



Watershed Protection Citywide Profile

The following information provides a brief introduction to Austin's watersheds and the City's efforts to reduce the impacts of flooding, erosion, and water pollution. This document serves as a companion piece to a series of profiles describing the different watershed characteristics, priorities, and solutions for each City Council district.

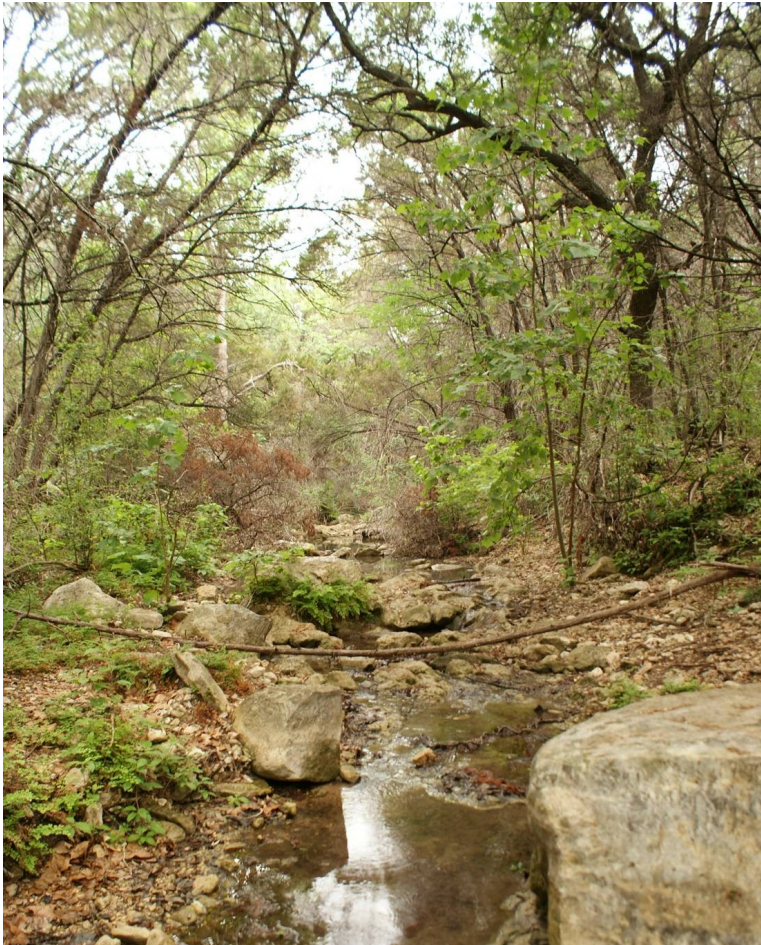
A watershed is the area of land that drains to a particular creek, lake, or aquifer. Water travels from the highest hill to the lowest area where it forms a water body. Austin's ten City Council districts stretch across 68 different watersheds, most of which enter the Colorado River before flowing to the Gulf of Mexico.

January 1, 2015

Photo: View of Lake Austin from Mt. Bonnell

Watershed Protection Citywide Profile

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Turkey Creek flows through the rocky terrain of the Edwards Plateau



