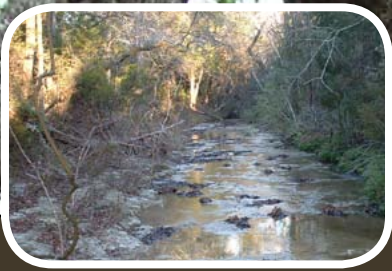


The City of Austin State of Our Environment Report



2013



Prepared for

City Council

Mayor

Lee Leffingwell

Mayor Pro Tem

Sheryl Cole

Council Members

Mike Martinez

Laura Morrison

Chris Riley

Bill Spelman

Kathie Tovo

City Manager

Marc Ott

Prepared by

Chuck Lesniak, Environmental Officer

Watershed Protection Department

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With special thanks to the following people for their help in creating this report:

Watershed Protection

Nathan Bendik

Mary-Love Bigony

Mary Gilroy

Nico Hauwert

Chris Herrington

Aaron Hicks

David Johns

Lucia Athens

Stephanie Lott

Mike Personett

Aaron Richter

Mateo Scoggins

Marilla Shepherd

Jessica Wilson

Erin Wood

Austin Energy

Eric Stager

Austin Water Utility

Tina Bui

Lisa O'Donnell

Amanda Ross

Mark Sanders

Kevin Thuesen

Parks and Recreation

Angela Hanson

Leah Haynie

Planning and Development Review

Michael Embesi

Dan Krenzlok

Keith Mars

Transportation

Pharr Andrews

Cari Buetow

Cover Photo

Angela Hanson

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Resources

Environmental Portal

www.austintexas.gov/environment

- Energy
- Green Building
- Zero Waste
- Water
- Climate Protection
- Nature
- Get Involved

Sustainability Portal

www.austintexas.gov/sustainability

What is Sustainability?

Sustainability means **finding a balance** among three sets of goals:

1. Prosperity and jobs
2. Conservation and the environment
3. Community health, equity, and cultural vitality.

It means taking positive, proactive steps to protect quality of life now, and for future generations.

Foreword

Welcome to the State of the Environment Report for 2013! Environmentally speaking it was another active year in Austin. Probably the most significant achievement this year was the City Council approving the **first major overhaul of the City's watershed regulations since 1986**. Led by the Watershed Protection Department, it was two years of incredibly hard work by staff from multiple City departments as well as stakeholders from the environmental and development communities. One of the most impressive things was that the new regulations received **broad support from both these stakeholder groups**, who are often at odds on development issues. The new development regulations increased the protection of more than 14,000 acres of Austin's creek headwaters while also providing greater flexibility for property owners and developers.

This year's State of the Environment Report incorporates components of the Imagine Austin plan and links the Imagine Austin environmental goals to topics in the State of the Environment report. We'll expand this even further next year. I hope you enjoy this new feature.

I also want to mention the **Lake Austin Task Force**. This Council-appointed citizen task force spent almost a year reviewing development and management of Lake Austin and put together a comprehensive list of recommendations for the City Council. Council almost immediately took action to implement many of these recommendations. City staff is now hard at work on a number of code amendments and organizational changes to protect the lake's water quality and improve management of recreation on the lake.

I encourage you to take a little time to read through this report and learn about Austin's environment and the City's effort to protect it. I want to thank the community for their continued support as we work to protect Austin's environment.

I hope you enjoy this year's report,



It has indeed been a "watershed year" for the environment in Austin. The adoption of the new Watershed Protection Ordinance doubles the stream headwaters that are protected in our eastern areas, a huge step forward. At the same time, we are struggling to deal with an extreme drought and record low lake levels, as well as record flooding in the Onion Creek area. A new Habitat Conservation Plan for Barton Springs was completed. While previous efforts have helped increase the population of the Barton Springs and Austin Blind Salamanders, they both remain on the endangered species list.

We continue to experience the interconnected nature of environmental and human health as related parts of a greater whole. As Chief Seattle famously said: "Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect." To meet the challenges of today we must combine ancient wisdom and common sense with the sophisticated science this report shares.



Creeks

Importance

Creeks flow into our reservoirs that provide drinking water, afford critical habitat for aquatic life, and provide recreational opportunities for people. The health of Austin's creeks and riparian areas adjacent to creeks is a direct measure of our success in managing land resources and protecting the environmental health of our community.

Goals

One of the City's broad environmental goals is to protect and improve the quality of water in our creeks. A specific goal of the Watershed Protection Department is to maintain Environmental Integrity Index scores of "good" or better in all monitored creeks.

Imagine Austin!

Policies

- Protect and improve the water quality of the city's creeks, lakes, and aquifers for use and the support of aquatic life.
- Reduce pollution in all creeks from stormwater runoff, overflow, and other non-point sources.
- Enhance the protection of creeks and floodplains to preserve environmentally sensitive areas and improve the quality of water entering the Colorado River through regional planning and improved coordination.

Priority Actions

- Strengthen regulations that protect creeks and floodplains from development by increasing buffer zones and reducing the amount and type of development allowed in these areas.
- Restore trees and vegetation along degraded waterways, especially in eastern watersheds.

Challenges and Responses

Ongoing

Encroachment by development, loss of bank vegetation, increased impervious cover (with associated increases in stormwater runoff), leaking wastewater infrastructure, uncollected pet waste, and improper fertilizer use all result in degradation of water quality. These threats can result in creeks that are not safe for human contact, are choked with nuisance aquatic plants, have unstable eroding stream banks, and have low dissolved oxygen levels that negatively impact aquatic life. The Watershed Protection Department addresses these problems through a combination of solutions including public education, regulations, programs, restoring riparian areas, controlling invasive plants, and capital improvement projects. Learn more at www.austintexas.gov/watershed



This Year

Specific challenges to creek health and City actions in 2013 included:

- On October 17, 2013, the Austin City Council passed a new Watershed Protection Ordinance to improve creek and floodplain protection; prevent unsustainable public expense on drainage systems; simplify development regulations where possible; and minimize the impact on the ability to develop land. See the annual focus below for more information.
- The Texas Commission on Environmental Quality (TCEQ) is required to regularly identify water bodies in Texas that do not support their designated uses. Total Maximum Daily Load (TMDL) is a determination made by the TCEQ of the quantity that a target pollutant must be reduced for a watershed to no longer be impaired. As part of the TMDL process, the City of Austin, in coordination with a wide range of citizen and governmental stakeholder groups, developed a plan to reduce fecal contamination in four Austin creeks identified as impaired. Fecal bacteria in Austin watersheds originates from leaking wastewater infrastructure, uncollected domestic pet waste, wildlife, and humans defecating near creeks. Proposed solutions in the plan include wastewater infrastructure maintenance, public education, restoring vegetation in the riparian areas along creeks, and treating stormwater runoff with engineered solutions. The planning effort is being facilitated by the University of Texas at Austin and the Texas Commission on Environmental Quality. For more information visit www.utexas.edu/law/centers/cppdr/training/tmdl.php
- Watershed Protection Department staff assessed the relationship of *Escherichia coli* fecal indicator bacteria during non-storm conditions in Austin creeks with associated demographic and land use data. The analysis found that impervious cover in riparian areas adjacent to creeks and the density of households are associated with increased fecal bacteria in Austin creeks, while the presence of stormwater control structures is associated with decreased bacteria levels. More information is available here: www.austintexas.gov/watershed_protection/publications/document.cfm?id=203918
- In cooperation with Texas State University, the Watershed Protection Department assessed the potential impact of wastewater effluent on freshwater mussels. Mussels are routinely used as biological indicators of stream health because they are relatively immobile and filter sediments out of the water for food. Results suggest that freshwater mussel survival, growth, and reproduction may be impaired after exposure to wastewater effluent, even high-quality treated effluent. Although wastewater treatment facilities are a necessary component of urban communities and are ultimately beneficial to the environment at the large scale, consideration

Current Environmental Integrity Index Score

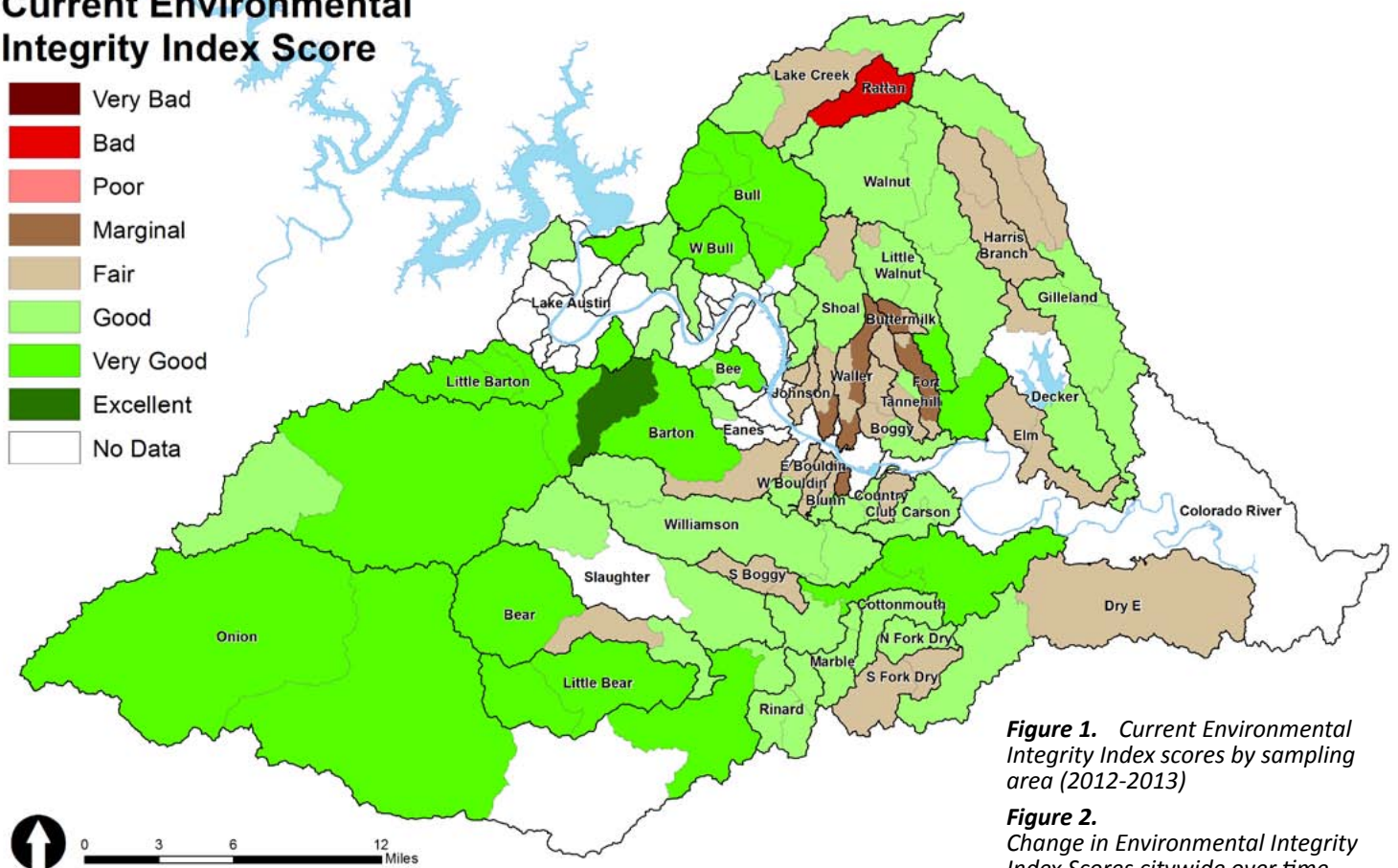
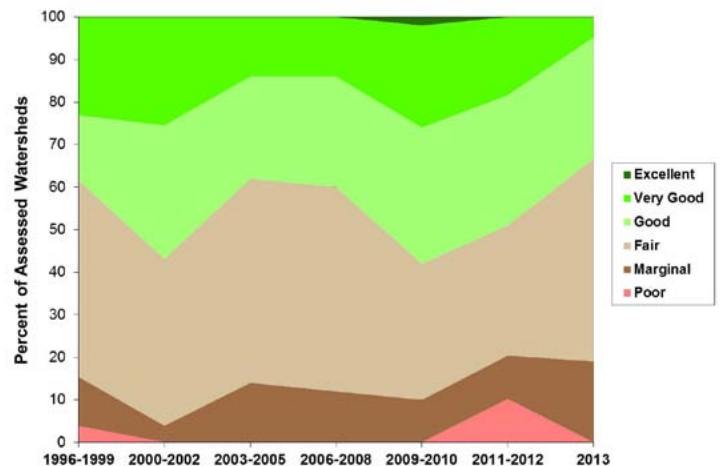


