



Storm *to* Shade

City of Tucson Green Stormwater
Infrastructure Program

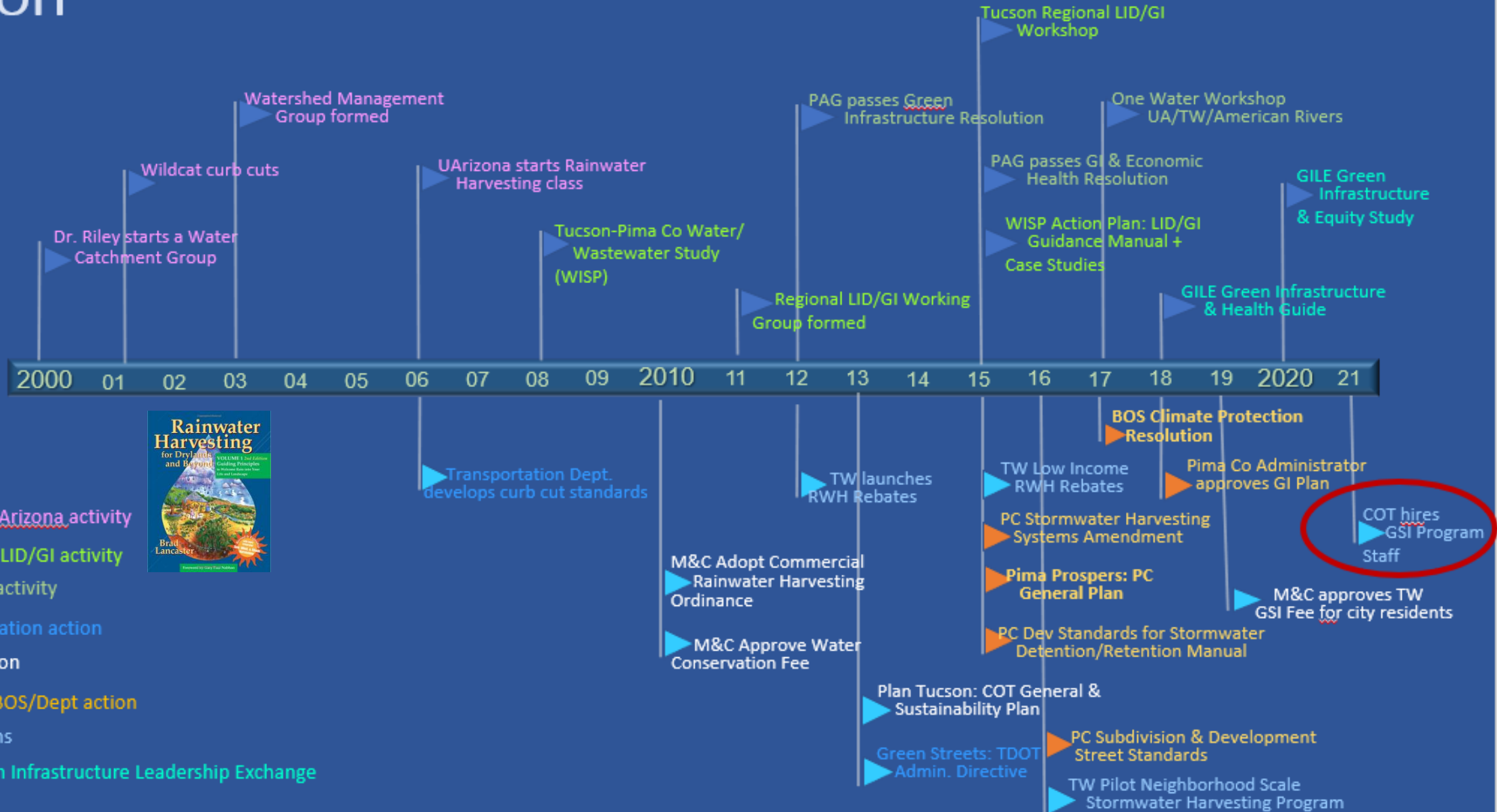
WRRC Webinar: GSI in Tucson

5.17.23

Blue Baldwin
Program Manager



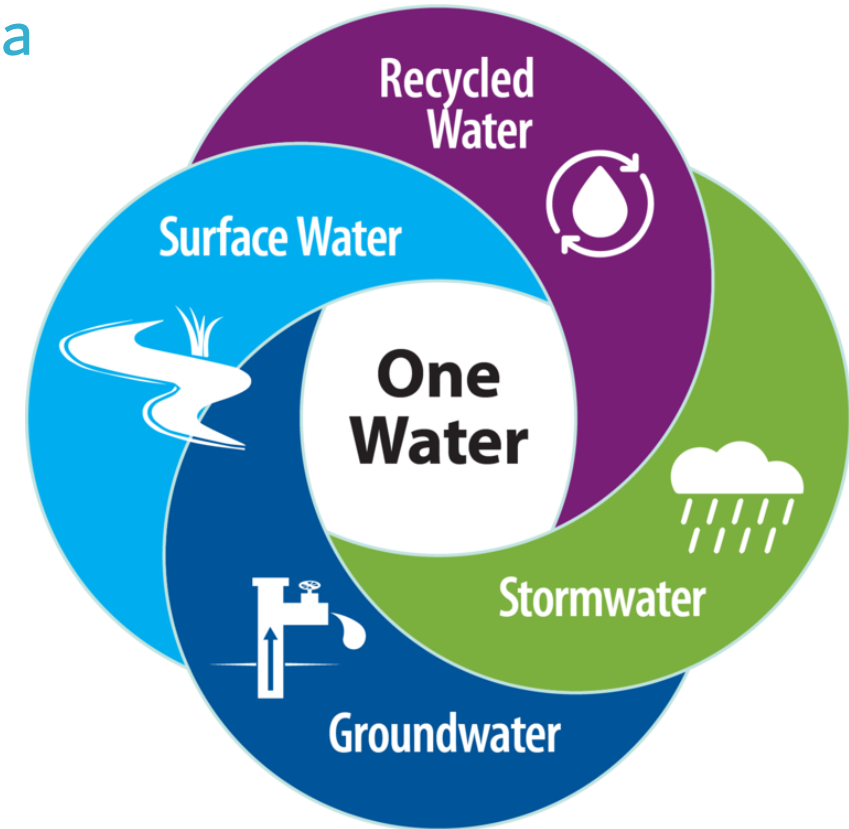
Institutionalizing Rainwater Harvesting in Tucson



