0 | 0.00 |
| November | 0 | 0.0 | 0.00 |
| December | 0 | 0.0 | 0.00 |
| **Total** | **0** | **0.0** | **0.00** |

| Regional Wastewater Reclamation Department | | | |
|---|---|---|---|
| 2019 Monthly Reclaimed Water Use * | | | |
| **Month** | **Gallons** | **Ccf** | **AF** |
| January | 0 | 0.0 | 0.00 |
| February | 0 | 0.0 | 0.00 |
| March | 0 | 0.0 | 0.00 |
| April | 0 | 0.0 | 0.00 |
| May | 0 | 0.0 | 0.00 |
| June | 0 | 0.0 | 0.00 |
| July | 0 | 0.0 | 0.00 |
| August | 0 | 0.0 | 0.00 |
| September | 0 | 0.0 | 0.00 |
| October | 0 | 0.0 | 0.00 |
| November | 0 | 0.0 | 0.00 |
| December | 0 | 0.0 | 0.00 |
| **Total** | **0** | **0.0** | **0.00** |

*Water used for sewer line flushing.

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

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

| Kino Sports Park & KERP | | | |
|---|---|---|---|
| 2019 Monthly Reclaimed Water Use | | | |
| **Month** | **Gallons** | **Ccf** | **AF** |
| January | 106,971 | 143 | 0.33 |
| February | 0 | 0 | 0.00 |
| March | 8,229 | 11 | 0.03 |
| April | 8,229 | 11 | 0.03 |
| May | 8,048,291 | 10759 | 24.70 |
| June | 12,746,057 | 17039 | 39.12 |
| July | 18,568,894 | 24823 | 56.99 |
| August | 9,640,145 | 12887 | 29.58 |
| September | 0 | 0 | 0.00 |
| October | 0 | 0 | 0.00 |
| November | 2,992 | 4 | 0.01 |
| December | 140,634 | 188 | 0.43 |
| **Total** | **49,270,442** | **65,865.0** | **151.21** |

| Historical Water Use at Kino Sports Park & KERP | | | |
|---|---|---|---|
| | Reclaimed | | Harvested Stormwater |
| **Year** | **Ccf** | **AF** | **AF** |
| 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 |
| 2010 | 56,140.0 | 128.9 | 88.53 |
| 2011 | 74,907.7 | 172.0 | 50.22 |
| 2012 | 94,651.0 | 217.3 | 36.79 |
| 2013 | 80,297.0 | 184.3 | 126.81 |
| 2014 | 76,132.0 | 174.8 | 149.39 |
| 2015 | 39,865.0 | 91.5 | 187.77 |
| 2016 | 40,631.0 | 93.3 | 318.14 |
| 2017 | 89,741.0 | 206.0 | 118.47 |
| 2018 | 139,511.0 | 320.3 | 102.96 |
| 2019 | 65,865.0 | 151.2 | 186.20 |
| **Total** | **1,622,984.5** | **3,725.9** | **1709.68** |

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

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

| Yearly Reclaimed Water Use by Pima County from Tucson Water's Reclaimed System | | | |
|---|---|---|---|
| Year | Gallons | Ccf | AF |
| 2003 | 69,573,993 | 93,006.9 | 213.51 |
| 2004 | 86,118,658 | 115,123.9 | 264.29 |
| 2005 | 74,349,631 | 99,391.0 | 228.17 |
| 2006 | 92,822,026 | 124,085.0 | 284.86 |
| 2007 | 295,588,987 | 395,145.0 | 907.13 |
| 2008 | 302,590,005 | 404,504.0 | 928.61 |
| 2009 | 418,643,532 | 559,645.0 | 1,284.77 |
| 2010 | 317,788,925 | 424,822.0 | 975.26 |
| 2011 | 366,899,807 | 490,473.7 | 1,125.97 |
| 2012 | 330,454,192 | 441,753.0 | 1,014.13 |
| 2013 | 360,033,662 | 481,295.0 | 1,104.90 |
| 2014 | 360,110,712 | 481,398.0 | 1,105.14 |
| 2015 | 301,148,509 | 402,577.0 | 924.19 |
| 2016 | 335,933,344 | 449,077.6 | 1,030.94 |
| 2017 | 359,470,379 | 480,542.0 | 1,103.17 |
| 2018 | 387,341,299 | 517,800.0 | 1,188.71 |
| **2019** | **281,818,200** | **376,736.1** | **864.9** |

### B. Environmental Restoration with Reclaimed Water

As part of Pima County's Sustainable Action Plan begun in FY 2009, 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.

