



August 2023 Landscape Management Update



Mountain Park Ranch





## Mountain Park Ranch

Maintenance Update

### **Maintenance:**

- General blowing and raking of the granite will be the focus through the next service cycles.
- We have also inspected numerous washes and they are all doing well since the last cleaning and basically no rain over the last 45 days.
- Turf, Trees and Plants have all have had their water cycle times increased with summer now upon us.

### **Looking ahead:**

- We have started losing more of the Saguaro's from the extreme heat and Bacterial Necrosis returning and rotting them out at the base causing them to topple over under their massive weight. See Page #3
- Storm damage clean up occurred on 7/31/2023 after the previous evenings storm. See page #5
- The effects of extreme plants and trees, on pages # 6 & 7. I have some information why the lack of water is Not the reason for some plants not surviving.
- Pine Tree needle droppings have been higher than usual this summer. I have put together some information to help understand the process these trees go through and the why they drop so many needles. See pages 8 & 9.
- **Water Management:**
- Through the first 6 months of the year, we are an amazing \$42K below the budget. We went slightly over in June, and I anticipate high overages after the month of June and so far, this August. See page #10

Homes: 6000 - Plus Commercial Locations  
Residents: Over 20,000  
Granite: 35 acres  
Turf: 17 acres  
Trees: 2667  
Irrigation Controllers: 63  
Irrigation Valves: 784  
Sprinkler Heads: 1,460  
Backflows: 63  
Value of Common Area Landscape ***\$18,530,000***



Mountain Park Ranch  
General Maintenance





Bacterial Necrosis is a vascular disease and is what has been determined to be affecting the Saguaro Cactus throughout the valley. This condition can be exasperated in extreme heat conditions as we are experiencing this summer. The process is where the Saguaro rots from the inside out, usually at a lower level on the plant and it causes the Giant Saguaros to fail and eventually topple over from the weight of the giant plants. We have been monitoring the remaining Saguaros and have also solicited the opinion of an outside expert for review of the overall health and if anything can be done to slow or prevent the continuing decline and eventual death of these majestic monsters of the Southwest Desert. This happened in the summer of 2020 when we had a very long and hotter than usual summer.

**Mountain Park Ranch**  
General Maintenance



**Mountain Park Ranch**  
Storm Clean up from July 30th storms



**Mountain Park Ranch - Branch Clean Up**  
**7/31/23**



Hottest 30 days in Arizona History

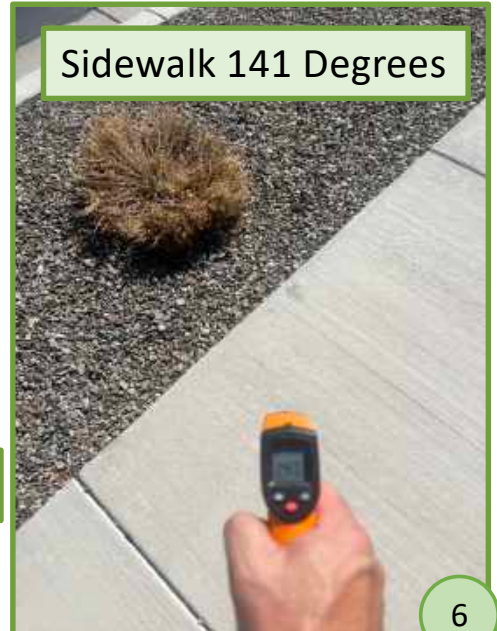


Temperatures taken at 3:30PM

Asphalt 161 Degrees



Sidewalk 141 Degrees



Base of Plant 152 Degrees





## Extreme Heat and the affects on Plants and Trees

During extreme heat conditions, plants can experience challenges in maintaining their transportation systems due to a combination of physiological and environmental factors. The primary transportation systems in plants are the xylem and phloem, responsible for the movement of water, nutrients, and other essential substances throughout the plant. Here's why these transportation systems may be affected during extreme heat:

**1. Water Loss:** High temperatures can lead to increased evaporation and transpiration rates from plant surfaces. Transpiration is the process through which water is drawn up from the roots to the leaves and then released into the atmosphere. Under extreme heat, plants may lose water faster than they can absorb it from the soil, leading to a condition known as water stress. This can result in reduced water availability for transport and impact the overall functioning of the xylem, which relies on a continuous column of water for movement.