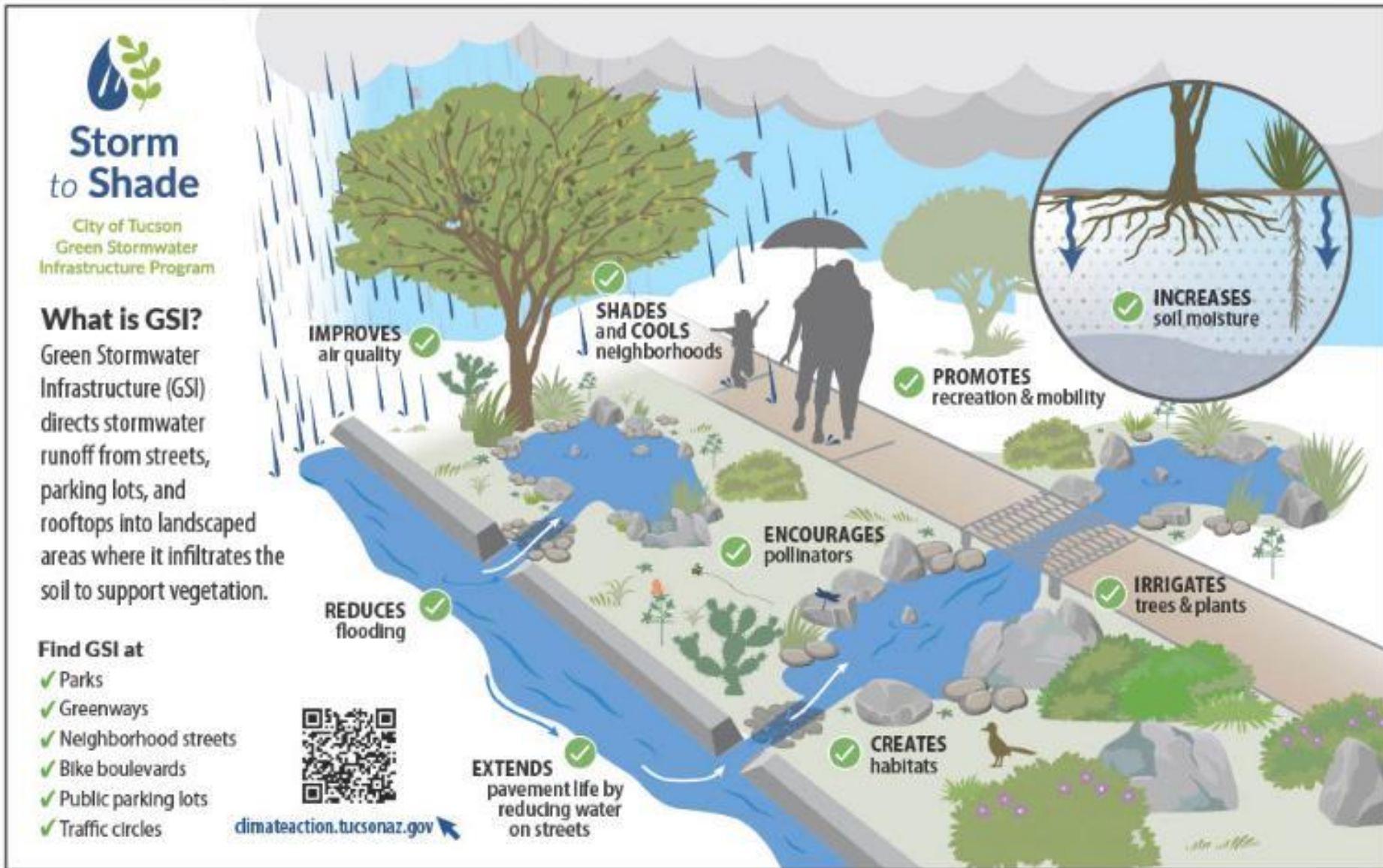
COT GSI Pilot Program

January 2021 – December 2022

- 2020 Mayor & Council vote to approve the creation of a GSI pilot program for Tucson
- Dedicated funding source
 - **.13 cents per ccf of water consumed**
 - **Average monthly customer cost ~ \$1/mo**
- Residential & commercial utility customers within city limits
- Non-regulatory driven
- Sunset on (pilot) fee voted to be removed December 2020



The City of Tucson's GSI Program shall:



1. Establish a Capital Improvement Program to build GSI throughout the 6 Wards in the COT
2. Maintain existing and new GSI
3. **EQUITY**



Capital Process & Project Prioritization

- Leveraging funds with existing COT improvement projects
 - Props 407, 101, 411
- Ward Office input
- Identifying priority areas of investment
 - Tree Equity Score