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

### B. Environmental Restoration with Reclaimed Water (Continued)

| Environmental Restoration with Reclaimed Water | | | |
|---|---|---|---|
| **Project Name** | **Volume (AF)** | **Multi-benefit Recharge Project?** | **Comments** |
| Kino Environmental Restoration Project (KERP)* | 0.0 | | Reclaimed water was not needed for riparian vegetation at the site during the year. KERP's vegetation is usually supported with harvested stormwater, except in particularly dry years. |
| Lower Santa Cruz Managed Recharge Project | 123.2 | Yes | This volume represents Pima County's share of the total evapotranspiration (ET) from the managed recharge project. The total ET was 1019.6 AF, and this volume is split among the participants by an agreed upon allocation formula. |
| Marana High Plains Effluent Recharge Project | 2.1 | Yes | Delivery of 595.5 AF was diverted from Santa Cruz River. Calculated evapotranspiration of 2.1 AF is the portion of the delivery volume that supports riparian vegetation. |
| Rillito Riparian/Swan Wetlands* | 6.4 | | Reclaimed water is being used for sustaining plants that were installed as part of this ecosystem restoration project. |
| Roger Rd WRF Pond | 13.1 | | This volume is used to support a riparian and wildlife viewing pond adjacent to the Santa Cruz River on-site at the Roger Rd WRF. |
| Santa Cruz River- West Branch Bosques* | 1.3 | | Small wetland area managed by PCRFCD. Reclaimed water used for vegetation establishment in water harvesting basins adjacent to existing mesquite bosque along West Branch of Santa Cruz River. Previously (2005-2011) provided drought relief for mature bosque vegetation. |
| Paseo de las Iglesias* | 12.7 | | Project involves bank protection, paved pathway River Park with new vegetation, water harvesting basins and preservation of in-place areas of vegetation/habitat on the Santa Cruz River near Silverlake Road, and managed by PCRFCD. |
| Arroyo Chico* | 3.2 | | Construction of a series of detention basins in Arroyo Chico near Cherry Avenue including athletic fields and environmental restoration of habitat and revegetation within the basins. Managed by PCRFCD. |
| Pantano* | 0.05 | | This volume is used to support restoration vegetation along the Pantano River Park segment of the Loop multi-use trail around Tucson. |
| **Annual Total** | **162.1** | | |

*Reclaimed water delivered through COT reclaimed water system.

## IV. 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 four facilities designed to replenish 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. The tables below reflect the groundwater recharge credits earned in 2019, the yearly storage credits earned by each facility, and the most recent balance of Pima County's Long-term Storage Account with ADWR.

| Recharge Volumes - Calendar Year 2019 in Acre Feet | | | | | | |
|---|---|---|---|---|---|---|
| **PROJECT** | **Delivery Volume** | **Evapo-transpiration** | **Contribution to Stream Diversions** | **Outflow** | **Cut to Aquifer** | **Recharge Credit** |
| Lower Santa Cruz Managed Recharge Project (LSCMRP) | 1,103.54 | 123.22 | 219.00 | 260.22 | 67.16 | 694.17 |
| Marana High Plains Effluent Recharge Project (MHPERP) | 595.50 | 8.30 | | | | 587.1 |
| Corona de Tucson | 395.24 | 0.3 | | | | 394.94 |
| Avra Valley | 1,541.75 | 34.0 | | | | 1,507.75 |
| **Total** | **3,636.03** | **165.82** | **219.00** | **260.22** | **67.16** | **3,184.06** |