Figure 1. Current Environmental Integrity Index scores by sampling area (2012-2013)

Figure 2. Change in Environmental Integrity Index Scores citywide over time



of their ecosystem impacts on biodiversity and conservation must be taken into account when planning their location and operation. More information is available here: www.austintexas.gov/watershed_protection/publications/document.cfm?id=203919

- Riparian zones are the areas beside streams that serve as a transition between the aquatic and land environments. They have significant influence on the integrity of the adjacent aquatic ecosystem. Traditional field methods of assessing riparian zones in large stream networks may be prohibitively time consuming and expensive. The Watershed Protection Department has developed a computer-based assessment tool to evaluate stream corridor integrity across the entire city using aerial imagery called the Index of Riparian Integrity. The index is a tool that helps Watershed Protection Department identify and prioritize riparian restoration project areas. More information is available here: http://www.austintexas.gov/watershed_protection/publications/document.cfm?id=206342
- The City's Invasive Species Management Plan (ISMP) lays out goals and methods for managing 24 invasive plant species on city property. A critical initial component of the management plan was creation of a database of plant distribution, density and extent. The creation of the database was initiated and completed in the summer of 2013 utilizing 150 trained volunteers, five interns and several city staff members. This group collected more than 2,200 data points on 40 City of Austin-owned priority parcels. Their work details ecological

and demographic patterns that will allow development of sound management practices and efficient utilization of limited resources to address this significant land management problem. More information about invasive plants in Austin can be found here: www.austintexas.gov/invasive

- Environmental monitoring staff with the Watershed Protection Department published a number of new scientific reports in 2013. There are currently more than 330 scientific papers available in our online, searchable database. To read more about Austin's water resources, visit: www.austintexas.gov/watershed_protection/publications/default.cfm

Status and Trends

Despite constantly increasing pressure from Austin's growing population, the quality of Austin's creeks has not declined markedly since the inception of Austin's protective water quality ordinances. The City monitors creek health using the Environmental Integrity Index (EII). The EII assesses water quality, sediment toxicity, contact recreation, aquatic life, physical integrity, and aesthetics by direct field sampling. Using the EII, the City monitors 50 watersheds across Austin on a rotating two-year cycle. EII information is used to track the long-term health of creeks and prioritize areas for specific projects. More information on the EII is available at www.austintexas.gov/department/environmental-integrity-index

The overall EII score is a comprehensive reflection of the health of Austin's creeks. It can be used to identify where problems occur (Figure 1) and may be used to track the success of Austin's water quality protection efforts over time (Figure 2). Only 33% of the watersheds assessed in 2013 maintained "good" or better overall EII scores. The continuing extreme drought throughout much of 2013 resulted in the majority of Austin's creeks going dry, and severely depressed EII scores.

Annual Focus

In 1986, the City of Austin passed the Comprehensive Watershed Ordinance. Since that time, much has been learned about best approaches to the protection of waterways, riparian areas, and floodplains. Central lessons have been the need to prevent problems before they are created; and that development activity should not increase impacts to public and private property from flooding and stream erosion or create additional public expense and environmental degradation.

On October 17, 2013, the Austin City Council passed a new Watershed Protection Ordinance to improve creek and floodplain protection; prevent unsustainable public expense on drainage systems; simplify development regulations where possible; and minimize the impact on the ability to develop land. The Watershed Protection Ordinance is the result of a resolution approved by City Council on January 13, 2011. The City held an extensive series of stakeholder meetings with more than 200 participants from August 2011 through June 2013 to obtain public input. The ordinance is organized around the seven major themes of the Council resolution:

1. **Creek Protection.** One major cornerstone of the new ordinance is the extension of the critical water quality zone to headwaters streams with 64 acres of drainage citywide—doubling the protected stream mileage in the eastern Suburban watersheds. Another fundamental part of the ordinance is the establishment of the erosion hazard zone and the prohibition on development within this setback.
2. **Floodplain Protection.** Another major revision of the ordinance is to strengthen rules for floodplain modification to better protect waterways and enable the recovery of degraded systems. Modification must be offset through on-site restoration or off-site mitigation where restoration is infeasible.
3. **Development Patterns and Greenways.** The ordinance added several provisions to promote the connectivity and local food goals of Imagine Austin, including clarification that trails and sustainable urban agriculture are permitted conditionally within the critical water quality zone.

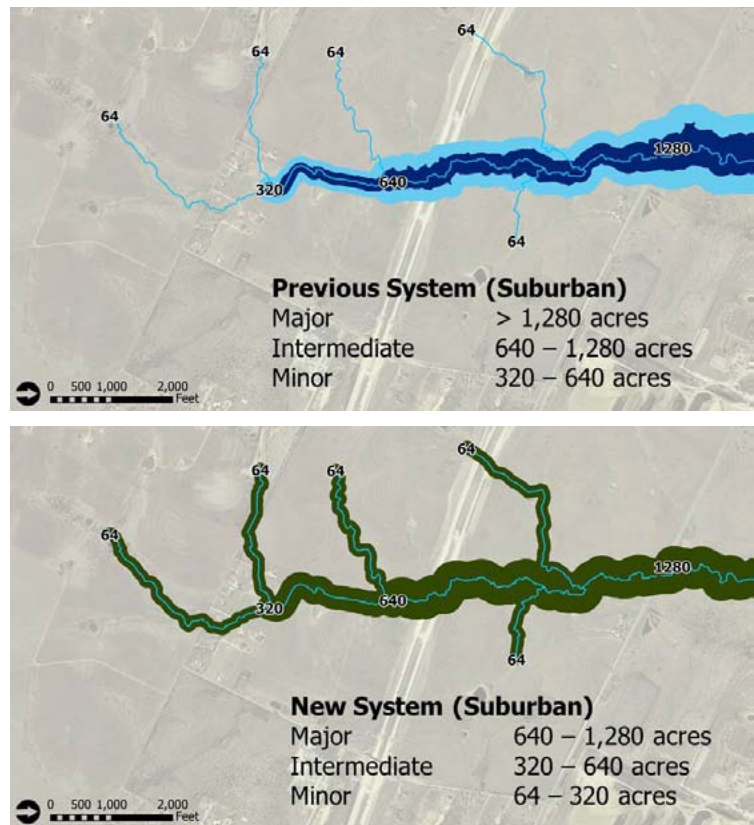


Figure 3. (top) Example of the previous and new stream buffers on a Suburban waterway.

4. **Improved Stormwater Controls.** To improve structural stormwater controls, the ordinance revised the current threshold for water quality controls from 20 percent of net site area to 8,000 square feet, required controls to be accessible for maintenance and inspection, and required maintenance plans and third-party inspections for sub-surface controls. In addition, the ordinance removed the requirement for isolating the water quality volume from larger flood flows.
5. **Mitigation Options.** The Watershed Protection Ordinance will improve the existing, limited transfers of development intensity sections within the Code to allow for increased flexibility and protection of additional environmental resources (e.g., floodplains). Transfers of development intensity allow for increased impervious cover in the uplands in exchange for permanently protecting sensitive environmental resources as open space.
6. **Simplifying Regulations and Maintaining Opportunity.** In order to offset impacts from the new core protections of this ordinance, a number of trade-off provisions are available in the eastern Suburban watersheds, including:
 - Using gross site area instead of net site area to calculate impervious cover
 - Eliminating the Water Quality Transition Zone
 - Allowing "buffer averaging" to reduce the width of buffers by up to one-half if the overall amount of area protected remains the same
 - In addition to these offsets, a large number of clarifications and corrections of existing code and policy interpretations were adopted as well.
7. **Coordinate with Regional Partners.** Staff worked closely with Travis County and the Lower Colorado River Authority throughout the ordinance development process to align and coordinate regulations where possible.



Lakes and Rivers

Importance

Austin has four lakes—Lake Austin, Lady Bird Lake, Lake Travis, and Lake Walter E. Long (also known as Decker Lake). Lake Austin, on the main stem of the Colorado River, is currently the sole source of drinking water for Austin, although a new water treatment plant is under construction that will withdraw water from Lake Travis. All of the lakes in the Austin area are regionally important recreation resources and provide critical habitat for fish and wildlife. Lake Walter E. Long also provides cooling water for an Austin Energy power plant. The lakes are the primary receiving water for stormwater runoff from urban areas, and pollutants from that runoff can collect in lake sediments for long periods of time.

Goals

The Watershed Protection Department’s three main goals for lakes are to maintain water quality, manage invasive plants, and control trash. Specifically, Austin Lake Index scores should be “good” (64) or higher, invasive plants should not impair recreation, and Visual Index of Pollution scores should be 2 or less. Lower Visual Index of Pollution scores indicate less trash.

Imagine Austin!

Policies

- Protect and improve the water quality of the city’s creeks, lakes, and aquifers for use and the support of aquatic life.
- Reduce pollution in all creeks from stormwater runoff, overflow, and other non-point sources.
- Enhance the protection of creeks and floodplains to preserve environmentally sensitive areas and improve the quality of water entering the Colorado River through regional planning and improved coordination.

Challenges and Responses

Ongoing

Increasing nutrient concentrations change the composition and quantity of nuisance algae. As algae increase, lakes become less clear and dissolved oxygen can be reduced. This places stress on aquatic life and can increase water treatment costs. In Lake Walter E. Long, treated wastewater effluent from may also increase algae because the intake to fill the lake comes from a site on the Colorado River that is 2.5 miles downstream of the wastewater treatment plant outfall.

In addition to algae, invasive aquatic plants, toxic pollutants, trash, and drought conditions are ongoing problems. Invasive vegetation alters natural habitat and reduces recreational opportunities. Toxic pollutants can accumulate in sediments at the bottom of the lakes. The City collects hundreds of tons of trash and debris each year from Lady Bird Lake. Drought negatively impacts the lakes, reducing the flow through the lake and increasing temperatures. Drought may result in increased aquatic plant growth, negatively impacting recreation.