Tucson Tree Equity Scores

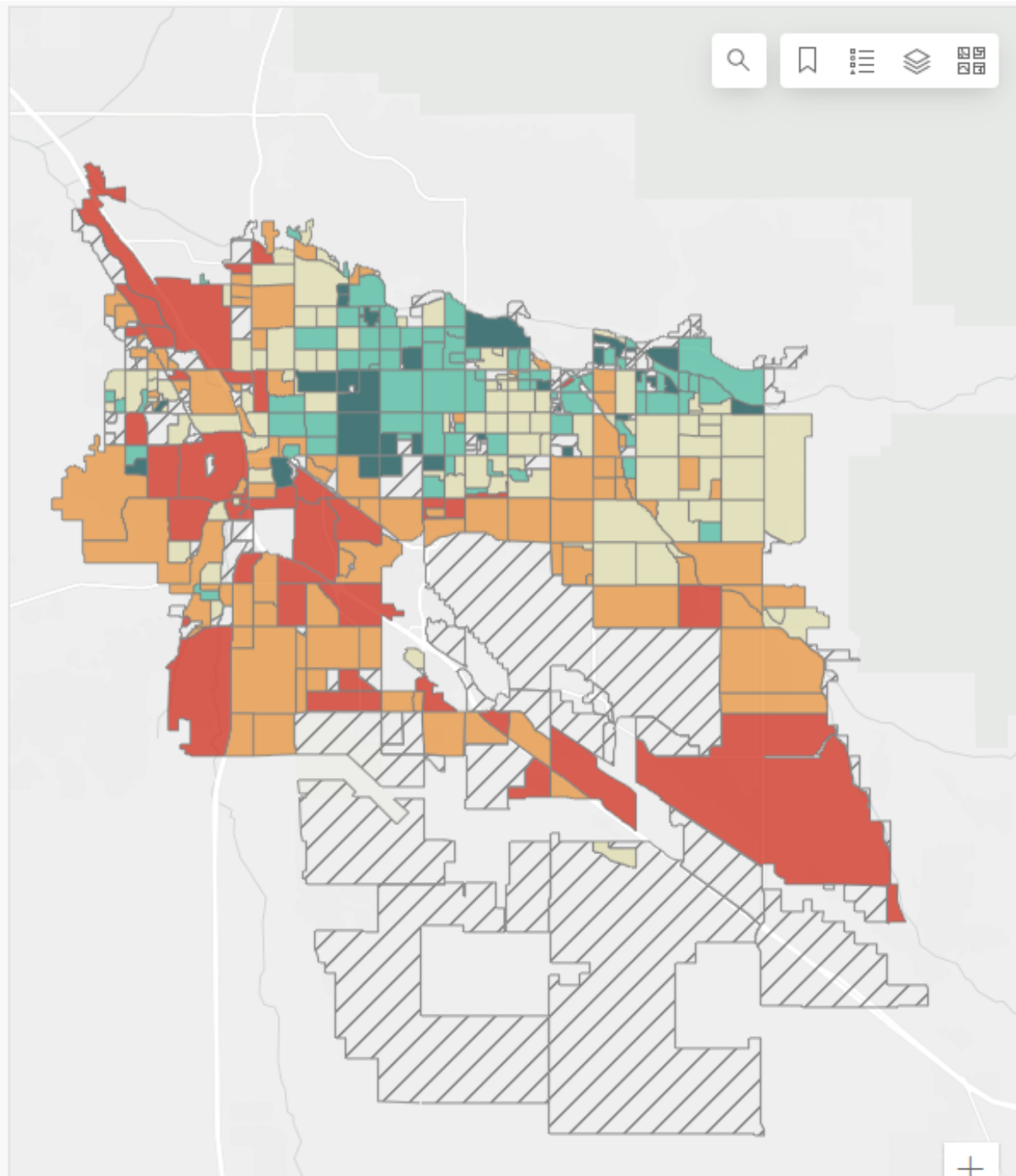


Tree Equity Scores for Tucson neighborhoods

This dashboard was developed using American Forests' Tree Equity Score methodology. The scores are a metric that informs the city on how well we are delivering equitable tree cover to all our residents. The score combines "measures of tree canopy cover need and priority for trees in urban neighborhoods. It is derived from tree canopy cover, climate, demographic and socioeconomic data." (American Forests, 2020)

Definitions:

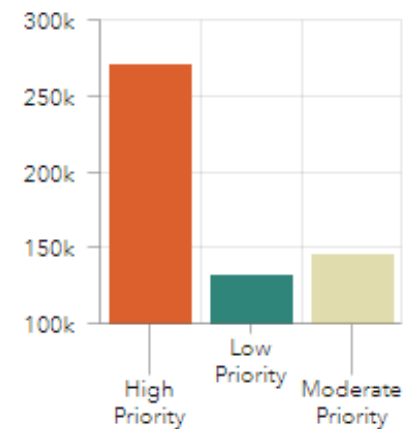
Tree Equity Score (0-100): A score of 100 means tree equity has been achieved in this neighborhood. Lower



Tree Equity Achieved in

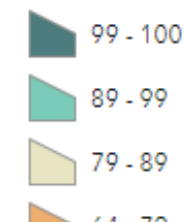
30

of 466 neighborhoods



Priority by Population

Tree Equity Scores by Neighborhood





El Paso & Southwestern Greenway

Storm to Shade is funding the design and construction of Green Stormwater Infrastructure...



18th & Main GSI Intersection

Storm to Shade is funding the design and construction of two in-street traffic-calming green...



Ironhorse Park GSI

Storm to Shade is funding the addition of green stormwater infrastructure (GSI) installations in...