**2. Air Embolisms:** Extreme heat can cause air bubbles (embolisms) to form within the xylem vessels. These air bubbles disrupt the continuous water column and block the movement of water and nutrients. This can interrupt the plant's ability to transport water from the roots to the leaves and other parts of the plant.

**3. Stomatal Closure:** To conserve water during heat stress, plants often close their stomata. Stomata are tiny pores on the leaf surfaces that allow for gas exchange (carbon dioxide uptake and oxygen release) and water vapor release. When stomata close, it reduces transpiration but also limits the entry of carbon dioxide for photosynthesis. This closure can impact the movement of sugars and other products of photosynthesis through the phloem.

**4. Protein Denaturation:** Extremely high temperatures can lead to the denaturation of proteins within plant cells. This can disrupt various cellular processes, including those involved in transport systems. Proteins are crucial for maintaining the integrity and function of cellular membranes, including those found in xylem and phloem cells.

**5. Reduced Metabolic Activity:** Heat stress can cause a slowdown in metabolic activity in plants. This can affect the production of energy and the synthesis of various molecules required for transportation processes.

**6. Root Damage:** Prolonged heat stress can also damage plant roots, reducing their ability to absorb water and nutrients from the soil. This, in turn, can limit the availability of resources for transport through the xylem and phloem.

In summary, extreme heat conditions can disrupt the transportation systems in plants by causing water stress, air embolisms, stomatal closure, protein denaturation, reduced metabolic activity, and root damage. These factors can collectively lead to reduced water and nutrient transport, affecting the overall health and survival of plants during heatwaves.



### Afghan Pine Trees & why are they dropping so many needles

Pine trees are adapted to their specific environments, and their behavior, including the shedding of needles, is influenced by a variety of factors, including temperature, water availability, and the natural growth cycle of the tree.

In the case of pine trees dropping their needles in hot environments like Arizona, there are a few reasons that might contribute to this behavior:

**1. Water Conservation:** Pine trees, like all plants, need water to survive and thrive. In hot and arid regions like Arizona, water availability can be limited. Pine trees have evolved to minimize water loss through a process called transpiration, where water is released through tiny openings called stomata on their needles. When it's hot and water is scarce, pine trees might close their stomata to reduce water loss, which could lead to the shedding of older needles to conserve water.

**2. Stress Response:** High temperatures and drought conditions can cause stress to pine trees. As a survival strategy, trees may shed older or damaged needles to redirect resources to more vital parts of the tree, such as new growth or maintaining the health of remaining needles.

**3. Energy Efficiency:** Pine trees might shed needles to increase energy efficiency. Photosynthesis, the process by which plants convert sunlight into energy, primarily occurs in the green needles. In extreme heat, photosynthesis might become less efficient due to factors like excessive water loss and high temperatures. Shedding older needles can help the tree allocate energy to fewer, healthier needles, optimizing the photosynthetic process.

## Mountain Park Ranch

Pine Tree health and the effects of  
Extreme Heat

**4. Natural Growth Cycle:** Pine trees have a natural cycle of needle growth and shedding. While evergreen trees like pines retain their leaves (needles) year-round, they do shed needles over time as part of their normal growth and renewal process. This shedding can be influenced by environmental conditions, including temperature and water availability.

It's important to note that the shedding of needles in response to heat is not unique to pine trees. Many types of trees, including deciduous trees, also undergo stress-related leaf shedding during periods of environmental stress.