This Year

- Hydrilla is a rapidly growing invasive aquatic plant that is managed with lake drawdowns and stocking of sterile Asian grass carp, which preferentially eat Hydrilla. In 2012, Hydrilla reached a historic high, covering more than 580 acres of Lake Austin. In August 2013, an additional 9,000 sterile Asian grass carp were added to the lake. No Hydrilla was observed during the September 2013 Texas Parks and Wildlife survey of Lake Austin. Although Hydrilla will return, stocking appropriate rates of grass carp has now been demonstrated to be a successful control strategy (Figure 1). For more information on Hydrilla infestation on Lake Austin, visit www.austintexas.gov/hydrilla

Acres of Lake Austin covered by Hydrilla and Number of Asian Grass Carp Added

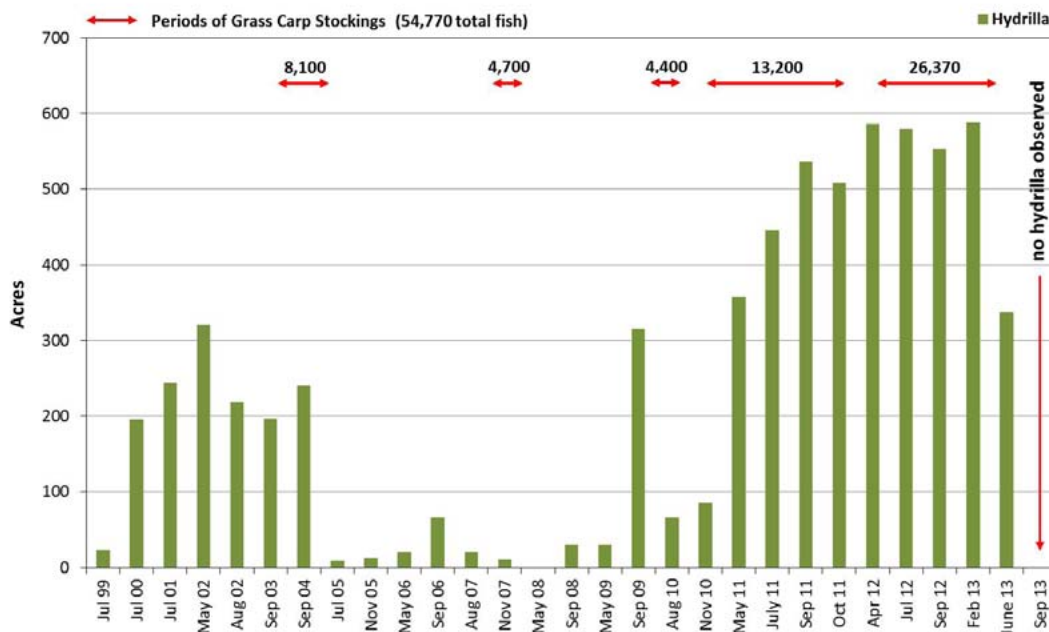


Figure 1. Acres of Lake Austin covered by the invasive Hydrilla plant and number of Asian grass carp added to eat the plant over time.

- The Lake Austin Task Force was commissioned by the Austin City Council to develop recommendations for future regulatory controls and enforcement mechanisms relevant to Lake Austin to promote, preserve, and protect this critical public asset. The task force consisted of citizen stakeholders representing a broad range of interests on the lake. In August 2013, the Lake Austin Task Force published a final report providing recommendations to Austin City Council to improve management of Lake Austin. City staff are now working on revising the Land Development Code to implement some of the recommendations of the task force. To read the report, visit www.austintexas.gov/sites/default/files/files/Boards_and_Commissions/LATF_Final_Report_Updated_August_2013_Rv_1.pdf

- Extreme drought continues to impact the quality and quantity of water in area lakes. (See Annual Focus for more information about the drought.) Under the new Water Management Plan for the Colorado River, the Lower Colorado River Authority continued to curtail the amount of water released from Austin's lakes for downstream agricultural uses. The low flow through Lake Austin contributes to more frequent blooms of microscopic algae, which in turn can contribute to an unpleasant taste and odor in drinking water. The number of days with blooms of microscopic blue-green plankton in Lake Austin was higher in 2013 than ever previously recorded (Figure 2). For more information about the increasing frequency and severity of algae blooms in area lakes, visit: www.austintexas.gov/watershed_protection/publications/document.cfm?id=186294

- The Watershed Protection Department continues to improve the riparian area around Lady Bird Lake by removing invasive plants on the shoreline. In 2013, the City completed a study of the most effective removal methods for invasive giant cane, *Arundo donax*. Covering 3.5 acres of the lake shoreline, the plant grows up to 20 feet tall, creating dense stands that shade out other plants. Read more about the City's findings for the most effective method to control *Arundo* here: www.austintexas.gov/watershed_protection/publications/document.cfm?id=203917

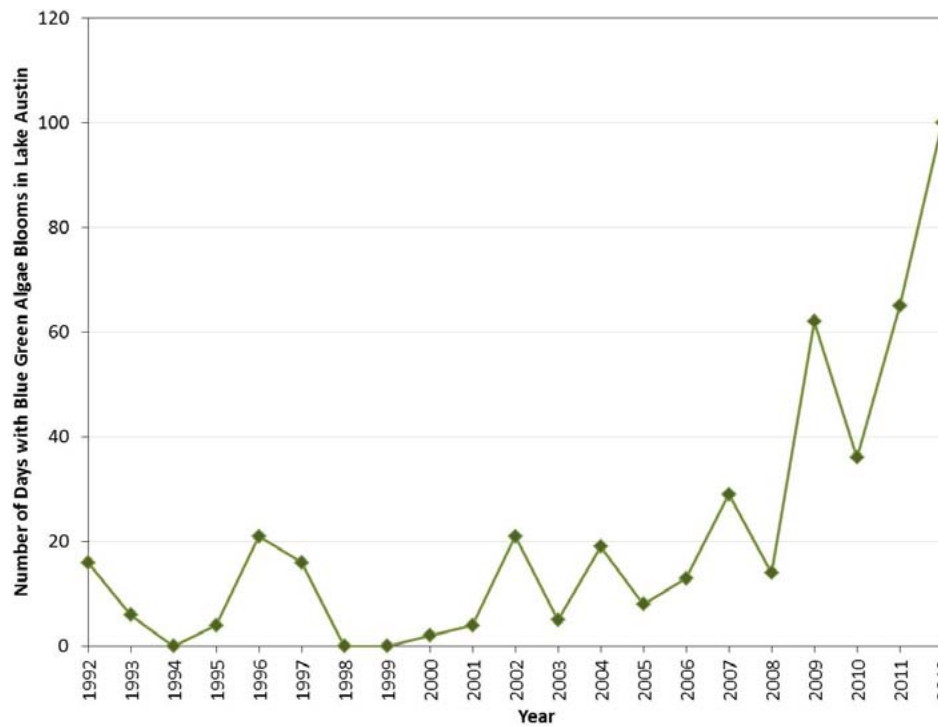


Figure 2. Number of days in which microscopic nuisance blue-green algae blooms occurred in Lake Austin by year.

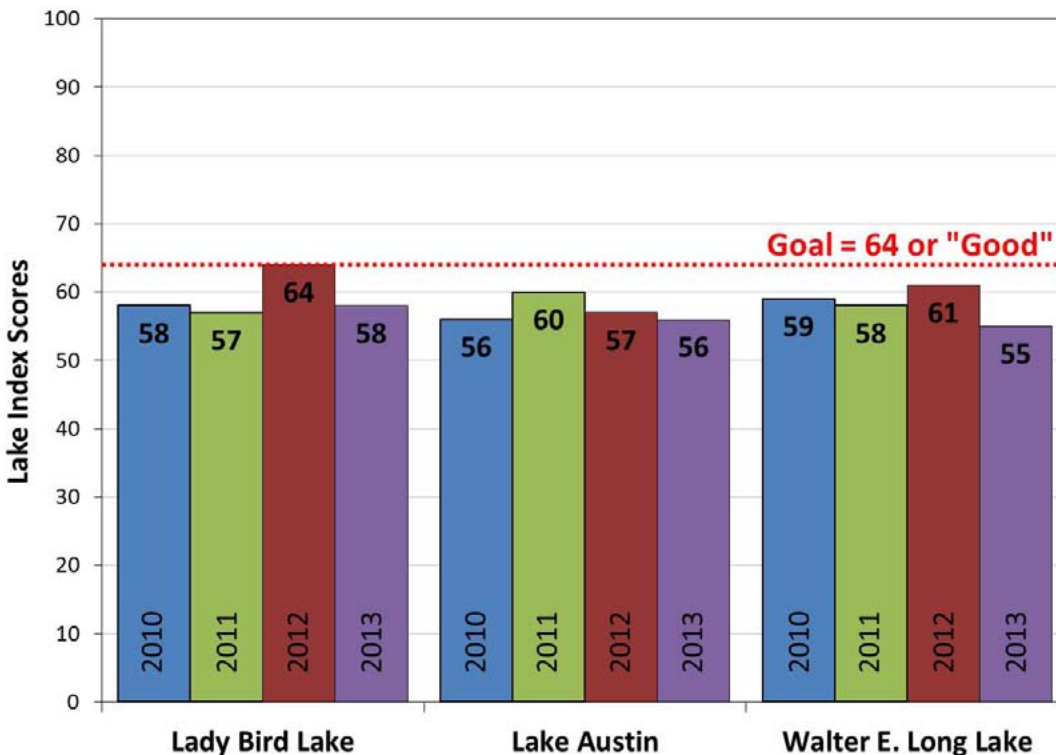


Figure 3. (left)

Overall lake index scores for Lady Bird Lake, Lake Austin, and Lake Walter E. Long from years 2010 through 2013. 100 is the best score and 0 is the worst. The ALI goal is to score 64 or better.

Figure 4. (next page-top left)

Visual Index of Pollution scores for Lady Bird Lake over time. Higher numbers indicate increased trash and debris.

Figure 5. (next page-top right)

Cumulative inflows to Lakes Buchanan and Travis during the current drought versus the 1950s drought of record. Inflows to the lakes during this current drought are rivaling those recorded during the 1950s drought of record, which lasted about ten years. However, after about five and half years into the drought of record (around the 65-month mark in the graph), inflows spiked significantly. By comparison, it has been about six years since the start of the current drought and inflows have not significantly increased, making for an approximately 1.5 million acre-foot difference at this time.