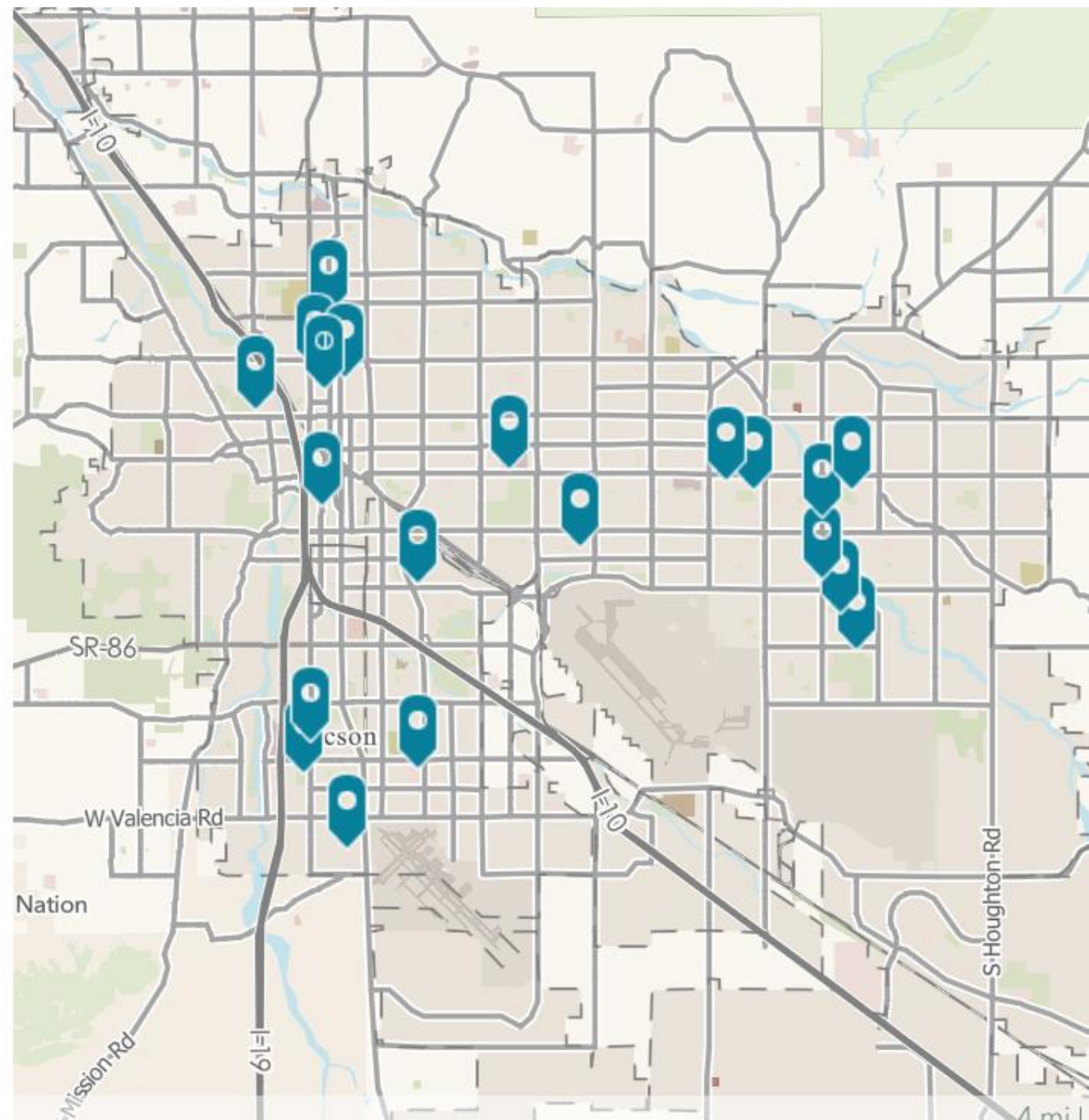
9th Avenue Bicycle Boulevard

Storm to Shade is funding the design and construction of curb extensions along portions of...



El Rio Neighborhood Center GSI

Storm to Shade is funding design and construction to retrofit the landscape at El Rio Neighborhood...



Storm to Shade Maintenance Program



Maintenance Challenges

- GSI assets are "owned" across various City departments
- Departments use different asset management systems that don't communicate w/one another
- Competing interests & protocols
 - TW well sites
 - Police, unsheltered population
- Mx Contractors & COT Mx staff



Resolving Mx Challenges

1. *Building Resilience, University-Community Partnership (52 GSI stakeholders)*

Establish, implement and disseminate a GSI maintenance protocol for the City of Tucson via a collaborative, participatory dialogue process.

2. GSI Mx training modules (on-line & in field)

3. GSI Mx Manual for internal/external use

4. GSI Mx Agreements w/City depts

5. Enterprise Asset Management System



Mx Program Milestones

- 230 individuals trained
 - 90 COT staff & community members
- *GSI Mx Maintenance Pocket Guide* published & disseminated
- 6 local GSI maintenance contractors hired, trained, & deployed
- Interdepartmental MOUs executed
- Site prioritization/3-Tiered system established
- EAM system launching soon!