In summary, the shedding of needles by pine trees in hot environments like Arizona can be attributed to a combination of factors, including water conservation, stress response, energy efficiency, and their natural growth cycle. These mechanisms help the trees adapt and survive in challenging conditions.

This is all a normal process for these trees and will occur each summer and can be worse in some years, as we are currently experiencing with such extreme heat and draught conditions.





# Mountain Park Ranch Maintenance Update / Water Monitoring

## 2023 WATER MANAGEMENT WORKSHEET

|            | SQ FOOTAGE | AREA  | DENSITY | ACREAGE | COST PER KGALS |
|------------|------------|-------|---------|---------|----------------|
| TURF SQ    | 140,207    | 45.3% | 100%    | 17.0    | \$3.75         |
| PLANT SQ   | 892,591    | 54.7% | 20%     | 29.5    |                |
| TOTAL AREA | 1,032,798  |       | TOTAL   | 37.5    |                |

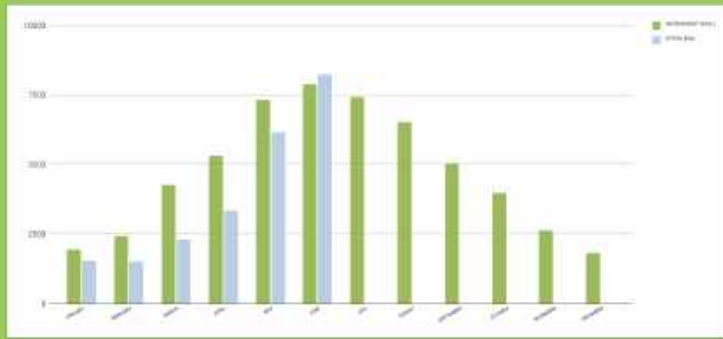


## Mountain Park Ranch HOA

| MONTH        | Turf Budget         |                | Plant Budget        |                | Total Budgeted      |              | Actual Usage |               |
|--------------|---------------------|----------------|---------------------|----------------|---------------------|--------------|--------------|---------------|
|              | WATER BUDGET (KGAL) | COST PER MONTH | WATER BUDGET (KGAL) | COST PER MONTH | WATER BUDGET (KGAL) | WATER BUDGET | ACTUAL KGAL  | ACTUAL COST   |
| JANUARY      | 1,437.8             | \$12,824.26    | 818.8               | \$154.12       | 1,956.7             | \$12,778.38  | 1538         | \$9,561.98    |
| FEBRUARY     | 1,783.4             | \$15,858.42    | 843.5               | \$191.76       | 2,426.9             | \$15,849.58  | 1531         | \$9,542.78    |
| MARCH        | 3,161.0             | \$27,578.32    | 1,333.4             | \$336.89       | 4,274.4             | \$27,915.01  | 2314         | \$14,362.05   |
| APRIL        | 3,765.8             | \$32,973.24    | 1,589.8             | \$409.84       | 5,355.6             | \$33,442.88  | 3350         | \$19,370.55   |
| MAY          | 4,813.4             | \$42,267.48    | 2,022.8             | \$52.42        | 7,348.2             | \$43,015.89  | 6145         | \$36,106.48   |
| JUNE         | 5,183.8             | \$45,812.38    | 2,127.8             | \$510.30       | 7,911.3             | \$46,322.68  | 8228         | \$47,237.94   |
| JULY         | 4,866.3             | \$42,725.89    | 2,589.6             | \$789.09       | 7,426.9             | \$43,835.07  | 0            | \$0.00        |
| AUGUST       | 4,284.4             | \$37,617.06    | 2,264.5             | \$589.74       | 6,538.9             | \$38,287.09  | 0            | \$0.00        |
| SEPTEMBER    | 3,543.9             | \$31,115.59    | 1,491.9             | \$443.18       | 5,035.8             | \$31,558.78  | 0            | \$0.00        |
| OCTOBER      | 2,901.2             | \$25,738.16    | 1,057.7             | \$316.20       | 3,888.8             | \$26,050.35  | 0            | \$0.00        |
| NOVEMBER     | 2,002.8             | \$17,565.73    | 832.4               | \$187.86       | 2,835.3             | \$17,773.58  | 0            | \$0.00        |
| DECEMBER     | 1,389.4             | \$12,198.55    | 438.7               | \$130.31       | 1,828.9             | \$12,328.86  | 0            | \$0.00        |
| ANNUAL TOTAL | 38,133.8            | \$345,587.35   | 17,572.7            | \$5,220.29     | 56,705.7            | \$348,607.65 | 23103        | \$ 136,361.38 |