Dry Creek East features the erosive, clay soils of the Blackland Prairie

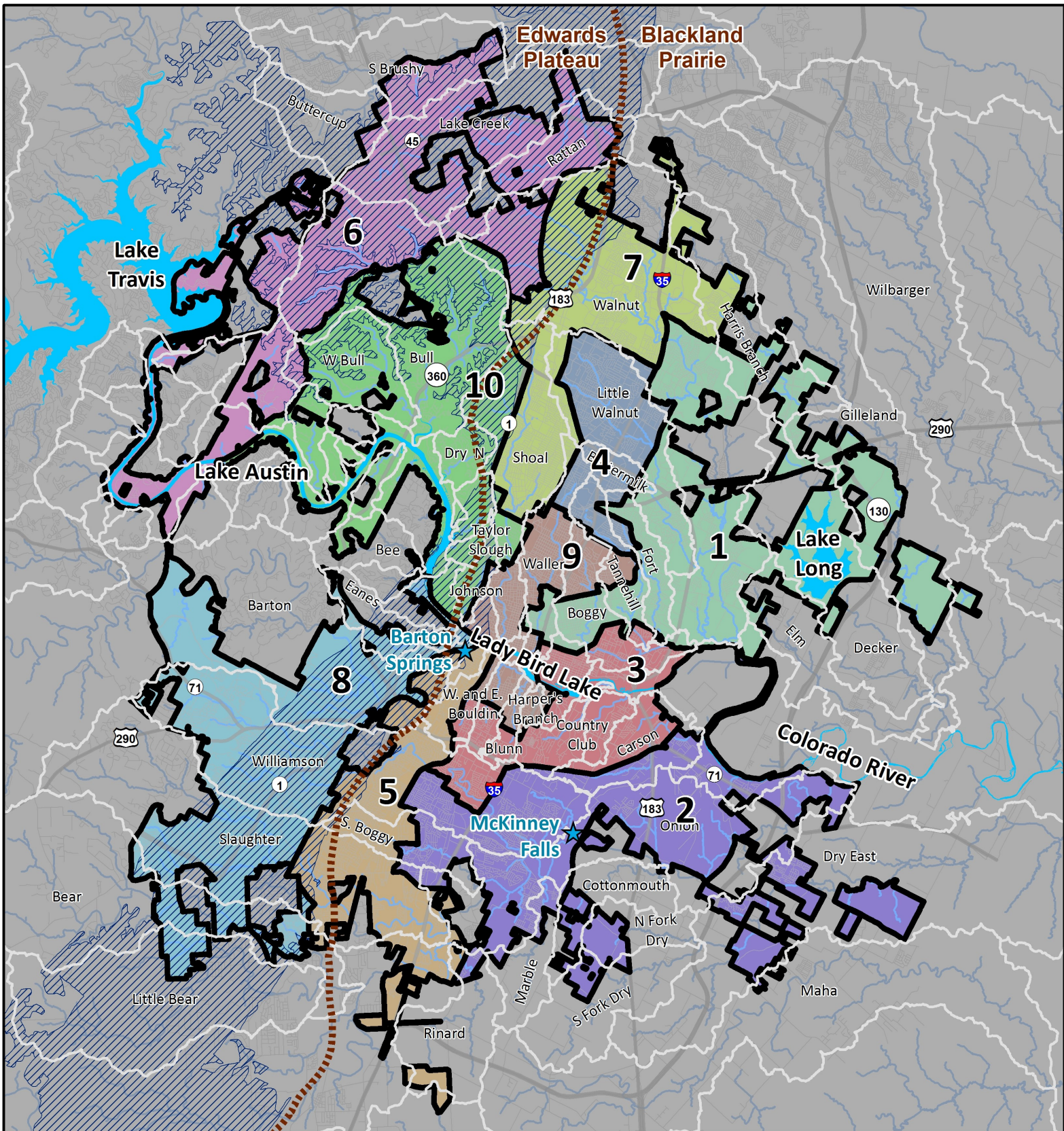
Austin's Watersheds

Austin and Central Texas are known and celebrated for creeks, rivers, lakes, and springs. Austin's water features are the source of intense pride for its residents and a powerful magnet for visitors, new residents, and businesses. One of the centerpieces is Barton Springs, the fourth largest spring in Texas and one of the most popular attractions in the region, second only to the State Capitol in terms of the number of annual visitors. Access to an abundant, reliable, and clean source of water played a key role in the original decision to locate the city just downstream of Barton Springs along the Colorado River and to select it as the state's capital in 1839.

Austin's jurisdiction is almost entirely situated in the Colorado River basin. The Colorado River and its contributing streams nourish a rugged and beautiful landscape, featuring rocky hills and juniper-oak forests in the Edwards Plateau to the west and rolling hills and tree-lined streams in the Blackland Prairie to the east. The physical variability of the region makes some watersheds more vulnerable than others to water pollution, such as those comprising the northern and southern Edwards Aquifer as well as Lake Austin, the principal source of our drinking water. Streams in the eastern watersheds are more vulnerable to erosion since creek channels cut through deep clay soils instead of bedrock.

Austin's watersheds are those lands that contribute to and sustain our creeks and lakes. Development anywhere within a watershed can have an impact on the water that flows through it, and consequently, the body of water into which it flows. The protection of these watersheds is therefore critical to the health of the waterways. Austin's citizens were among the first in the nation to recognize the connection between well-planned and designed development and continued high water quality and protection from flooding and erosion.

Austin's waterways and aquifer stretch across multiple districts, as illustrated on the map on the opposite page. This means that implementation of solutions to address flooding, erosion, and water quality problems may necessitate participation of multiple districts. Likewise, given the fluid nature of water as well as the regional attraction of Austin's beloved natural resources, solutions with a limited geographic scope can often generate benefits for a much broader area.



Watershed Features

-  10-1 Council Districts
-  Watershed Boundary
-  Lakes & Rivers
-  Edwards Aquifer Recharge Zone
-  Creeks

January 1, 2015

0 1 2 4 6 8 Miles





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For more than three decades, the City of Austin has been recognized as a national leader in watershed protection. From the 1970s to today, the City's flood, erosion, and water quality protection efforts have matured with the passage of protective regulations, development of comprehensive programs, and with dedicated funding for capital improvement projects. The mission of the Watershed Protection Department (WPD) is to protect lives, property, and the environment of our community by reducing the impacts of flood, erosion, and water pollution.

Flood Mitigation

The WPD goal for flooding is to protect lives and property by reducing the impact of flood events. Austin is located in an area known as "flash flood alley." Its unique combination of intense rainstorms, steep slopes, and slow-draining soils make it especially prone to severe flooding conditions. Most people who live in Austin have witnessed firsthand or seen reports of flooding of homes, roads, or other property. Floods in 1981 (the "Memorial Day Flood") and 2013 (the "Halloween Flood") are reminders of the public safety and property hazards associated with flooding. Flooding can occur in both the primary and secondary drainage systems. Creek flooding problems are associated with the primary system (major creeks and their tributaries) while local flooding problems are associated with the secondary drainage system (storm drains and minor channels).



Onion Creek floodwaters overtopping William Cannon Dr.

Stream Erosion Control

The WPD goal for erosion control is to protect channel integrity and prevent property damage resulting from erosion. Many of Austin's streams exhibit erosion, especially in the older urban core in areas developed prior to the advent of protective regulations. Erosion problems typically stem from increased stormwater runoff from urbanization and/or placement of structures and utilities too close to streambanks. Excessive channel erosion not only threatens creekside resources but also harms water quality and aquatic ecosystems.



Eroding streambank along Fort Branch Creek

Water Quality Protection

The WPD goal for water quality control is to protect and improve Austin's waterways and aquifer for citizen use and the support of aquatic life. Exemplary surface and groundwater quality has always and continues to be central to Austin's identity and well-being. Clear, flowing water is vital to human and ecological health, property values, and tourism. Since at least the early 1970s, Austin recognized that uncontrolled urbanization threatens water quality and, with it, these invaluable community resources: our lakes, rivers, creeks, and springs. Sources of water quality problems are numerous and complex to study and control. Key concerns include increases in runoff, sediment, nutrients, metals, litter, bacteria, and degradation of aquatic and riparian habitat.