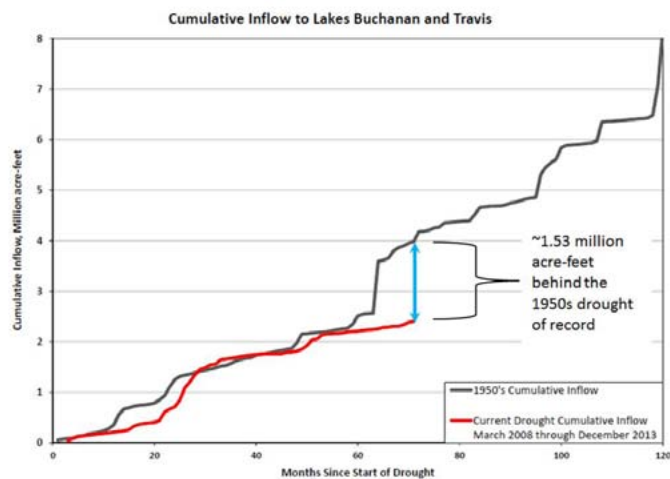
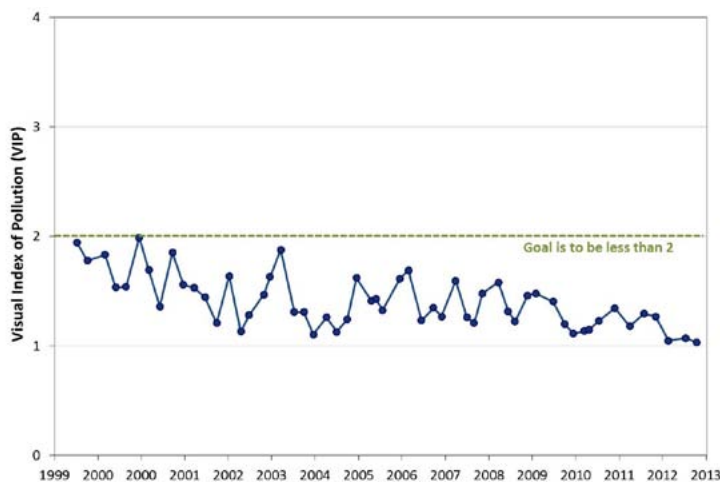
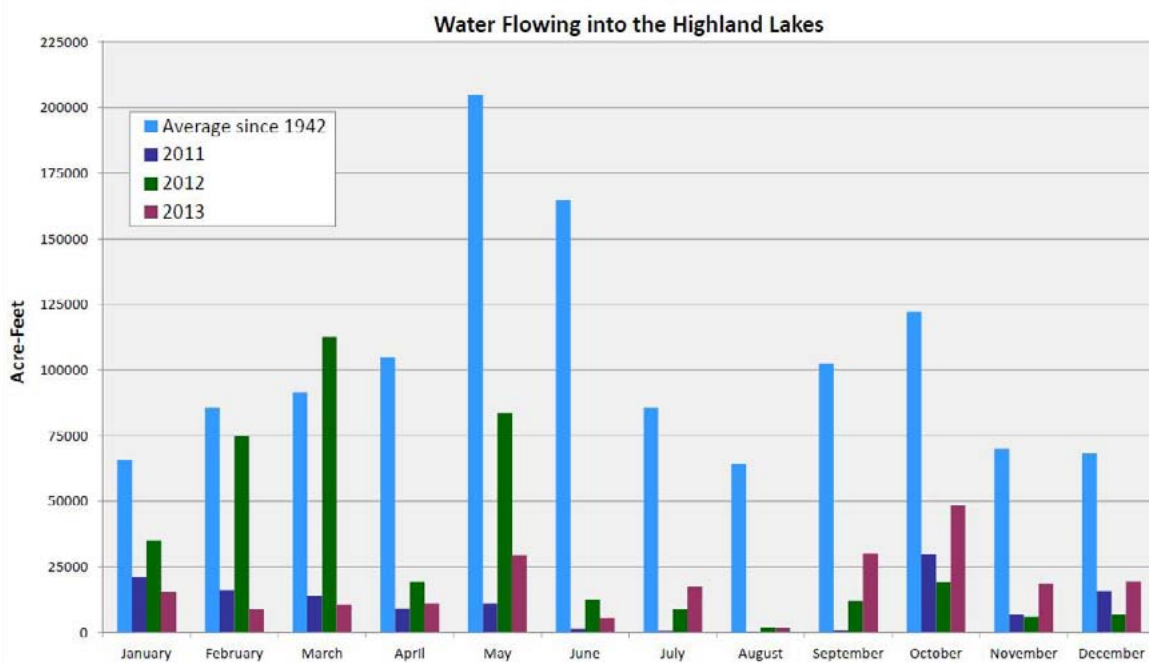


Figure 6. Cumulative inflows to Lakes Buchanan and Travis in 2011 through 2013, compared to average. Source: Lower Colorado River Authority. Inflows continue to be at record lows during the current drought. In 2013, inflows were only about 15 percent of average, making 2013 the second-lowest year for inflows to the lakes.



* Inflows: the estimated amount of water flowing into the Highland Lakes from rivers and streams. Data for 2013 is preliminary and subject to change.

Period:	January - December (in acre-feet)
Period Average:	1,230,301
2011:	127,802
2012:	393,163
2013:	216,353

Status and Trends

Since 2010, three area lakes have been monitored as part of Austin’s Lake Index (ALI). The ALI includes annual monitoring and assessment of aquatic habitat, insects, water quality, sediment quality, invasive vegetation, and floating algae. Higher ALI scores indicate better water quality. As shown in Figure 3, all three lakes yielded lower ALI scores in 2013 than in 2012 and scored in the “fair” range. This is most likely due to the ongoing extreme drought (see Annual Focus). Read more about the specific water quality issues affecting the ALI score for Austin lakes at: www.austintexas.gov/austinlakes

Additionally, trash and aesthetic impacts to Lady Bird Lake are assessed using the Visual Index of Pollution (VIP). The VIP has been ongoing with consistent methods since 1999. Higher scores indicate more trash and debris. Scores have continued to improve (or lower) over time (Figure 4).

Annual Focus

While heavy rains bombarded Central Texas in 2013 on several occasions and resulted in the tragic October floods, the hydrologic drought that began in 2008 continues to grip the region. Inflows into the Highland Lakes, including Lake Travis and Lake Buchanan, remain at record lows. 2013 was the second-lowest year for inflows to the

lakes because the heavy rains experienced in Austin fell largely outside of these watersheds. As further evidence of the severity of this drought, five of the ten lowest years of inflows to the lakes have occurred during the current drought. In comparison, only one of the ten lowest years occurred in the 1950s during what is considered the worst drought previously recorded, known as the drought of record.

Historically low lake levels occurred in 2013, with Lake Travis and Lake Buchanan at only about 764,000 acre-feet or approximately 38 percent full at the end of the year. Barring an unexpected change in weather patterns, this drought is nearing the official drought of record that occurred in the 1950s, when the lowest level that Lakes Travis and Buchanan hit was 621,221 acre-feet. If drought conditions persist, lake levels could fall even lower. In order to break out of this drought, there must be more than a handful of rain events, no matter how major. Only a long season of rain: six months, nine months, a year’s worth will pull the region out of this drought. This is uncharted territory for Central Texas, making it imperative that the citizens of Austin unite to meet this historic challenge.

Learn more about the drought at www.austintexas.gov/department/drought-update.

Aquifers



Importance

The Barton Springs Segment of the Edwards Aquifer is the sole source of drinking water for approximately 60,000 Central Texans. It also provides flow at Barton Springs, which is critical to the habitat of the endangered Barton Springs and Austin Blind Salamanders. Barton Springs is also an iconic recreational resource for Austin, drawing hundreds of thousands of visitors annually and providing more than \$1.5 million in revenue for the Austin Parks and Recreation Department. In northern Austin, small springs discharging from the Northern Edwards Aquifer provide critical habitat for the Jollyville Plateau Salamander, designated as a threatened species by the U.S. Fish and Wildlife Service.

Goals

The principal goal of the Watershed Protection Department for the Edwards Aquifer is to preserve the integrity of the contributing and recharge zones in order to protect water quality and aquifer recharge and to maintain habitat for endangered salamander populations.

Imagine Austin!

Policies

- Protect and improve the water quality of the city's creeks, lakes, and aquifers for use and the support of aquatic life.
- Maintain or enhance the existing rate of recharge in the Edward's Aquifer.
- Conserve Austin's natural resources systems by limiting development in sensitive environmental areas, including the Edwards Aquifer, its contributing and recharge zones, and endangered species habitat.

Priority Action

- Expand and strengthen water quality regulations to achieve non-degradation and protect recharge zones, floodplains, creeks and their headwaters, and other environmentally sensitive areas, including increased buffers and setbacks, restricted land uses with significant spill risks in sensitive environmental areas, and changes in allowed impervious cover.

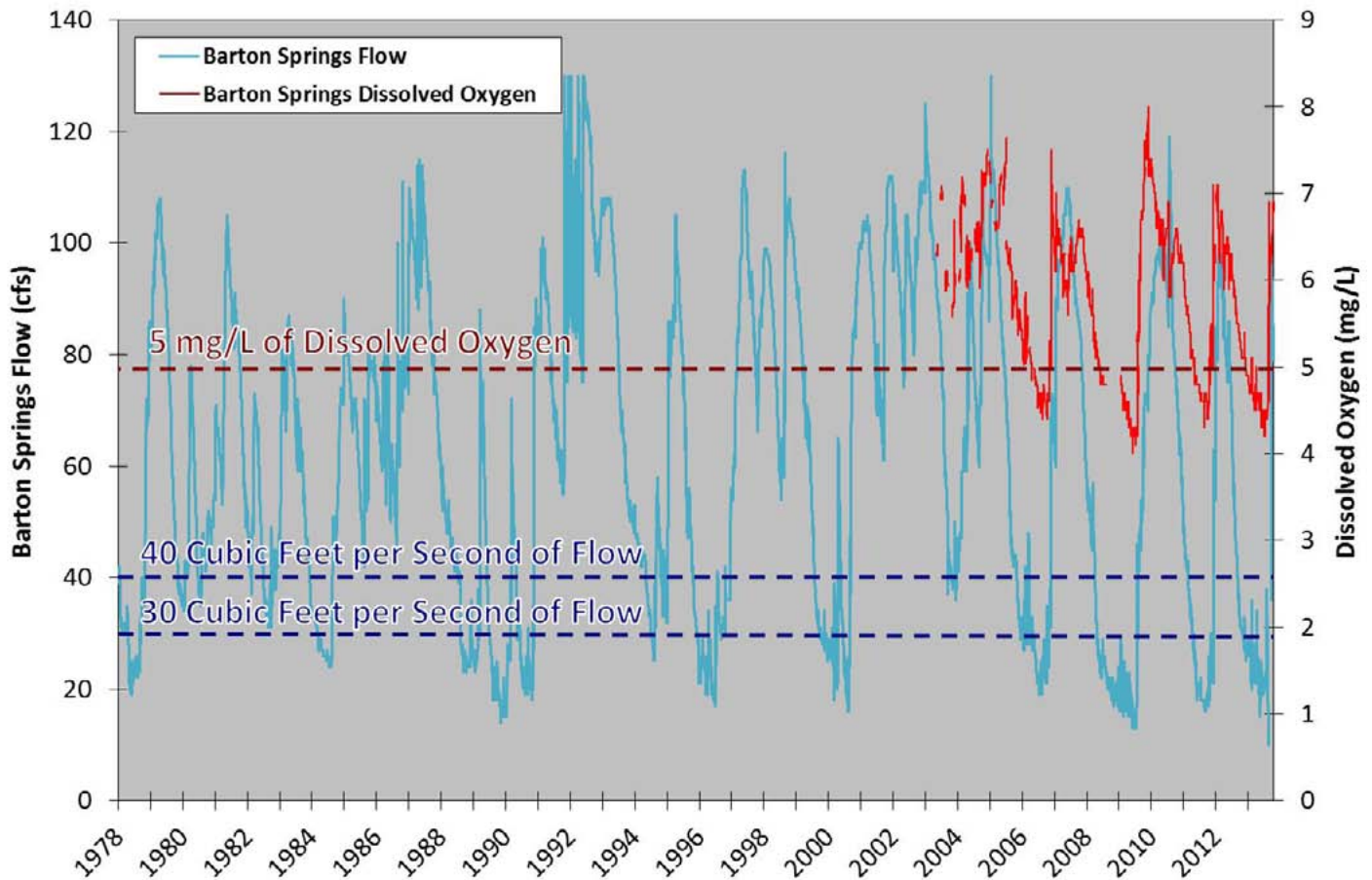


Figure 1. Barton Springs flow and dissolved oxygen over time.

Challenges and Responses

Ongoing

Aquatic salamanders require adequate levels of dissolved oxygen to survive and thrive. Pumping from the aquifer reduces flow and dissolved oxygen in Barton Springs, especially during drought. Development over the aquifer's recharge and contributing zones threatens the quality of water recharging the aquifer, which may in turn negatively affect salamanders.

Barton Springs flow and dissolved oxygen directly affect the habitat and populations of the Barton Springs Salamander and the Austin Blind Salamander. Dissolved oxygen concentrations less than 5 milligrams per liter (mg/L) are of particular concern. When Barton Springs flow is less than 40 cubic feet per second, significant water quality changes become evident. When flow is below 30 cubic feet per second, Barton Springs salamanders are negatively affected by the decrease in dissolved oxygen (Figure 1, previous page).