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

### C. Underground Storage (Groundwater Recharge) of Effluent (Continued)

| Pima County Recharge Facilities: Yearly Storage Credits | | | | | |
|---|---|---|---|---|---|
| Year | Lower Santa Cruz Managed Recharge Project (LSCMRP) | Marana High Plains Effluent Recharge Project (MHPERP) | Corona de Tucson Underground Storage Facility | Avra Valley Underground Storage Facility | Total County Storage Credits |
| | (AF) | (AF) | (AF) | (AF) | (AF) |
| 2003 | 58.10 | | | | 58.10 |
| 2004 | 449.30 | | | | 449.30 |
| 2005 | 535.10 | | | | 535.10 |
| 2006 | 532.30 | | | | 532.30 |
| 2007 | 604.30 | 184.08 | | | 788.38 |
| 2008 | 677.60 | 348.29 | | | 1,025.89 |
| 2009 | 367.66 | 414.01 | 195.74 | | 977.41 |
| 2010 | 396.20 | 411.53 | 277.64 | | 1,085.37 |
| 2011 | 321.83 | 397.23 | 271.00 | | 990.06 |
| 2012 | 320.52 | 542.10 | 269.09 | | 1,131.71 |
| 2013 | 181.14 | 500.30 | 281.25 | | 962.69 |
| 2014 | 449.90 | 600.00 | 290.08 | | 1,339.98 |
| 2015 | 542.61 | 600.00 | 284.26 | 484.02 | 1,910.89 |
| 2016 | 424.47 | 600.00 | 329.85 | 1,435.08 | 2,789.40 |
| 2017 | 323.54 | 600.00 | 368.15 | 1,476.62 | 2,768.31 |
| 2018 | 122.11 | 600.00 | 367.95 | 1,473.21 | 2,563.27 |
| 2019 | 694.17 | 587.20 | 394.94 | 1,507.75 | 3,184.06 |
| **Total** | **7,000.85** | **6,384.74** | **3,329.95** | **6,376.68** | **23,092.22** |

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

### C. Underground Storage (Groundwater Recharge) of Effluent (Continued)

| 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 | 1,085.37 | 5,451.85 |
| 2011 | 3,571.66 | 990.06 | 6,441.91 |
| 2012 | 3,319.26 | 1,131.71 | 7,573.62 |
| 2013 | 3,237.25 | 962.69 | 8,536.31 |
| 2014 | 3,391.99 | 1,339.98 | 9,876.29 |
| 2015 | 3,315.63 | 1,910.89 | 11,787.18 |
| 2016 | 3,245.58 | 2,789.40 | 14,576.58 |
| 2017 | 3,142.48 | 2,768.31 | 17,344.89 |
| 2018 | 2,828.01 | 2,563.27 | 19,908.16 |
| **2019** | **2,933.50** | **3,184.06** | **23,092.22** |

## IV. 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

| Pima County Effluent Use Summary (10% Metropolitan Allotment) | | | | | |
|---|---|---|---|---|---|
| Description | | | AFY | MG/Yr | MGD |
| Reuse | Reclaimed System | Natural Resources, Parks and Recreation | 698.09 | 227.47 | 0.62 |
| | | Kino Sports Park & KERP | 151.21 | 49.27 | 0.13 |
| | | Department of Transportation | 0.00 | 0.00 | 0.00 |
| | | Regional Flood Control District | 15.58 | 5.08 | 0.01 |
| | | Regional Wastewater Reclamation | 0.00 | 0.00 | 0.00 |
| | | System Loss (4% in 2019) | 34.59 | 11.27 | 0.03 |
| | | Total from Reclaimed System | 899.46 | 293.09 | 0.80 |
| | Reuse on Metropolitan WRF sites | | 74.77 | 24.36 | 0.07 |
| Santa Cruz Releases | Delivered to High Plains Constructed Recharge Project | | 595.50 | 194.04 | 0.53 |
| | Qualified as Delivery to Lower Santa Cruz River Managed Recharge Project (LSCMRP) | | 1,103.54 | 359.59 | 0.99 |
| | PC Share of Outflow from LSCMRP | | 260.22 | 84.79 | 0.23 |
| **Effluent Total** | | | **2,933.49** | **955.88** | **2.62** |

## V. Effluent Entitlements

The 1979 IGA and subsequent agreements govern effluent entitlement from the metropolitan facilities. In 2019 the total metropolitan effluent produced was 57,535 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 26,401.5 AF, while Pima County retained 2,933.5 AF.

| Entitlement Calculations | Effluent Total (AF) |
|---|---|
| Total Effluent | 57,535.0 |
| SAWRSA | 28,200.0 |
| Total Less SAWRSA* | 29,335.0 |
| | |
| Water Providers Share | 0.9 |
| Pima County Share | 0.1 |
| | |
| **Entities Share 2019** | |
| - Water Providers (90%) | 26,401.5 |
| - Pima County (10%) | 2,933.5 |

*SAWRSA = Southern Arizona Water Rights Settlement Act.