Campbell's Hole in the Barton Creek Greenbelt

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Solutions to watershed problems are grouped into three categories: capital projects, programs, and regulations. The Watershed Protection Department uses a “needs-based” prioritization approach for solutions that identifies the most severe flooding, erosion, and water quality problems in the City. The best available technical data is used for this prioritization.

Preferred solutions consider the nature and context of a given watershed problem; its potential solution types (capital, regulatory, or programmatic); the strengths, feasibility, and possible negative impacts of these solutions; and community considerations for the area in which the solution is proposed. Solutions are also assessed for their ability to implement the vision, goals, and priorities of the Imagine Austin Comprehensive Plan.

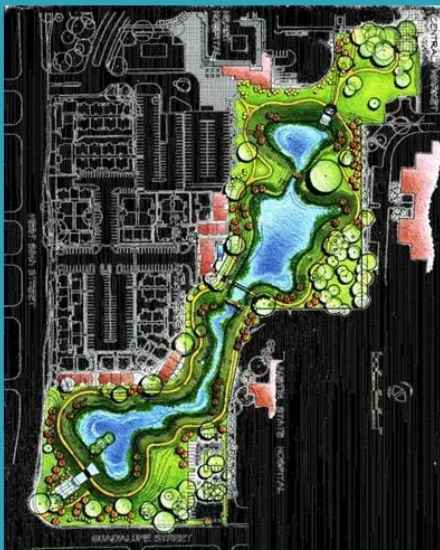
Partnerships are a valuable tool that can boost the impact, success, and cost-effectiveness of capital projects, programs, and regulations. The Watershed Protection Department partners with other City departments, private developments, governmental agencies, non-profits, neighborhoods, and community groups.

Capital Projects design, construct, and improve infrastructure and other capital-intensive assets. Examples include: storm drain systems; stream channel and riparian restoration; flood detention ponds; low-water crossing upgrades; dam safety repairs; water quality controls; and buyouts of properties threatened by flood or erosion or to protect water quality.

Programs are a broad set of activities implemented by City staff. Examples include: infrastructure maintenance and inspections; planning and technical analysis; flood and water quality monitoring; spills response; and public education.

Regulations are the legal framework to enforce City codes and rules. Examples include: flood detention requirements; floodplain restrictions; drainage conveyance design requirements; erosion hazard protections; structural water quality controls; stream and sensitive environmental feature setbacks; impervious cover limits; control of illegal discharges; and drainage and environmental criteria to clarify how to comply with code requirements.