GSI Maintenance Pocket Guide

Published by the City of Tucson
Green Stormwater Infrastructure
Program: Storm to Shade



**Green Stormwater
Infrastructure (GSI)
Maintenance**

First Edition: June 2022

A Pocket Guide



The structural elements of GSI



INLETS/OUTLETS

Conveyance allowing stormwater to flow into or out of a GSI feature



CURB CUT

Removed section of curbing that serves as an inlet or outlet



CURB CORE

Circular core drilled through curbing that serves as an inlet or outlet



SEDIMENT

Rough area at inlet to settle before water enters



INFILTRATION BASIN

Depression within a GSI feature that allows stormwater to infiltrate the soil



PLANTING SITE

Elevated planting area feature



GSI Maintenance the tools of the trade

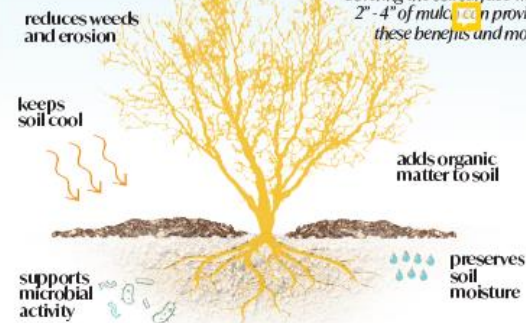
Sustaining Soil

Maintaining healthy soil is also crucial to plant health and GSI feature functionality. Consider the following best practices while performing GSI maintenance:

- minimize soil disturbance, avoid raking for aesthetic purposes
- keep soil mulched (wood chips, leaves, trimmings, other aggregates)
- avoid activities that can lead to soil compaction - i.e. driving, parking, walking in or on GSI features or plant root zones
- minimize erosion - ensure earthworks, rockwork and other grade controls are in place and functioning
- avoid the use of herbicides and pesticides*

Magical Mulch

Covering the soil surface with 2" - 4" of mulch can provide these benefits and more.