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 Pima County and the City of Tucson (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 at the time 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 U.S. Department of Interior Bureau of Reclamation (BOR) 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 95% of the water recharged; prior to February 2019, only 50% of recharged effluent was credited.

## V. Effluent Entitlements (Continued)

### 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 on 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. 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. Use of effluent from the Pool is restricted to those entities identified in the 2001 Supplemental Agreement between City of Tucson and Pima County, including a number of local water providers and the Regional Flood Control District.

Use of this Pool effluent requires a decision from the Pima County Board of Supervisors, as well as the City's Mayor and Council; with the exception of Endangered Species Act (ESA)-related riparian projects, which are deemed approvable. The Conservation Effluent Pool is available to any qualified entity to mitigate project effects under Section 7 or Section 10 of the ESA, although such a connection with the Act is not required. No CEP water has been used through the reporting year, 2019. However, Pima County has appointed a Conservation Effluent Pool Administrator and a CEP Taskforce has identified 13 prospective sites.

In December 2018, City of Tucson became the first qualified entity to submit a formal request for evaluation by the Pool Administrator. The City requested to utilize CEP water to cover the evapotranspiration losses in the two effluent-dependent reaches of the Santa Cruz River downstream of the metropolitan treatment facilities, as well as in their Heritage Project located upstream of Congress Street. All three projects were characterized as designated riparian projects, in that none of them claimed any water from CEP in relation to the ESA mitigation.

The County and City Administrators for CEP evaluated the three applications in January 2019, and found all three to be incomplete. The application form and requirements are posted on the County's webpage for the Pool. The completeness review and application requirements are based on standards specified in the intergovernmental agreement for administration of the Pool. One type of information lacking on all proposals was to identify the "critical vegetation" that the Pool will sustain. Applications must also specify a water budget that is keyed to the water requirements of the habitat features that are part of the riparian project. These types of information ensure the Pool is used judiciously over time. No further action will be taken until the information deficiencies identified are addressed.

## V. Effluent Entitlements (Continued)

### E. Intergovernmental Agreement between the COT and PC for Treating Effluent and Wheeling Reclaimed Water (Wheeling Agreement), Resolution No. 2003-286 and Resolution No. 2017-17

The Wheeling Agreement, signed December 16, 2003, governs reclaimed water transactions between RWRD (the effluent provider), the City of Tucson (COT, the distributor and a reclaimed water user) and other County facilities (reclaimed water users). Effluent enters the reclaimed water system at the COT Sweetwater Plant and formerly 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 Pima County by COT for distribution of Pima County effluent to County sites. In 2016 and 2017, the COT and Pima County approved revision to the 2003 Wheeling Agreement which will facilitate adding new sites where reclaimed water can be delivered.

### 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 Tres Rios (at that time, 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, Spanish Trail Water Co, Pima County, and the City of Tucson.

## VI. Effluent Generation and Use in the Tucson Active Management Area (TAMA)

ADWR and local water managers often examine the water budget from the perspective of the entire Tucson Active Management Area (TAMA). In order to show the overall picture of effluent production and use for this region, a table is included here that depicts the amount of effluent each entity controlled and how that effluent was utilized. Pima County's wastewater production constitutes the primary source of effluent in the region, but there are a number of other entities that operate treatment facilities. This data is somewhat incomplete in that information is not available for all of the smaller wastewater treatment facilities. However, future reports may be able to capture additional data in this regard, and the majority of effluent generated in the TAMA is represented below.