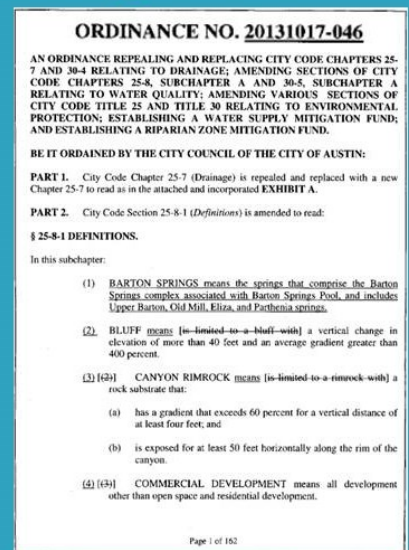
Capital Projects



Programs



Regulations

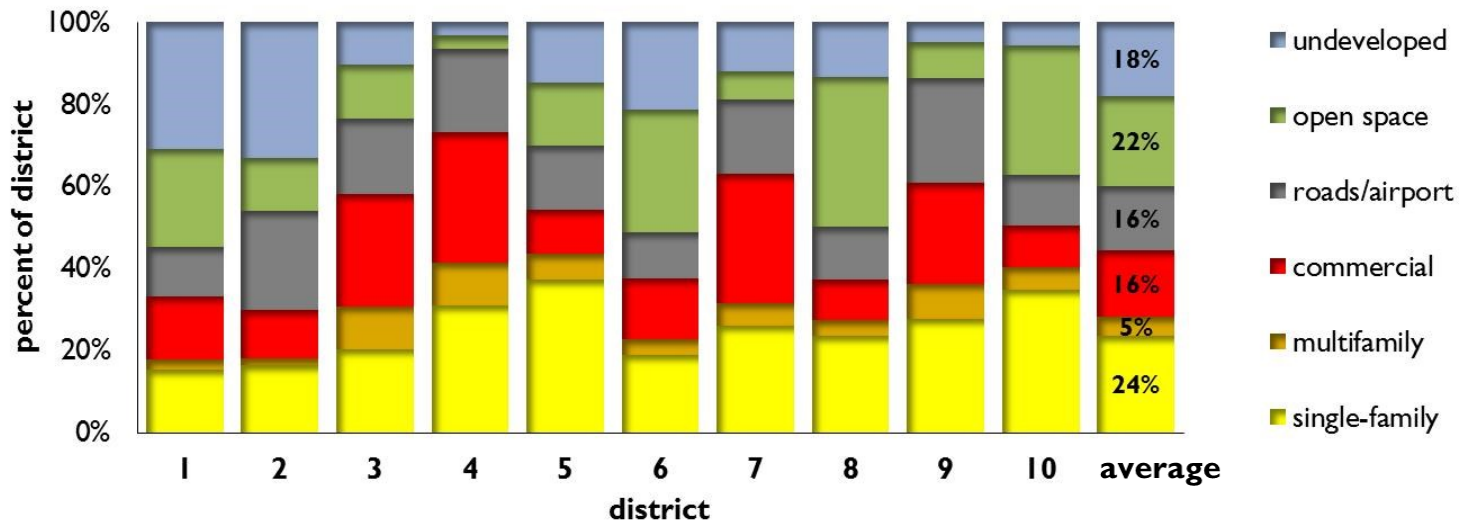


Partnerships

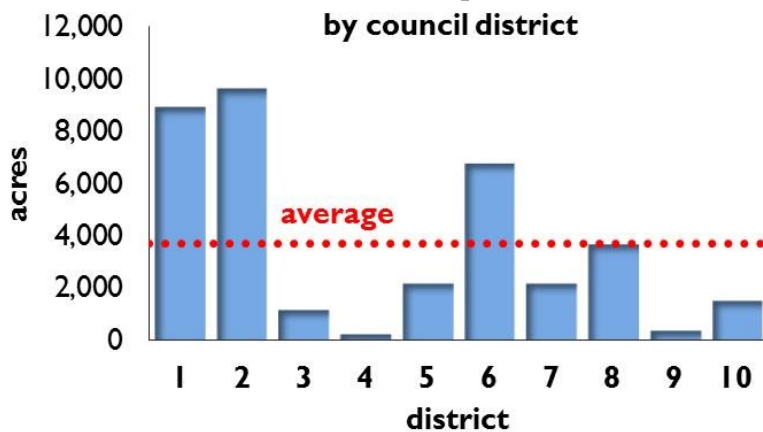
Watershed Protection Citywide Profile

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land use distribution by council district

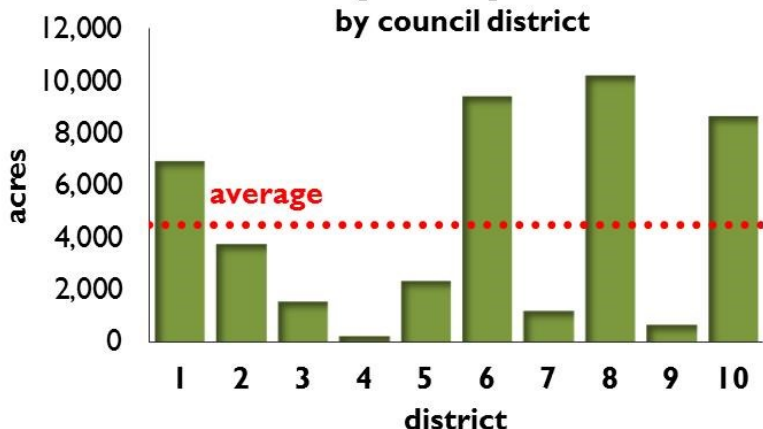


undeveloped land by council district



Preferred solutions can vary significantly with land use as well as the age of development. For undeveloped land, watershed regulations for new development provide important protections for water quality, erosion, and flooding and help prevent the need for future capital projects. For older development constructed before watershed regulations were in place, capital solutions such as storm drain upgrades and streambank stabilization are a key tool. Programs such as public education and outreach can be tailored to specific problems associated with different land uses.

open space by council district

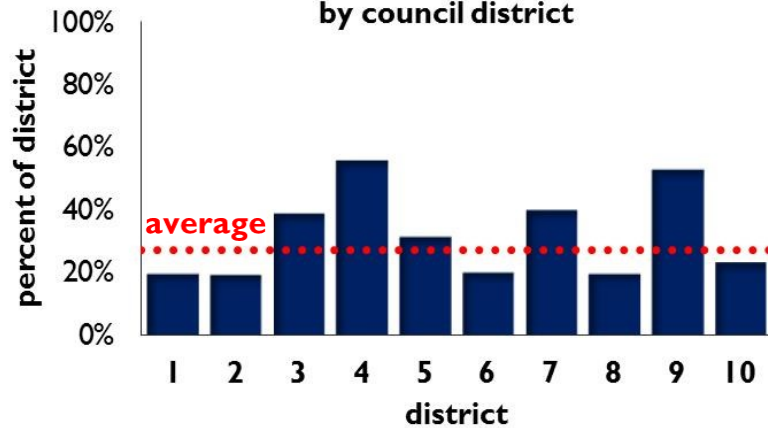


Natural open space protects water quality and mitigates stormwater runoff with vegetation and soils to slow and infiltrate rainfall. Watershed regulations preserve open space by protecting a variety of environmentally sensitive areas during the development process, including creeks, floodplains, springs, wetlands, caves, steep slopes, and trees. In addition, the City of Austin purchases environmentally sensitive land that protects both the quantity and quality of water recharging the Edwards Aquifer. The voters of Austin have approved \$158 million since 1998 and, as a result, 25 percent of the Barton Springs recharge zone (28,000 acres) is now permanently preserved as Water Quality Protection Land.

Watershed Protection Citywide Profile

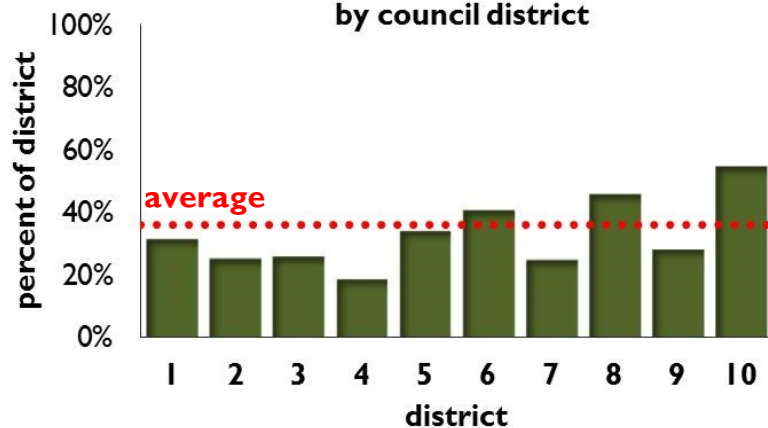
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impervious cover by council district