Common Weeds

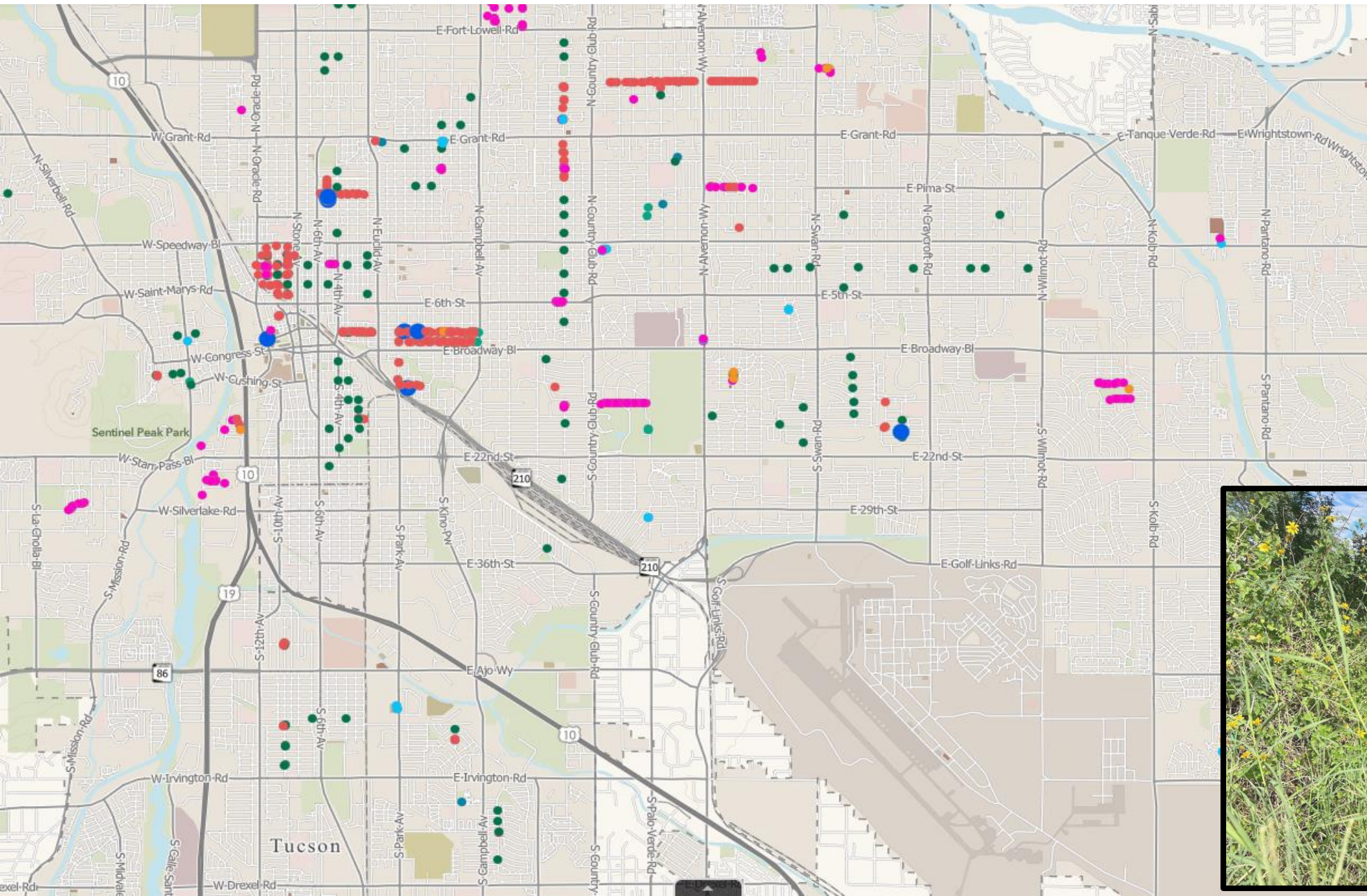


* Herbicides/pesticides may be applied by AZ State Certified Applicators with formal approval from the Storm to Shade Maintenance Program Manager.

GSI Asset Inventory

~600 city-built assets

Tree Inventory = ~850



Layer List

Layers

- GSI ASSET TREE INVENTORY
- GSI Asset Inventory

- Chicane/Curb Extension
- Right of Way Basin
- Traffic Circle
- Rain Garden
- Vegetated Swale
- Traffic Median
- Stormwater Harvesting Basin
- Other

GSI_Asset_Inventory - devside_AKONDEH1.devside_AKONDEH1_GSI_A ...
SSET_MAINTENANCE_WORK_Checklist



Lessons Learned

- Early involvement in project planning saves time and resources
- Project costs
 - Significantly higher than anticipated
 - Vary greatly by project type
 - in street, behind the curb, in parks, on parcels
- Contractor challenges
 - Timelines
 - Experience & expertise
 - Drawing – construction disconnect ----->
- Plant pallet
- Irrigation systems vs. hand watering
- Utility constraints
- Internal coordination
- Data needs





“Action on behalf of life transforms. Because the relationship between self and the world is reciprocal, it is not a question of first getting enlightened or saved and then acting. As we work to heal the earth, the earth heals us.”

*~ Robin Wall
Kimmerer*

Questions
or
comments?





Grants & Partnerships