In 2019, the total amount of effluent produced in the TAMA was 65,704 AF. Of this total, a volume of 19,151 AF or 29% was either directly reused or recharged with subsequent recovery for use during the year. Aquifer recharge activity resulted in net accrual of 31,515 AF in long-term storage credit, approximately 36% more than the volume stored in 2018. Only 8% of the effluent produced, or 5,271 AF, flowed out of the AMA according to measurement at the Trico Road gage on the Santa Cruz River. This volume of outflow was about 3,473 AF less than in 2018; and considerably less than in the three years prior to the 2013 plant upgrades, when outflow at Trico ranged from 19,000 to 28,000 AF.

## VI. Effluent Generation and Use in the Tucson Active Management Area (TAMA) (Continued)

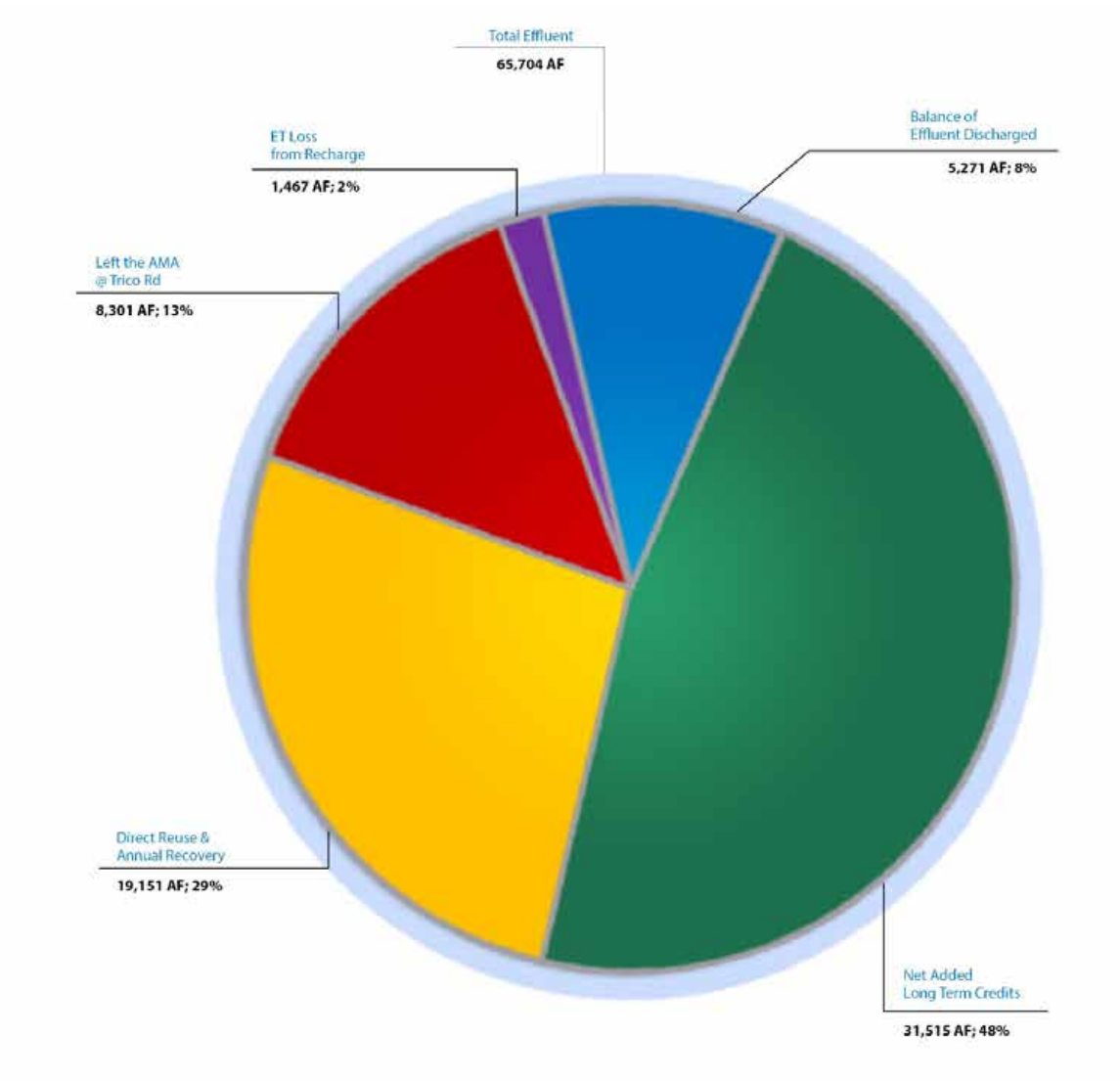



**Figure 5:** 2019 Tucson AMA Effluent Use and Dispensation

Increased infiltration and dramatically reduced outflow are likely due to improved water quality from upgraded treatment plants and concurrent clearing of organic matter that was plugging sediment in the channel bottom. Additionally, in 2019 Tucson Water diverted less effluent to their Sweetwater recharge basins where a total of 7,607 AF was used. Finally, in 2019 a total volume of 2,464 AF was either "cut to the aquifer" from recharge accounting or simply discharged in a manner that it was not accounted for as either reuse or recharge credit.

## VI. Effluent Generation and Use in the Tucson Active Management Area (TAMA) (Continued)

### Tucson AMA

### Annual Effluent Utilization

| Entities with Effluent | 2019 Effluent Generation & Use in the Tucson AMA (values in acre-feet) | | | | | | | | | | | | 2019 Effluent Recharge Balance Activity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Off Channel Recharge (Constructed USF or GSF) | | | | In Channel Recharge | | | | | | Off Channel Recharge (Constructed USF or GSF) | | In Channel Recharge | |
| | Net Effluent | Off Channel Recharge and Direct Reuse | Delivered to Off-Channel Recharge | Calculated Evapora-tion (ET loss) | Cut to the Aquifer | Annual Recovery | Delivered to In-Channel Recharge | Share of Down-stream Diversions[2] | Calculated Evaporation (ET loss) | Cut to the Aquifer | Outflow at Trico Rd Gage | Annual Recovery | Long-Term Credits Earned/ Reported | Long-term Credits Recovered | Long-Term Credits Earned/ Reported | Long-term Credits Recovered |
