1. HEADLINE

SCOTTSDALE MAKES WAVES IN PROMOTING WATER CONSERVATION

City announces a tool that accurately automates landscape feature classification, saving water.

2. DATELINE + OVERVIEW

(Scottsdale, Arizona November 14, 2019) City of Scottsdale Water Conservation Office representatives today have announced the WC-Tool, an automated program that identifies landscaping to enhance outdoor water conservation efforts. By highlighting areas on a map, the tool can accurately classify landscape materials, including size and type (tree, grass, shrub, and bodies of water).

Utilizing the tool has allowed water conservation staff to quickly assess a site and its composition - allowing for individualized water budgets that can ultimately save money and conserve water citywide.

3. LEADERSHIP QUOTE

"With the launch of the WC-Tool, the City of Scottsdale builds on 40 plus years of innovative water stewardship," said Scottsdale City Councilor Drip Drinkwater. "We've collaborated with ASU and AWS to harness the power of technology to create a more accurate and timely water budget to identify and capture opportunities to reduce water use."

4. OPPORTUNITY + PROBLEM

Before WC-Tool, the Water Conservation Office manually merged water and land use information when preparing water plans. The manual process was time consuming, lacked standardization, and was inconsistent, all of which impacted the Conservation team's ability to maximize efforts to realize reductions in water consumption.

5. CUSTOMER QUOTE

"The process for accurately measuring large landscapes for our customers was frustrating and used to take many hours and often included several site visits," said Scottsdale Water Conservation Coordinator Elisa Klein. "Now with the WC-Tool we can more accurately provide repeatable landscape measurements at the click of a button."

6. CUSTOMER EXPERIENCE + HOW IT WORKS

The WC-Tool automates landscape classification and calculation by leveraging artificial intelligence, machine learning and data analytics to consolidate multiple data sets and GIS layers. It can identify trees, shrubs, grass and bodies of water, calculating ground cover square footage, tree canopy, and water surface area. Now Water Conservation staff is able to quickly generate water budgets for large landscapes in the office and provide irrigation guidance over the phone, reducing the need for onsite inspections. This process increases the overall accuracy of the classification, shortens response time and frees up staff from administrative processes, allowing for a proactive approach for water conservation outreach.

7. CALL TO ACTION

To learn more about the WC-Tool and how you can use WC-Tool to improve your city's water conservation efforts go to www.scottsdale.gov/water.

FREQUENTLY ASKED QUESTIONS

1. **How do we define "accurate" in terms of the product?** Through an accuracy assessment and a confusion matrix. Additionally, user's accuracy or producer's accuracy can be utilized. Ideally it would be a combination of factors that, when looking at the desired classes (tree, shrubs, water, grass) there is a high level of accuracy for the data.

2. **How do we define classifications for landscape type?** For the landscape water budget, measurements of tree, grass, shrub, and surface water (pools, lakes) are needed. Ideally, artificial turf would also be included as it is an area of interest that continues to grow. Permeable and impermeable surfaces (bare dirt, roads, pavement, etc.) are also useful, however they are not used in the budget so they would have a lesser priority.

3. **What data sources do we need to build, operate and maintain the product?** LIDAR, aerials, street/road layers, NIR, building footprints/rooftops, parcel lines, tree counts, other various layers etc.

4. **How long does the data need to be stored?** Indefinitely. For landscapes, we would like to calculate change over time. Being able to compare 2019's classification to 2030's will be invaluable.

5. **What are the desired spatiotemporal resolutions?** Resolutions of 25 feet and below are ideal for the prototype. Customers have either or both high-water-use warm season grass (e.g. Bermuda) and winter grass. Flying during the fall could be difficult to detect grass vegetation as customers scalp the yard in preparation for over-seeding for winter grass. They may also shut off the water. The biggest concerns are warm season grass being very lush and green during the summer months of peak evapotranspiration. Scottsdale Water also serves customers outside of the city boundaries. We would need to trim the classification to the service boundary, not the city boundary.

6. **Where will the data and application hosted and stored?** The prototype will be built on AWS products.

7. **Can the proposed application scale into a platform?** Yes.

8. **Will this tool be public or internal to start and what are the considerations?** Internal – cannot make all information public due to restrictions on water use information, potentially in the future could release parcel-level information to customers.

9. **Explain the full manual process currently done today.** Currently, an HOA or large landscape makes a request, data is gathered for meter/water use data in-house, usually a meter map is created (aerial view with meters/serial numbers/account numbers). This process can be simple or complex depending on the number of meters, customer numbers, and any unknown information. Then, we conduct an on-site visit (usually 2-4 hours, depending on the site and

questions). Here we gather information on water use information in relation to land use – where is the pool tied into, what is the state of the irrigation system, what is the scheduling, which buildings are tied to which meters, what are the areas of concern, where do they need a budget, what is looped, etc. Then, in-house, a manual classification is done with the aid of ArcMap. There is a written procedure for this entire process that includes several steps on its own, totaling about 10-15 hours of work per site (sometimes more if the landscape is complex). Then, final maps and budgets are produced (1-5 hours) and a final meeting is scheduled with the customer to review the materials (another 2-4 hours meeting).

10. **What do data outputs look like (or are necessary) when the model is run?** A polygon feature class.

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