| Tracking         |             |
|------------------|-------------|
| DOLLAR TO BUDGET | % TO BUDGET |
| \$ (3,216.48)    | 75%         |
| \$ (6,306.88)    | 80%         |
| \$ (13,572.96)   | 91%         |
| \$ (13,872.33)   | 99%         |
| \$ (6,907.41)    | 84%         |
| \$ 914.88        | 102%        |
| \$ -             | 0%          |
| \$ -             | 0%          |
| \$ -             | 0%          |
| \$ -             | 0%          |
| \$ -             | 0%          |
| \$ -             | 0%          |
| \$ (42,961.03)   | 39%         |

| YOY TOTAL (KGAL) |        |        |        | RAINFALL |      |      |      |
|------------------|--------|--------|--------|----------|------|------|------|
| 2020             | 2021   | 2022   | 2023   | 2020     | 2021 | 2022 | 2023 |
| 1,889            | 1,822  | 2,234  | 7581   | 0.19     | 0.00 | 0.12 | 1.81 |
| 1,258            | 3,901  | 3,940  | 2,914  | 0.36     | 0.01 | 0.33 | 0.38 |
| 2,052            | 5,540  | 5,161  | 3,553  | 0.00     | 0.00 | 0.00 | 0.00 |
| 3,713            | 4,914  | 7,560  | 8,145  | 0.00     | 0.17 | 0.33 | 0.33 |
| 5,028            | 8,421  | 8,538  | 8,028  | 0.10     | 1.79 | 0.21 | 0.21 |
| 6,418            | 4,738  | 3,780  | 0      | 0.98     | 1.54 | 0.91 | 0.91 |
| 6,715            | 3,857  | 4,224  | 0      | 0.00     | 0.16 | 0.16 | 0.16 |
| 6,658            | 2,900  | 3,888  | 0      | 0.00     | 0.00 | 0.00 | 0.00 |
| 2,902            | 8,811  | 4,843  | 0      | 0.00     | 0.30 | 0.16 | 0.16 |
| 3,560            | 4,801  | 5,272  | 0      | 0.00     | 0.00 | 0.00 | 0.00 |
| 7,138            | 1,466  | 1,730  | 0      | 0.45     | 4.30 | 0.41 | 0.41 |
| 47,595           | 48,839 | 59,873 | 23,100 | 3.87     | 7.11 | 6.79 | 1.41 |



| YTD TO BUDGET | YOY DIFF +/- 2018 |
|---------------|-------------------|
| -\$42,961.03  | \$ 136,361.38     |



| YTD TO BUDGET | YOY DIFF +/- 2018 |
|---------------|-------------------|
| -\$42,961.03  | \$ 136,361.38     |

\*BUDGET BASED ON IMPLEMENTING A LANDSCAPE WATER MANAGEMENT PLAN AND TECHNOLOGY  
\*\*WEATHER RAINFALL IS BASED ON 1 YEAR ONLY

Through the first 6 months of the year, we are \$42K below budget, which is huge as we went over in June, and I am anticipating being over in July and August with the extreme heat we have experienced.

The chart below illustrates how the controllers have adjusted up and down each week based on the weather conditions.