This Year

- Austin is building a new water treatment plant to withdraw water from Lake Travis. The transmission main carries the water underground to residents and crosses under the Bull Creek Watershed and within the Northern Edwards Aquifer area. Tunneling for the new transmission main was completed in 2013. Environmental monitoring of Bull Creek surface water and groundwater is being conducted to verify that there are no negative impacts to Jollyville Plateau Salamanders from reduced water quality or spring flow as a result of the construction and operation of the transmission main. Learn more: www.austintexas.gov/department/water-treatment-plant-4
- The City of Austin continues to evaluate the potential environmental impact of the proposed extension of State Highway 45 Southwest. The proposed alignment crosses the recharge zone of the Barton Springs Segment of the Edwards Aquifer and could significantly impact Flint Ridge Cave. Watershed Protection staff used tracers flushed with natural runoff to test how long it would take runoff from the proposed highway to reach caves in the area and whether pollutants would be filtered out by the soil. The tracers traveled up to 220 feet laterally through the ground and to a depth of 18 feet into the cave within two hours. The overlying soil filtered little of the runoff. The tracing results indicate that contaminated surface runoff from the proposed highway would readily penetrate the soil with limited pollutant removal, negatively impacting the aquifer. More information about the potential impact of SH 45 SW can be found here: www.austintexas.gov/watershed_protection/publications/document.cfm?id=196481
- In 2013, the City of Austin purchased and permanently protected 607 acres over the recharge zone that was proposed for development by Jeremiah Ventures. If the development had progressed as proposed, wastewater

would have been treated and then disposed of by irrigation directly over the recharge zone. Soils over the recharge zone have a limited ability to reduce the nutrients and contaminants found in wastewater effluent. The development would have been the first major land application of wastewater effluent over the Barton Springs recharge zone, and would have negatively impacted Barton Springs and the Edwards Aquifer. More about permanent protection of land from development can be found in the Open Space section.

- The City of Austin began designing a project in 2013 to increase habitat for the Barton Springs Salamander. The project will “daylight” the outlet pipe from Eliza Spring. The current outlet pipe, which flows from Eliza Springs into the Barton Springs bypass tunnel, is collapsing and infiltrated by tree roots. The project will permanently uncover and remove the pipe located on the north side of Barton Springs Pool and convert the flow back to an open stream. Learn more about the project here: www.austintexas.gov/department/eliza-spring-daylighting
- The City of Austin initiated a project to protect five large sinkholes on the Blowing Sink Preserve in 2013. Protecting sinkholes and other karst features is critical to maintaining recharge into the aquifer. Runoff flows into the aquifer through soils in upland areas, recharge features in creeks, and through karst features like sinkholes and caves. However, karst features can become clogged with soil over time. Historically, some were even filled with trash to prevent livestock from falling into the open holes. For the five sinkholes in question, engineered permanent structures are being constructed that will provide safe access for scientists into the sinkholes, allow wildlife to continue to enter and exit the sinkhole, prevent future clogging with sediment, and discourage illegal entry to the features protecting the public from the 75-foot-deep open shafts. The site has a close hydraulic connection with Barton Springs, based on dye studies nearby. The studies revealed that it took water only 24 to 48 hours to arrive at the springs nearly seven miles away from the area near the Blowing Sink Preserve.

Status and Trends

The City, in cooperation with the United States Geological Survey (USGS), monitors the flow of Barton Springs using automated instruments that take measurements every 15 minutes. Flows at Barton Springs are still driven primarily by rainfall, but pumping of water from the aquifer negatively impacts Barton Springs flow. Access data from the USGS here: waterdata.usgs.gov/tx/nwis/inventory/?site_no=08155500&agency_cd=USGS&

The City also closely monitors the water quality of Barton Springs, as well as habitat conditions and populations of the Barton Springs Salamander and the Austin Blind Salamander. City efforts to protect and improve habitat have resulted in a significant improvement in populations of the Barton Springs Salamander since 1997, when it was listed as an endangered

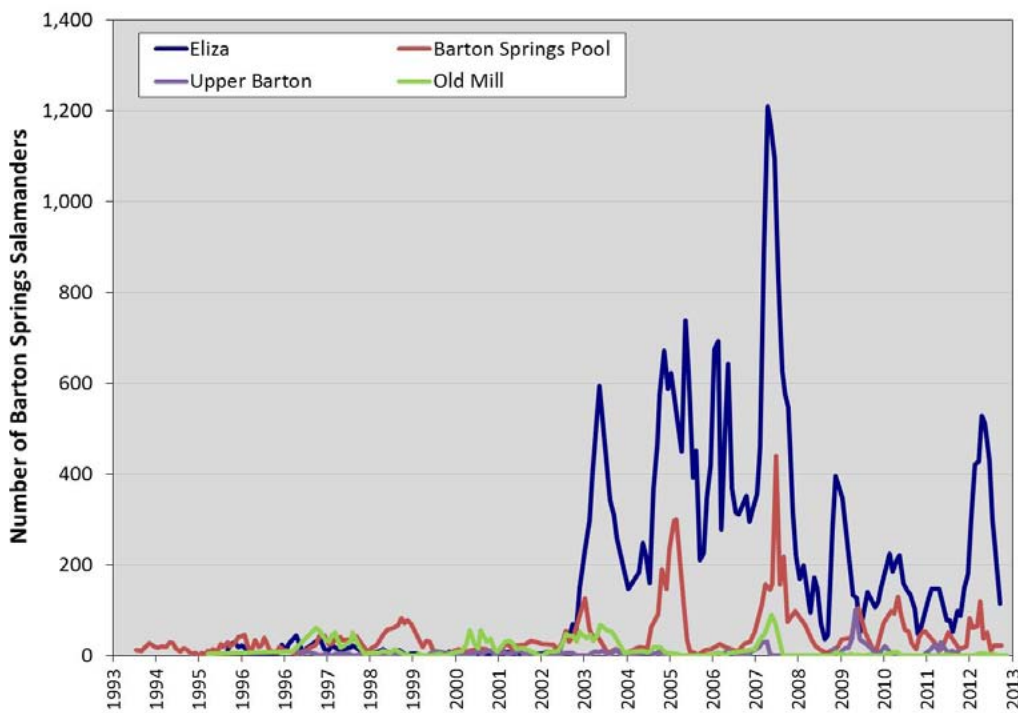


Figure 2. Barton Springs Salamander counts from Barton Springs Pool, Eliza Spring, Old Mill Spring and Upper Barton Springs. Upper Barton Spring was dry for most of 2013.

Annual Focus

The U.S. Fish and Wildlife Service listed the Austin Blind Salamander as an endangered species and the Jollyville Plateau Salamander as a threatened species in 2013. The Barton Springs Salamander was listed as an endangered species in 1997. More information on the federal rule making process is available here: www.fws.gov/southwest/es/AustinTexas/ESA_Sp_Salamanders.html

species. Low counts of the Barton Springs Salamander in surface habitats relative to historic highs were observed again in 2013, although counts were higher than the number of salamanders observed in 2012 (Figure 2).

Jollyville Plateau Salamander population counts at the surface springs in northern Austin are a direct representation of the health of the species, and the salamanders are strongly affected by the flow of the springs in which they live. Many springs in the Bull Creek Watershed stopped flowing in 2011 because of the extreme drought. Salamander populations at some sites not impacted by urbanization rebounded with the return of spring flow in 2012 and in 2013 (Figure 3). Learn more about salamander protection efforts: www.austintexas.gov/salamanders

The Barton Springs Salamander and the Austin Blind Salamander are only observed in four springs within Zilker Park. Because Barton Springs is critical endangered species habitat, a permit from the U.S. Fish and Wildlife Service (USFWS) is required to operate and maintain the pool for public use. The USFWS issued the first permit for the operation of Barton Springs Pool in 1998. Since the permit was due to expire in 2013, salamander biologists from the Watershed Protection Department completed a Habitat Conservation Plan to apply for a new permit, which the USFWS issued in September, 2013. The new Habitat Conservation Plan describes conservation measures for protecting endangered salamander habitat through the year 2033. The objectives of the new plan include protecting the ability of salamander populations to adapt over time, restoring natural characteristics of salamander habitat, reducing the impact of pollutants, improving the efficiency of Barton Springs Pool maintenance, and continuing the collection and sharing of data about salamander populations. The City has made significant progress toward the goals of protecting endangered salamanders, exemplified by an increase in the average population size of the Barton Springs Salamander since implementation of the first Habitat Conservation Plan in 1998.

Read more about the new Habitat Conservation Plan here: www.austintexas.gov/watershed_protection/publications/document.cfm?id=196468

Bull Creek (Franklin), Site 349

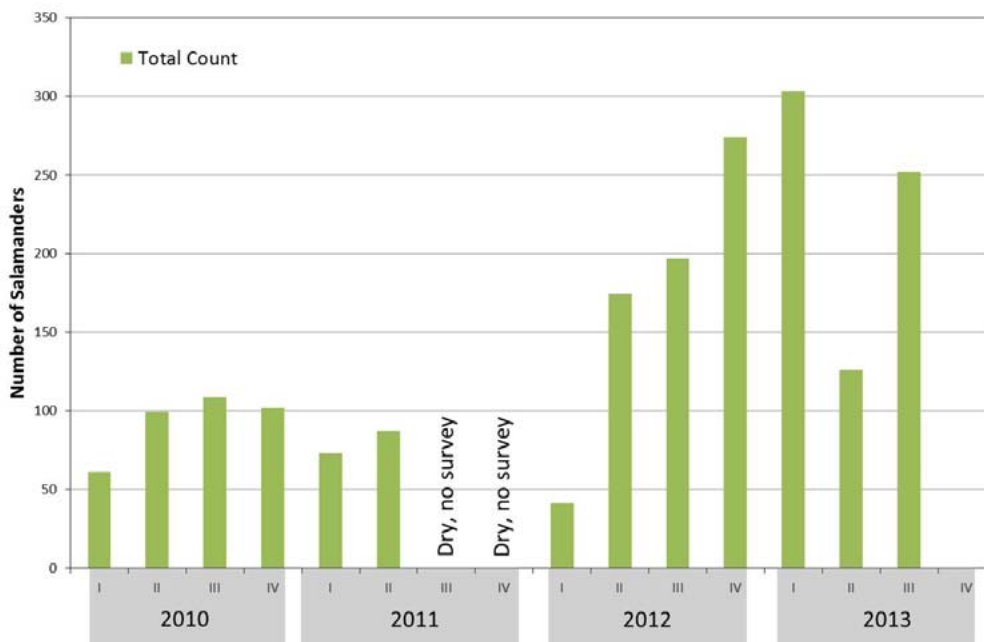


Figure 3. Jollyville Plateau Salamander population counts at one representative Bull Creek monitoring site. Some surveys could not be completed in 2011 because the drought caused springs to go dry.

Urban Forest



Importance

Austin’s urban forest provides social, ecological, and economic benefits to the community and enhances the quality of life for Austin residents. Recognizing Austin’s urban forest as an asset and an important part of the City’s infrastructure, City policy and practices aim to preserve, maintain, and replace individual trees and the urban forest as a whole. A thriving, healthy urban forest is a reflection of the City’s ability to preserve individual trees and vegetation communities, restore or repair degraded lands, protect lands for their environmental services, encourage the removal of non-native, invasive species, and replant trees and vegetation.

Goals

The primary goals for the City’s urban forest management are to (1) ensure public well-being and safety; and (2) enhance the benefits of the urban forest through preservation, care, maintenance, and replenishment of the urban forest. These goals are pursued by preserving trees and vegetation communities impacted by development activities, encouraging the removal of non-native invasive trees, addressing tree risk and tree maintenance, managing oak wilt, replenishing the urban forest through planting, and promoting conservation and replenishment programs that benefit Austin’s urban forest.

Two tree-specific City programs manage the urban forest: the City Arborist Program regulates trees on public and private property and the Urban Forestry Program manages public trees.