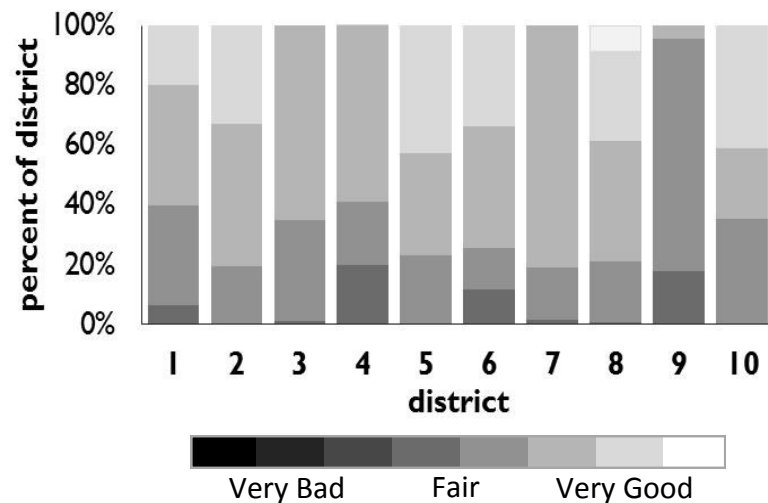
Impervious cover is any surface that prevents the infiltration of water into the ground, such as roads, parking areas, and buildings. When rainwater falls on impervious surfaces, it picks up contaminants like sediment, bacteria, nutrients, and metals, which can have a significant impact on the water quality of Austin's aquifer and creeks. The increase in velocity and volume of stormwater runoff from these surfaces also contributes to erosion and flooding. To minimize the negative effects of stormwater and to promote infiltration, watershed regulations place limits on impervious cover.

tree canopy by council district



Trees can help reduce stormwater runoff and enhance groundwater recharge by breaking the impact of raindrops and improving soil structure. Trees can act as natural stormwater management areas by filtering particulate matter, including pollutants, some nutrients, sediments, and pesticides, and by absorbing water. In addition, the establishment of dense trees, shrubs, and ground cover along creeks provides many benefits, such as reducing stream bank erosion, improving the area's soil and water quality, increasing wildlife habitat, and slowing down flood waters.

creek health by council district



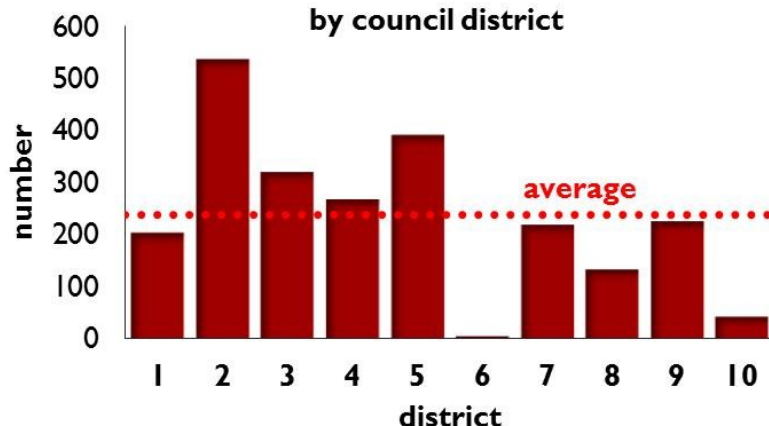
Creek health is measured by the Watershed Protection Department using the Environmental Integrity Index (EII). The EII is a tool developed by the City of Austin to monitor and assess the health and impairment of Austin's creeks. High EII scores represent more fully functional and less degraded creeks. Watershed regulations establish stream buffers that keep buildings and parking lots set back from waterways. These stream buffers promote healthy soils and vegetation along the creek corridor and allow the stream adequate space to migrate over time.

Watershed Protection Citywide Profile

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flooded structures

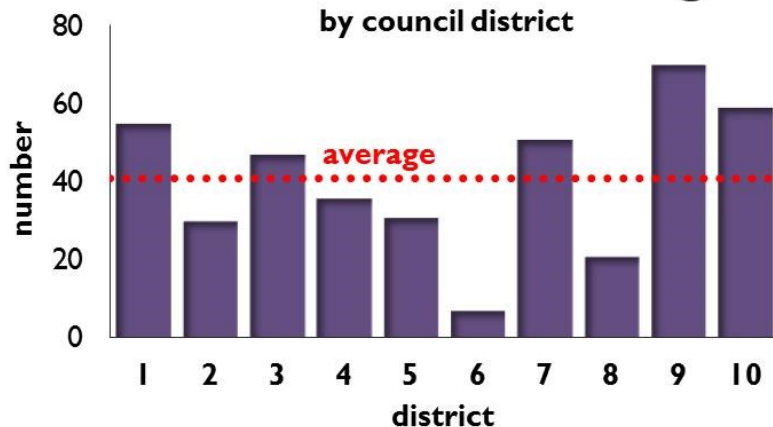
by council district



Flooding problems in major creek systems are identified using computer models. These models predict when flood levels become high enough to overflow creek banks and flood nearby structures (e.g., homes and other buildings). Over the past thirty-five years, the City has developed floodplain models and maps for almost all the major watersheds within Austin. Flood assessments identify the depth and frequency of flooding for all structures and roadway crossings. This problem severity data is then used to calculate flood problem scores, weighted by the frequency of flooding and the type of resource threatened. Encroachment of new buildings and parking areas is prohibited in the 25-year floodplain and significantly restricted in the 100-year floodplain.