| **PC Metropolitan WRFs** | | | | | | | | | | | | | | | | |
| Secretary of the Interior[1] | 28,200.0 | | | | | | 28,200.0 | 0.0 | 253.5 | 1,841.5 | 6,516.6 | 0.0 | | | 19,841.9 | 0.0 |
| Conservation Effluent Pool | | | | | | | | | | | | | | | | |
| Pima County[3] | 2,933.5 | 1,569.7 | 595.5 | 8.3 | | | 1,699.0 | 814.5 | 123.2 | 67.2 | 260.2 | | 587.2 | | 864.2 | |
| City of Tucson[1,4] | 21,817.7 | 11,522.8 | 7,606.8 | 28.4 | | 7,578.4 | 7,414.8 | 1,151.3 | 901.4 | 512.7 | 1,368.2 | | 0.0 | | 6,487.8 | |
| Marana | 316.0 | | | | | | 255.7 | 50.7 | 28.6 | 15.6 | 60.3 | | | | 160.8 | |
| Oro Valley | 1,894.0 | 1,831.6 | | | | | 50.5 | 10.0 | 5.6 | 3.1 | 11.9 | | | | | |
| Metro Water | 1,881.9 | | | | | | | | | | | | | | | |
| Flowing Wells | 438.4 | 1.6 | | | | | 353.5 | 70.2 | 39.5 | 21.5 | 83.4 | | | | | |
| Spanish Trail | 71.0 | | | | | | 43.2 | 8.6 | 4.8 | 2.6 | | | | | | |
| Subtotal | 57,552.5 | 14,925.6 | 8,202.3 | 36.7 | | 7,578.4 | 38,016.7 | 2,105.3 | 1,356.6 | 2,464.1 | 8,300.5 | 0.0 | 587.2 | | 27,354.8 | 0.0 |
| **PC Non-Metro WRFs** | 4,147.6 | 4,147.6 | 1,937.0 | 34.3 | | | | | | | | | 1,902.7 | | | |
| **Other Facilities** | | | | | | | | | | | | | | | | |
| Marana WRF | 584.4 | 584.4 | 584.4 | 12.0 | 0.0 | 0.0 | | | | | | | | | | |
| Milagro | 1.9 | 1.9 | | | | | | | | | | | | | | |
| Marana - Rillito Vista | | | | | | | | | | | | | | | | |
| Marana High School | 12.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Robson Ranch Quail Creek[5] | 1,446.7 | 1,446.7 | 1,446.7 | 5.4 | | | | | | | | | 1,441.3 | | | |
| Saddlebrooke/Saddlebrooke Ranch | 636.4 | 636.4 | 229.0 | 0.2 | | | | | | | | | 228.8 | | | |
| Sahaurita | 1,197.9 | | | | | | 1,197.9 | | 21.7 | | | | | | | |
| U of A Tech Park | 124.5 | 124.5 | | | | | | | | | | | | | | |
| **Effluent Total** | **65,704.1** | **21,867.1** | **12,399.4** | **88.6** | | **7,578.4** | **39,214.6** | **2,105.3** | **1,378.2** | **2,464.1** | **8,300.5** | **-** | **4,160.0** | **-** | **27,354.8** | **-** |