- **Building Resilience: A University-Community Partnership to Develop a Green Stormwater Infrastructure Maintenance Protocol for Tucson, Arizona**
 - AIR-TRIF, University of Arizona
- **Green Infrastructure Standardization through Stakeholder Engagement, Guidance, and Construction Details**
 - ADEQ
- **Growing Water Smart Technical Assistance--Soil Health Amendments Pilot Program**
 - Sonoran Institute



S2S Program Snapshot

Financials (as of September 30, 2022)

- Total revenues \$8,604,520
- Total expenditures \$1,013,785
- Fund balance \$7,135,827

Capital Improvement Program

- Planning process, prioritization framework, and program metrics established
- City of Tucson/Pima County GSI Construction Standard Details (18) and GSI Site Guidance updated
- 21 projects in design or construction

Maintenance Program

- Comprehensive City-owned GSI asset inventory completed – 600 assets identified

- Formal City GSI Maintenance standards developed with community input, and published in a concise [guide](#) for use by maintenance crews in the field
- GSI maintenance training program materials developed; 227 local government staff and contractors trained, including 90 City staff in Parks & Recreation, Department of Transportation and Mobility, Tucson Water, and Environmental and General Services
- Six specialized GSI maintenance contractors hired, trained, and deployed
- 66 assets maintained, including all Ward offices (October 1 through November 9, 2022)