flooded road crossings

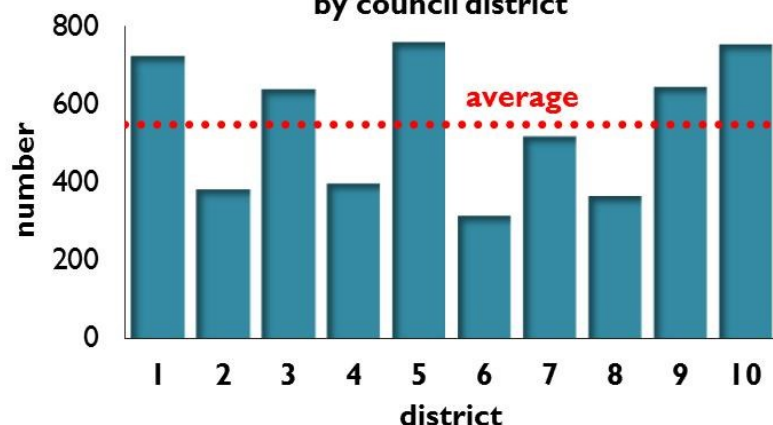
by council district



Outside of the creek itself, the depth of water is usually more of a threat to public safety than the velocity of water. However, at roadway crossings, the velocity of water can be just as hazardous as the depth of water across the roadway. Approximately 75 percent of all flood-related fatalities occur in vehicles. Shallow water can be deceptively swift and easily wash a vehicle off the road. Water over a roadway can also conceal damage to the roadway or supporting structure. If you encounter a flooded low water crossing, turn around — don't drown. [ATXFloods](#) is an interactive map of low water crossings in Austin that displays current flood information and emergency road closures during storm events.

drainage complaints

by council district

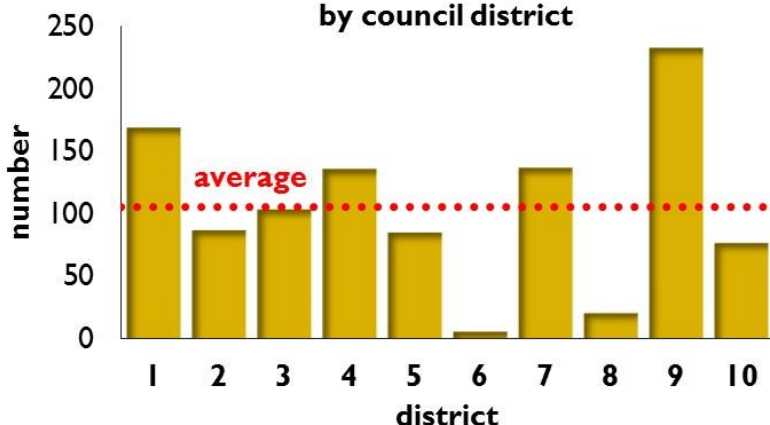


Local flooding occurs when rainfall overwhelms smaller drainage systems, such as storm drain pipes and small open channels. The most longstanding source of data for local flood problems is that of citizen complaint calls to 3-1-1. Watershed Protection staff investigate each call to determine, if possible, the source and severity of the flooding. The investigator also seeks to identify potential remedies. Once a cause has been determined, the complaint is routed to the appropriate work group within the department. This can be as simple as creating a work order for crews to clear a clogged inlet or it may need more detailed engineering analysis.

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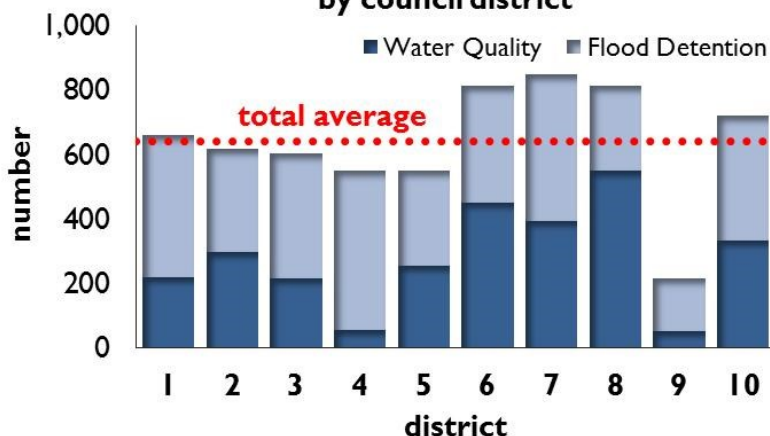
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erosion sites
by council district



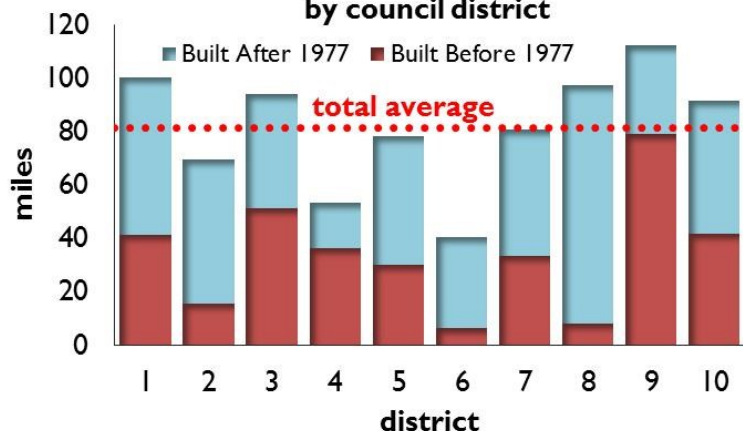
To help identify erosion concerns, Watershed Protection conducts erosion assessments of existing and potential future threats. Approximately 1,100 erosion sites have been verified and catalogued to date. Watershed regulations require new development to account for future erosion by calculating the Erosion Hazard Zone of the waterway, which is the area near a creek where erosion is expected to occur and possibly pose a hazard to improvements, such as houses, roadways, or utility infrastructure. Property and infrastructure can be protected by keeping it out of the Erosion Hazard Zone or safeguarding the development should erosion occur.