City Arborist Office website:

<http://www.austintexas.gov/department/city-arborist>

Urban Forestry Program website:

www.austinurbanforestry.org

Imagine Austin!

Policies

- Maintain and increase Austin’s urban forest as a key component of the green infrastructure network.
- Integrate green infrastructure elements such as the urban forest, gardens, green buildings, stormwater treatment and infiltration facilities, and green streets into the urban design of the city through “green” development practices and regulations.

Priority Action

- Create an urban forest plan that identifies tree canopy goals, establishes a budget, and presents implementation measures.

Austin’s Public Urban Forest Plan At a Glance

Chapter 1	Why do we need a plan? Introduction to the Urban Forest Plan
Chapter 2	What is Austin’s Urban Forest? State of the Urban Forest
Chapter 3	How Will We Reach Our Vision? Implementation Goals & Actions Policy Elements ↳ Departmental Operational Plans
Appendix	Annual Reporting Performance Report Card Departmental Operational Plans

Figure 1. Austin’s Urban Forest Plan, A Master Plan for Public Property at a Glance

Challenges and Responses

Ongoing

Austin’s urban forest is increasingly challenged by development pressure and changing land use patterns as well as urban stressors such as soil compaction, invasive species, and competition for space. The added impact of prolonged drought is another significant contributor to tree stress and mortality. Interdepartmental coordination, comprehensive planning, and communication with the development community regarding tree regulation and management are areas for continuous improvement.

This Year

To address these ongoing challenges in 2013, the City Arborist Program and the Urban Forestry Program performed the following.

City Arborist

- Completed a downtown tree survey of all protected and heritage trees on private and public property and all trees in the right-of-way (see Annual Focus).

- As part of Land Use Review, staff reviewed 599 commercial site plans and 255 subdivisions, 2,710 tree permits, and averaged more than 100 tree inspections per month.
- Staff reviewed 853 tree permits for heritage trees and more than 135 site plans and 38 subdivision plans for compliance with the heritage tree ordinance. Greater than 95 percent of all healthy heritage trees were preserved in the development review process.
- Successfully defended the City's tree regulations at the 83rd Texas Legislature.
- Presented research on Post Oak (*Quercus stellata*) distribution at the 2013 Texas Chapter of International Society of Arboriculture Tree Conference.
- City Arborist grant program issued \$115,247 for tree care, oak wilt treatment, tree planting, urban forest planning, and tree transplanting.

Urban Forestry

- After two years of effort, the Urban Forester and Urban Forestry Board finalized the Austin Urban Forest Plan, A Master Plan for Public Property with the goal of Council adoption in early 2014. Implementation is envisioned over the next several years through separate Departmental Operational Plans (DOPs) where specific issues such as existing tree care, new plantings, and canopy coverage goals will be outlined. An annual State of the Urban Forest will report on the health of the public urban forest (Figure 1).
- The City of Austin received Tree City USA designation for the 21st straight year by the Arbor Day Foundation for "better tree management."
- The Urban Forestry Program received an additional \$1 million in its operating budget, which includes capital items, operating expenses, and nine additional full-time positions. This increase will allow the Urban Forestry Program to care proactively for more of the public urban forest.
- The Urban Forestry Program completed more than 2,739 work orders; reviewed 310 commercial and parkland site plans for impacts to public trees; and with the help of nonprofit partners and more than 1,496 volunteer hours, planted 6,600 bare root seedlings and 3,770 containerized trees.
- The Urban Forestry Program facilitated more than \$100,000 in funding (or equivalent) from donations, volunteer work days, and community partnerships and programs, including \$66,100 generated by Public Tree Care Permits.
- The Urban Forestry Program began phased removal of dead trees in cemeteries and supported the development of the Cemetery Master Plan, which will include forestry components such as tree planting, care and maintenance.
- Urban Forestry and the City Arborist began using iTree Eco (software provided by U.S. Forest Service) to sample trees on public lands and evaluate the economic and ecological benefits of Austin's trees.
- The Urban Forestry Program developed the Tree Portal, a resource for Austin citizens to easily access information related to the urban forest. Visit <http://austintexas.gov/treeportal>

Interdepartmental

The Urban Forestry and City Arborist Programs continued to support tree education and recognition programs including Austin Community Trees, Urban Forest Stewards Workshop, an urban forest newsletter, training 17 Urban Forest Stewards, Arbor Day, and a Grow Green informational video series on tree care and maintenance.

Status and Trends

A 2012 Texas A&M Forest Service survey suggests 301 million trees died statewide as a result of the devastating 2011 drought. Another 5.6 million trees in urban areas also died as a result of the drought, according to a separate Texas A&M Forest Service study. The news release for the studies can be found here: <http://texasforestservicetamu.edu/main/popup.aspx?id=16509>.

The private and public tree permitting data from 2013 appear consistent with the state-wide tree mortality studies. Urban environmental conditions coupled with development activities and increased awareness of permitting requirements have likely resulted in the perennial increase in tree permits and demand for tree maintenance and removal.

Tree mortality likely exacerbated by drought conditions continues to be an ever-present urban forest challenge as suggested by permitting more than 40,414 inches of trees to be removed for dead, diseased, or hazardous conditions.

The demand for public tree maintenance has continued to increase over the past 10 years, with an average annual increase of 42%. In addition, the proportion of tree maintenance performed on an emergency basis, in response to the blocking of a transportation corridor, has increased by an average 20% per year for the past 10 years. Based on a sample inventory, 72% of public trees are in "fair" or "poor" structural health condition.

Annual Focus

To assist staff and boards and commissions, a survey of trees in the central business district (CBD) was completed in 2013. The CBD encompasses downtown Austin and is bounded by Lady Bird Lake, Lamar Boulevard, Martin Luther King Jr. Boulevard, and IH-35. The survey captured all right-of-way trees and all heritage tree species 19 inches in diameter and greater on private and public property. Heritage tree species include Texas Ash, Bald Cypress, American Elm, Cedar Elm, Texas Madrone, Bigtooth Maple, all Oaks, Pecan, Arizona Walnut, and Eastern Black Walnut.

The survey located 5,200 total trees within the right-of-way in the CBD. The survey also located 1,100 trees in the CBD that are classified by City Code as heritage trees, meaning they are heritage tree species and are 24 inches or greater in diameter. The survey suggests approximately 75 percent of the heritage trees are structurally and biologically sound and two species (Live Oak and Pecan) dominate the species distribution. In addition, the survey identified another 1,000 trees that are heritage tree species and between 19 to 23 inches in diameter. This report, coupled with an analysis of downtown tree canopy coverage (Figure 2), will yield needed insights to aid tree preservation, planting, and planning programs.

2010 Canopy Coverage of Central Business District

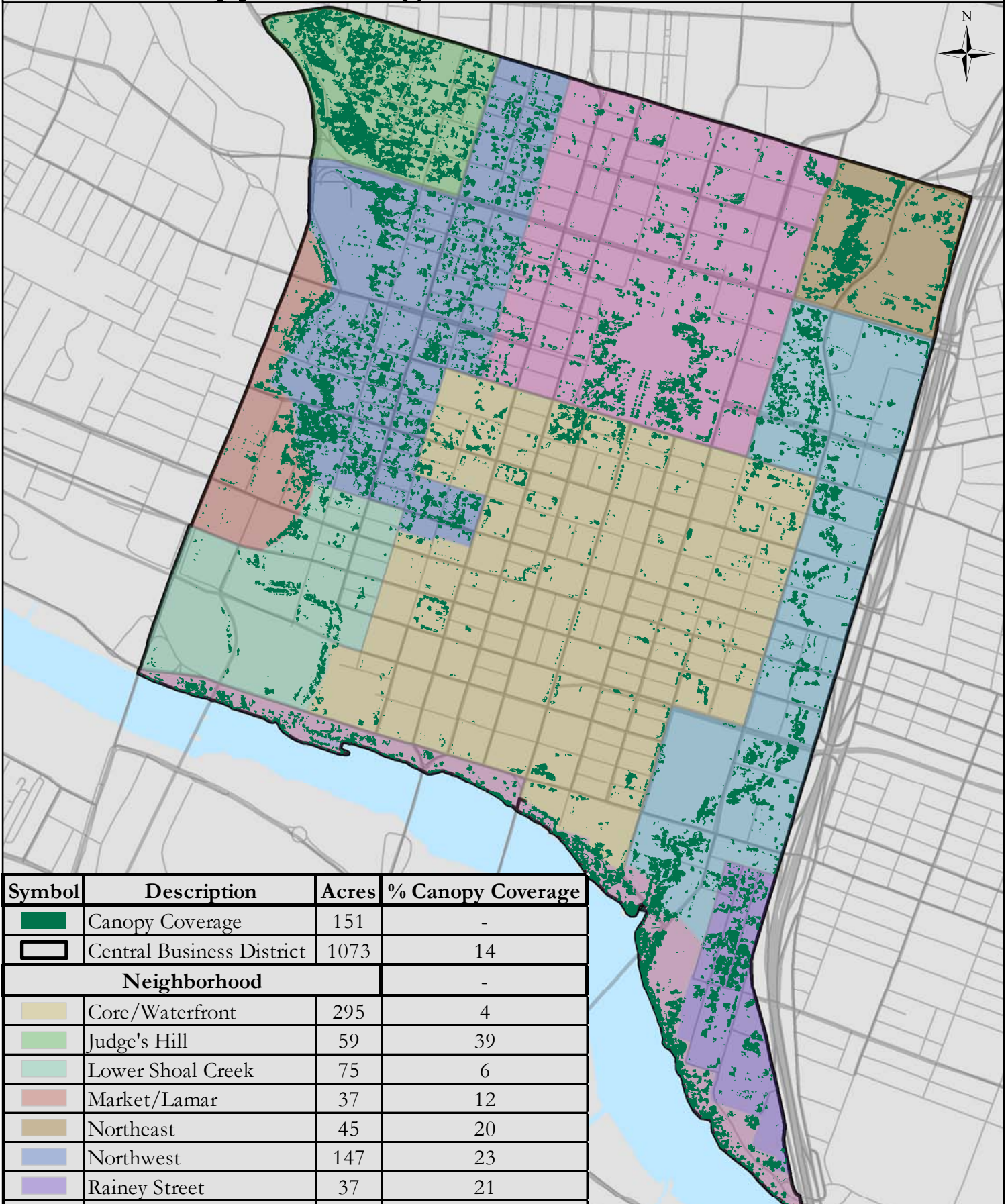


Figure 2. 2010 Canopy Coverage Analysis of Central Business District

Open Space and Habitat



Importance

Austin Water's Wildland Conservation Division (referred to as Wildland) manages natural areas to improve our water quantity and quality, endangered species habitat, and quality of life. Continued growth is in Austin's future, and the City is carefully planning to help preserve clean air, clean water, and natural areas through Wildland.

Goals

The Wildland Division encompasses two programs: Balcones Canyonlands Preserve (BCP) and Water Quality Protection Lands (WQPL). The primary goal of the BCP is to protect and enhance the habitat of endangered and rare species as mitigation for development in western Travis County. WQPL's goal is to produce the optimal level of high quality water to recharge the Barton Springs segment of the Edwards Aquifer by managing protected land to restore prairie-savanna ecosystems and healthy riparian corridors.

Imagine Austin!

Vision

- Our open spaces and preserves shape city planning, reduce infrastructure costs, and provide us with recreation, clean air and water, local food, cooler temperatures, and biodiversity.

Policies

- Permanently preserve areas of greatest environmental and agricultural value.
- Expand the amount of permanently protected natural and environmentally sensitive areas for use as open space and passive recreational areas.