Data from Entities with Effluent Entitlements, ADWR, ADEQ, or Corporation Commission records.

[1] In-channel recharge data include credits from both SCRMUSF + LSCRMRP.

[2] Diversion of effluent off-channel is for agricultural use, which also counts as reuse.

[3] Off channel recharge and direct reuse data for Pima County include direct reuse of 1,569.7 af plus 595.5 af directed to constructed recharge.

[4] Off channel recharge and direct reuse data for City of Tucson include direct reuse of 11,522.8 af plus 7,606.8 af directed to constructed recharge.

[5] Robson recharges effluent from Green Valley WRF. Delivery is the volume reported to ADWR for 2019, but ET and credits earned are estimated.

**Summary Table**

| | AF | % of Total |
|---|---|---|
| Effluent Available | 65,704.1 | 100 |
| Direct Reuse & Annual Recovery | 19,151.4 | 29.1 |
| Net Added Long Term Credits | 31,514.8 | 48.0 |
| ET Losses from Recharge | 1,466.9 | 2.2 |
| Left Tucson AMA (@ Trico Rd) | 8,300.5 | 12.6 |
| Effluent Balance | 5,270.6 | 8.0 |

## VII. 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
**AMA** or **Active Management Area:** Areas with heavy reliance on mined groundwater were identified and designated as Active Management Areas (AMAs) by the 1980 Arizona Groundwater Management Act. There are five AMAs: Prescott, Phoenix, Pinal, Tucson, and Santa Cruz, where groundwater is subject to state regulation.
**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.
**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.

## VII. 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. This project harvests stormwater and uses reclaimed water for both environmental restoration and irrigation of sports fields and landscape.
**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.
**Oxidation Ditch:** The oxidation ditch is a component of the wastewater treatment process that provides long-term aeration. It consists of a long channel laid out in an elliptical or circular configuration. The channel is equipped with mechanical aeration equipment, such as brush rotors, disc aerators, draft tube aerators, or fine bubble diffusers. The design generates wastewater flow through the ditch, stirring water in the channel and supplying oxygen. A certain amount of settled solids (sludge) is added into the incoming wastewater in order to activate the bacterial treatment.
**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 PCRFCD):** 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.
**Stabilization Lagoons:** This type of treatment facility consists of shallow man-made basins comprising a single or several series of anaerobic, facultative or maturation ponds that are operated without aeration. Such ponds allow suspended solids to settle and the soluble element of organic matter (BOD) is reduced through the coordinated activity of algae and heterotrophic bacteria.
**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

PIMA COUNTY

**Board of Supervisors**

Ramón Valadez, *Chairman*, District 2
Ally Miller, District 1
Sharon Bronson, District 3
Stephen W. Christy, District 4
Betty Villegas, District 5

**Pima County Administrator**

Chuck Huckelberry

**Deputy County Administrator for Public Works**

Carmine DeBonis

**Assistant County Administrator for Public Works**

Yves Khawam

PIMA COUNTY
WASTEWATER RECLAMATION

**Director**

Jackson Jenkins

**Deputy Directors**

Jeff Prevatt, PhD, Treatment Division
Jaime Rivera, Conveyance Division
Eric Wieduwilt, Technical Services & Engineering Division