stormwater ponds
by council district

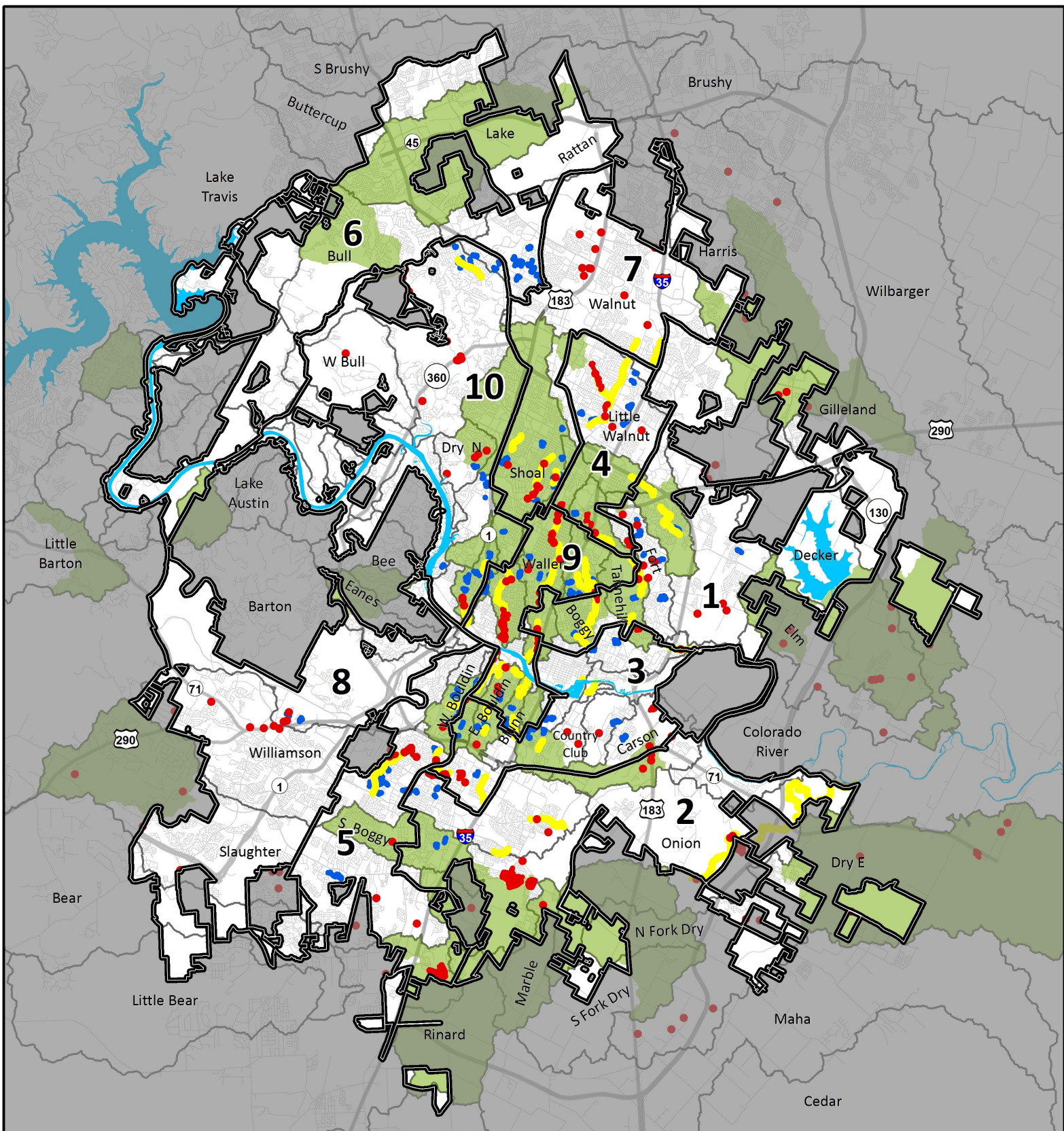


Watershed regulations require structural controls or “ponds” for new development to address flood mitigation, water quality, and erosion control. Flood detention ponds reduce flood hazards associated with large storm events by reducing the peak flows associated with these storms. Water quality controls improve water quality by removing suspended particulate matter and associated constituents such as bacteria, nutrients, and metals. The volume of stormwater captured by water quality controls is also effective in preventing downstream erosion impacts. Note that most ponds do not hold water for more than two days and the latest generation of green controls look more like landscaped areas than holding basins.









storm drains
by council district



The secondary, or “local” drainage system is composed of pipes, curb inlets, manholes, minor channels, roadside ditches, and culverts. Watershed Protection operates and maintains approximately 1,000 miles of storm drain pipes, ranging in diameter from six inches to the 24-foot Waller Creek Tunnel. In addition to minor channels and ditches, the system includes over 27,000 curb inlets. This system is intended to convey stormwater runoff to the primary drainage system, the creeks. Beginning in 1977, the City required all new systems to be built according to formal drainage criteria, which greatly reduced the creation of undersized and substandard systems.