Priority Action

- Expand the City of Austin's acquisition of environmentally significant land, conservation easements, and/or development rights for the protection of sensitive areas, including floodplains, riparian areas, wetlands, prairies, land the supports recharge of the Edwards Aquifer, wildlife habitat and corridors, bottomland forests and priority woodlands, critical environmental features, and agricultural land.

Challenges and Responses

Ongoing

The very appeal of living close to the natural areas protected by Wildland spurs some of its greatest challenges. As Austin's population grows, the challenges associated with the 270 miles of preserve perimeter also grow. Trespassing, encroachment, feral hogs, invasive animal and plant species, oak wilt, and threat of wildfire remain ongoing challenges. Wildland continues to communicate with neighbors in an effort to reduce these challenges.

Wildland Conservation Division Status*

270 perimeter miles
 40,207 total acres
 26,603 acres of Water Quality Protection Lands (WQPL)
 13,604 acres of Balcones Canyonlands Preserve (BCP)

* including conservation easements and dual managed tracts

This Year

- A historic drought blanketing Texas the past few years led the Texas A&M Forest Service to estimate that Texas lost 301 million trees, with some of the hardest-hit areas in Central Texas. Trees weakened by the 2011 drought were susceptible to opportunistic pathogens like hypoxylon canker. Data collected in 2013 show that the endangered golden-cheeked warblers avoided areas with significant tree mortality. Tree mortality and the resulting challenges including habitat loss and wildfire concerns will be a focus for Wildland as the drought continues.
- Invasive species continue to negatively impact native wildlife. Tawny crazy ants, an invasive ant species from South America, are the latest major threat impacting threatened and endangered species. This reddish-brown hairy ant was first discovered in Texas in 2002 and has since spread to 27 Texas counties, including Travis County. A recent study in the Gulf Coast prairie region has shown this species has severe, adverse effects on the abundance and diversity of arthropods in invaded areas, so much so that they have displaced red imported fire ants. At this point, tawny crazy ants are not attracted to standard fire ant baits. Research is being conducted to find the best method to control these nonnatives.



Figure 1. Example specimen of a tawny crazy ant. Photo by April Nobile from www.AntWeb.org.

- As part of an intensive study effort of the golden-cheeked warbler, BCP scientists banded a total of 110 warblers in 2013, including 104 males and six females. Volunteers helped conduct a survey to compare the Vickery method to more intensive nest monitoring. The Vickery method uses a ranking of observed reproductive activity to establish reproductive success. Results of this survey found the Vickery method data underestimated pairing and breeding success of the golden-cheeked warbler.
- Texas Parks and Wildlife created a video highlighting the life of the golden-cheeked warbler and challenges facing the BCP. The video includes some of the first-ever footage of a banded golden-cheeked warbler feeding young in a nest. www.youtube.com/watch?v=uuCRLT98pM8.

Status and Trends

In 2013, the City added 693 acres of land to the WQPL (see map below). This additional WQPL land will add to the land that is managed to direct the rain falling over the recharge zone to the depths of the aquifer. Overall, WQPL lands protect 7% of the Barton Springs/Edwards Aquifer contributing zone and 23% of the recharge zone.

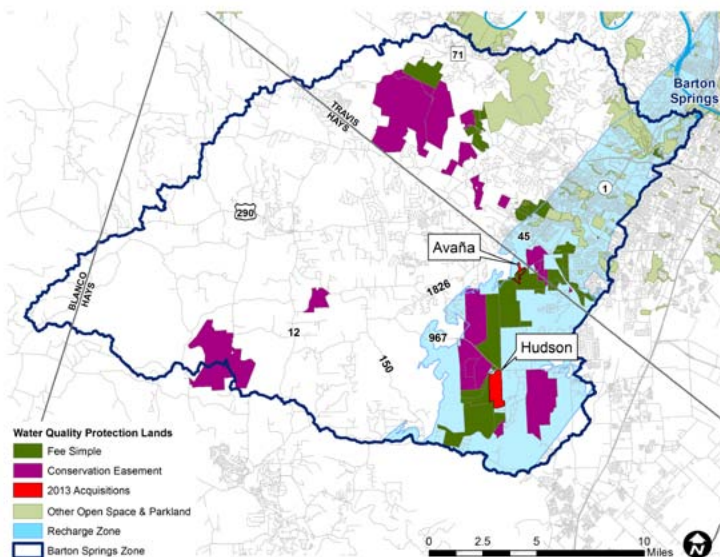


Figure 2. New 2013 land acquisitions in the Barton Springs Zone.

Wildland volunteers act as ambassadors to the community by leading volunteer activities; participating in volunteer days and independent projects; guiding interpretive hikes; and communicating with fellow citizens. In 2013, volunteers donated more than 4,500 hours, a cost savings value of \$100,000. Wildland guided hikes continue to be a popular way to explore areas typically not open to the public. Approximately 550 people attended the 39 hikes offered in 2013. Visit www.austintexas.gov/wildlandevents to register for an upcoming hike.

Wildland staff and partners conducted prescribed burns on 788 Water Quality Protection Land acres in 2013. Prescribed fire has been an effective land management tool used by the Wildland division since 2003. In that time Wildland staff and partners have conducted prescribed burns on 6,300 acres of Wildland properties to improve ecosystem health and restore endangered species habitat.

In addition, Austin Energy and the Parks and Recreation Department developed a management plan in 2011 for the 340-acre peninsula on Lake Walter E. Long and the nearby Indiangrass Wildlife Sanctuary. This management plan included prescribed burns conducted by the Austin Fire Department's newly formed Wildfire Division. By utilizing both summer and winter burns, City environmental staff will be able to study the effect of burn timing on the reduction of invasive species. Future goals for the property include providing educational opportunities for local students and a site for research in prairie restoration techniques. More information at: www.austintexas.gov/rxfire

Austin is working to become a Fire Adapted Community, a community that understands the threat posed by wildfires and takes the personal actions necessary to help minimize the risk. To achieve this, Austin and Travis County partnered to draft a Community Wildfire Protection Plan (CWPP). A series of public stakeholder meetings were held around Travis County during the summer of 2013 and a risk assessment for the entire county was created. By the end of 2014, Travis County will be one of the first counties in the United States with a CWPP—a substantial step in becoming a fire adapted community.

Additional efforts to reduce wildfire risk include partnering with neighborhoods to offer boundary clean-ups to remove downed and dead material along the fence line, mowing of three linear miles of mowed fuel breaks, and upkeep of shaded fuel breaks. The City's BCP partnered with the U.S. Fish and Wildlife Service, Austin Fire Department, Watershed Protection, and the Texas Forest Service to offer a home ignition zone workshop for BCP neighbors and landscape professionals.



Figure 3. Wildland volunteers prepare for a project on one of the preserves.

Annual Focus

Wildland properties thrive as native landscapes that support a diversity of flora and fauna unique to the Austin area. Wildland staff and volunteers have spent countless hours documenting this unique diversity.

A Wildland volunteer, who is also a retired professor of Botany, began building a list of plants identified at WQPL's Onion Creek Management Unit in Hays County in 2006. By 2011 he had documented more than 400 species of plants on the 2,550 acres of this management unit. Not all were native (31), but the vast majority were (387). Further, the biodiversity of this management unit compared quite favorably with the diversity present in the entire County. Hays County is approximately 435,000 acres and has a total of 916 plant species, and while this tract is only 2,550 acres (0.6% of the County's size), it has almost 45% of the plant species that occur County-wide. (Note that Hays County also includes a portion of the Blackland Prairie in addition to the Edwards Plateau and none of these species have been excluded). This would seem to be strong evidence that the same land management work that benefits the water reaching Barton Springs also benefits the local ecology with increased biodiversity.



A variety of wildlife can also be found throughout the Wildland properties, including the often forgotten diversity under the ground. The cave environments of Central Texas support one of the most important cave faunas in the world. This often-overlooked ecosystem is home to an abundance of rare and endangered species. There are six species of endangered karst invertebrates and 25 karst species of concern covered by the Balcones Canyonlands Conservation Plan (BCCP). Some of these species are so tiny and secretive that they are still being discovered today. BCP collects data on this diverse array of species through annual in-cave faunal surveys.

Most of these karst species evolved through isolation. Physical adaptations to cave environments include:

- No eyes or vestigial eyes
- Lack of pigmentation
- More elongated bodies
- Longer appendages
- Longer lives than surface-dwelling relatives

Due to difficulty in accessing habitat (caves are tight, confined spaces), the species are very challenging to find and occupy a narrow habitat niche. Some of these species are known to live in only one cave in the world. As a result, a lot of these species are poorly understood.

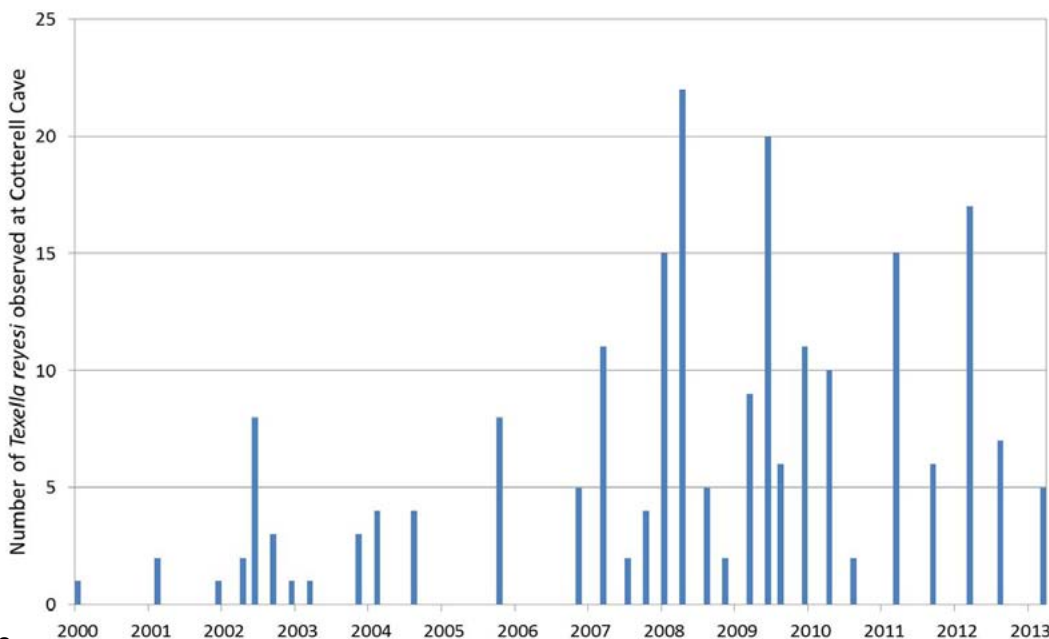
Protecting a cave includes protecting a drainage basin surrounding the cave. Many of these invertebrates live in significant recharge features and depend on food sources that are washed into the caves. The diversity of life found on Wildland properties thrive because Austin actively plans for its future and all the unique life that call Austin home.



Figure 4. (top left) Ladies Tresses can only be found in a few counties in Texas. This specimen was found on the WQPL.

Figure 5. (bottom left) Example of karst invertebrate survey data for the Bone Cave Harvestman (*Texella reyesi*).

Figure 6. (above clockwise) The Tooth Cave Pseudoscorpion is 3/16 of an inch long, does not have a tail or eyes, and uses pinchers to capture small invertebrates. The Bone Cave Harvestman has a 1/8-inch-long body and does not have eyes. This harvestman is especially sensitive to low humidity and is found only north of the Colorado River. The Tooth Cave Spider has blue tinged legs and builds fine, delicate sheet webs.