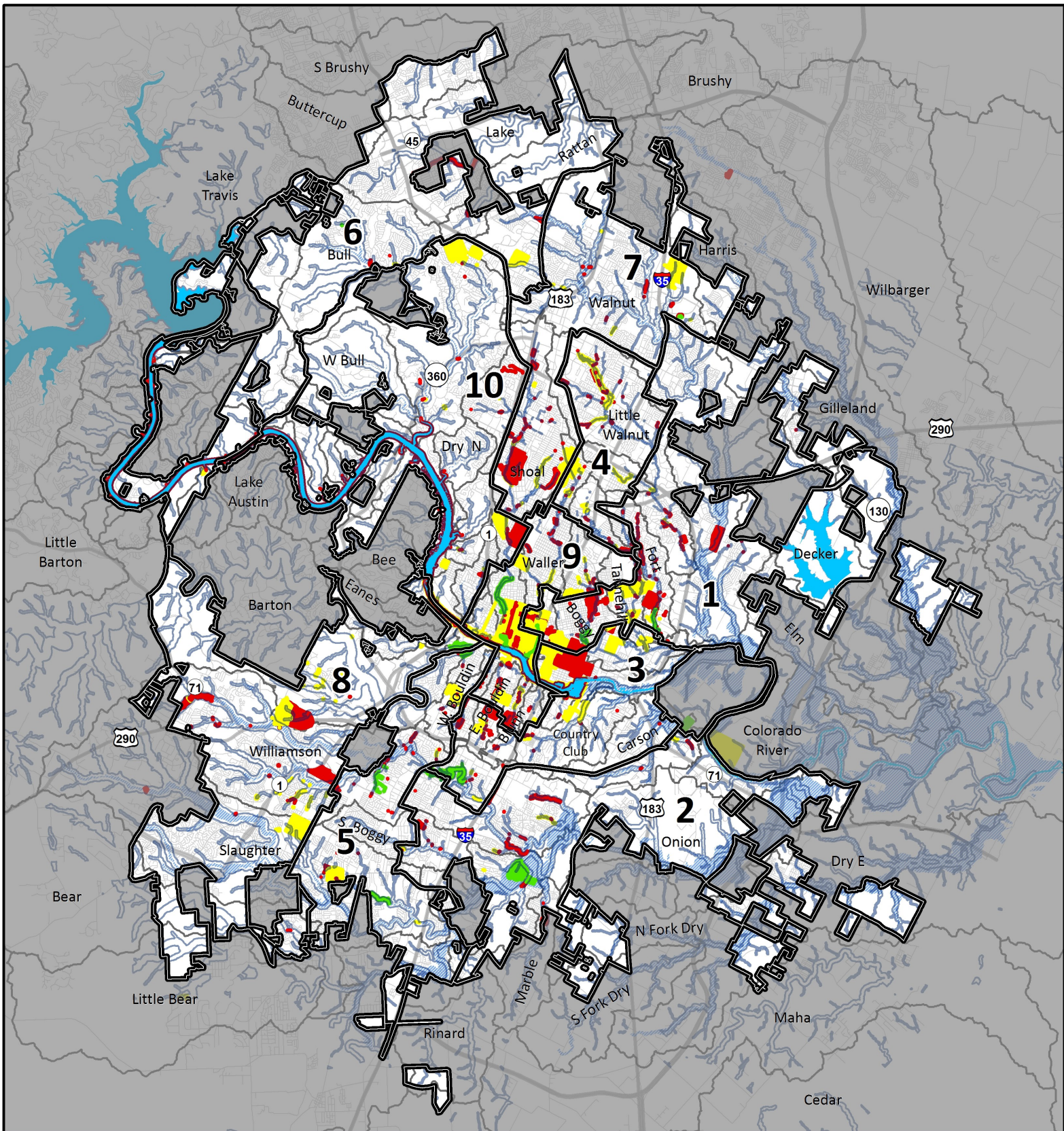
Priority Watershed Problems

- | | |
|---|--|
|  Water Quality |  10-1 Council Districts |
|  Erosion |  Watershed Boundary |
|  Creek Flooding |  Lakes & Rivers |
|  Localized Flooding |  Creeks |

January 1, 2015

0 1 2 4 6 8 Miles





Watershed Protection Solutions

January 1, 2015

- | | |
|---|---|
| Completed Projects | # 10-1 Council Districts |
| Projects Underway | Watershed Boundary |
| Planned Projects (5 Years) | Lakes & Rivers |
| Creek Buffers | Creeks |
| 100-Year Floodplain | |

0 1 2 4 6 8 Miles





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Barton Springs Pool, often called the "Soul of the City"

Additional Resources

Watershed Protection Department

austintexas.gov/watershed

Find Your Watershed

www.austintexas.gov/GIS/FindYourWatershed/

Creek Flooding

austintexas.gov/departments/creek-flooding

Localized Flooding

austintexas.gov/stormdrains

Flood Information and Road Closures

www.atxfloods.com

Stream Erosion

austintexas.gov/departments/erosion-control-stream-restoration

Water Quality

austintexas.gov/departments/environmental-resource-management

Field Operations

austintexas.gov/departments/field-operations

Policy and Planning

austintexas.gov/departments/watershed-policy-planning

24-Hour Pollution Hotline: 512-974-2550

Staff in the Spills and Complaints Response Program respond to citizen pollution complaints and spills that threaten our creeks or water bodies, 24 hours a day, seven days a week.

Report a drainage problem: 3-1-1

Call 3-1-1 to report flooding, erosion, and other drainage problems such as debris blocking the flow of water in a creek, a clogged inlet or culvert, standing water in a pond (for more than 72 hours), or high vegetation.

Sign up for ATXFloods Alerts: atxfloods.com/alerts

ATXFloods Alerts notifies the public of road closures due to flooding and rapidly rising creeks within the Austin city limits. You can choose to receive notifications through text, email message, and/or phone.