Air Quality

Importance

The primary air quality concern in Austin is ground-level ozone. Ozone, the main component in smog, forms when nitrogen oxides (NOx) and volatile organic compounds (VOCs) combine and “cook” in the sun. Some ozone exists at all times, but it can reach unhealthy levels under certain conditions, like hot, sunny days with little wind. Austin’s ozone season runs from April through October. High ozone levels historically occur most frequently between August and September. The secondary period of frequently high ozone days occurs between May and June. In recent years the frequency of high ozone days in a given year has both decreased and become equally distributed between the May-June and August-September periods. Typically, one out of every six days in September in Central Texas has unhealthy ozone levels.

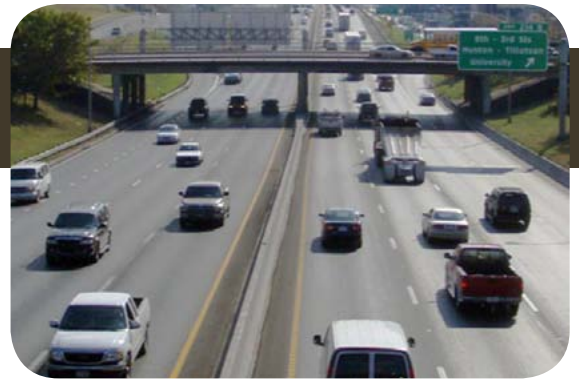


Figure 1 shows the effects that unhealthy ozone levels can have on humans. Many individuals can experience increased respiratory ailments, especially children, the elderly, those with lung disease, such as asthma sufferers, and healthy adults working or playing outdoors. In fact, 1 in 10 children and 1 in 13 adults in Central Texas suffer from asthma. This, in turn, leads to lost school and work days. When the air quality level is unhealthy, anyone may experience some health effects and individuals in the sensitive groups will experience more severe symptoms.

WHAT ARE THE EFFECTS OF GROUND-LEVEL OZONE

BREATHING OZONE CAN TRIGGER A VARIETY OF HEALTH PROBLEMS

Even at relatively low levels, ground-level ozone can be harmful to human health and the environment. It is especially a problem in urban and suburban communities; however winds can carry ozone precursor-emissions many miles from their original sources, affecting rural areas as well.

Children are at the greatest risk, because of their developing lungs and frequent outdoor activity. Anyone with a compromised respiratory system is especially vulnerable to ozone. Even healthy adults can be affected when working or playing outdoors.

Coughing

Difficulty breathing deeply and vigorously

Sore or scratchy throat

Inflamed and damaged airways

Shortness of breathes and pain when taking a deep breath

Aggravation for lung diseases like asthma, emphysema, and chronic bronchitis

Increased frequency of asthma attacks

Greater susceptibility to lung infection

Continued damage to the lungs even after symptoms have disappeared

Figure 1. What are the Effects of Ground-Level Ozone. Figure provided by Ozone Action Heroes (<http://ozoneactionheroes.com>), a part of the Capital Area Metropolitan Planning Organization (CAMPO).

Goals

The City's goal is to promote healthy outdoor air quality for all citizens. The City of Austin Air Quality Program addresses the impact of City operations on air quality. The program also participates in regional efforts to improve air quality throughout Central Texas.

Imagine Austin!

Vision

- Public and private sectors work together to improve our air quality and reduce congestion in a collaborative and creative manner.

Policies

- Improve the air quality and reduce greenhouse gas emissions resulting from motor vehicle use, traffic and congestion, industrial sources, and waste.
- Reduce traffic congestion, increase transit use, and encourage alternative transportation modes through such practices as Transportation Demand Management which includes carpooling, flex time work schedules and subsidizing transit costs for employees.

Priority Action

- Maintain a safe and reliable energy system and improve Austin's air quality and lower greenhouse gas emissions through continued review and adoption of alternative fuel sources and energy storage technologies.

Challenges and Responses

The Austin region ended the 2013 ozone season in attainment of the existing ozone standard, with an ozone design value of 73 parts per billion (ppb) (Figure 2). Attainment status is a determination of whether the region is in compliance (in attainment) or out of compliance (in non-attainment) with the 2008 federal health-based ozone standard of 75 ppb. The design value is a statistic that reflects the region's average ozone level. When determining the region's attainment status, the design value is compared against the federal health-based ozone standard. While the continued downward trend in the region's design value is impressive, efforts to improve Austin's air quality must continue. It is expected that the federal health-based ozone standard of 75 ppb may be reduced in the future to 70 ppb or less; compared to the current 2013 design value, this would place the Austin region in non-attainment with the ozone standard.

Research suggests that 18%-20% of the ozone-forming emissions originate from man-made sources within the Austin-Round Rock region. Approximately 10% of the ozone-forming emissions are from natural sources, such as trees and other vegetation. A large amount of ozone, between 65%-70%, is transported to Austin from upwind areas; therefore, most of the sources that cause elevated ozone in the Austin region are beyond local control. Within the Austin region in 2013, motor vehicles remained the primary contributor of the ozone precursors NOx and VOC. In fact, on-road mobile sources accounted for nearly 50% of ozone-forming emissions released within Central Texas.

**Austin-Round Rock Metropolitan Statistical Area
8-Hour Ozone Averages 1999 - 2013**

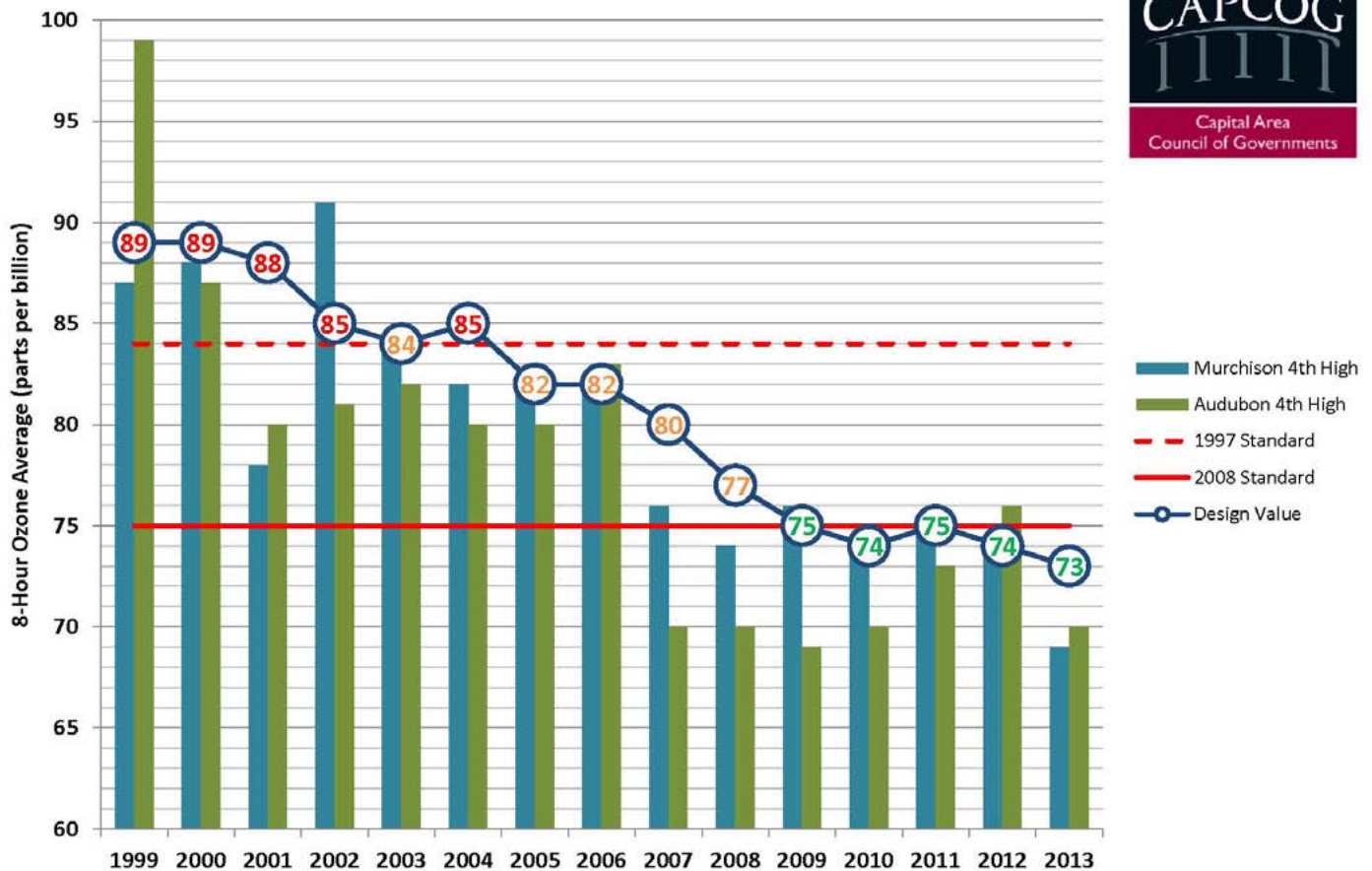


Figure 2. Austin-Round Rock Metropolitan Statistical Area (MSA) area ozone trends for 1999-2013.1 Chart provided by the Capital Area Council of Governments (CAPCOG). The graph shows the annual design value since 1999 for the Austin-Round Rock MSA.

Source Name	Source Description	% Contributed
On-Road Mobile	Cars, trucks, buses	47%
Non-Road Mobile	Farm vehicles, lawn and garden equipment, construction, mining, and industrial equipment, railroad locomotives, aircraft, and others	18%
Point Sources	Industrial and nonindustrial stationary equipment or processes	15%
Natural Sources	Trees and other vegetation	12%
Area Sources	Human sources that are too small, too abundant, or too dispersed geographically to inventory individually	8%

Ongoing

Central Texas has a history of participation in proactive air quality initiatives with regional partners. The City of Austin will continue to support regional partners in reducing ozone-forming emissions; review and comment on new U.S. Environmental Protection Agency (EPA) ozone standards; and evaluate existing and new measures to improve air quality. As our region's population continues to grow, air quality issues will become increasingly important. The development of regional public awareness and education campaigns to encourage voluntary action to improve air quality is critical. Recognizing the regional nature of air quality, the City is taking an active role in the following area initiatives:

- Clean Air Coalition, www.capcog.org/divisions/regional-services/clean-air-coalition
- Movability Austin, www.movabilityaustin.org
- Commute Solutions, www.commutesolutions.com

The City of Austin has committed to implement several measures to reduce ozone-forming emissions as outlined below in the Annual Focus.

This Year

In 2013, the City worked with the Clean Air Coalition toward the development of the new regional Ozone Advance Plan. For more information, see the annual focus below or visit www.capcog.org/divisions/regional-services/ozone-advance

Status and Trends

Average ozone levels in the Austin area have been decreasing for more than a decade. The downward trend is almost certainly caused by cleaner emission sources both in Austin and in upwind areas, such as cars and trucks that are equipped with improved emission control systems. The region-wide inspection and maintenance program has also contributed to the reduction of ozone by ensuring that local vehicles are maintained. Figure 3 provides a comparison with previous years. For the 10th year in a row there were no days designated unhealthy for all groups. There were four days that were unhealthy for sensitive groups, which is the lowest level since 2010. Days with moderate ozone readings totaled 43, which is lower than the totals recorded in 2011 or 2012; however, this total was still more than any of the years between 2007 and 2010.

Annual Focus

In 2013, the Austin City Council agreed to participate in the Ozone Advance Plan. Ozone Advance is a collaborative, voluntary effort between the EPA, states, tribes, and local governments to encourage reductions of ground-level ozone, including the ozone precursor emissions of NOx and VOC. Through this voluntary effort Ozone Advance is expected to help areas remain in attainment with the National Ambient Air Quality Standards.

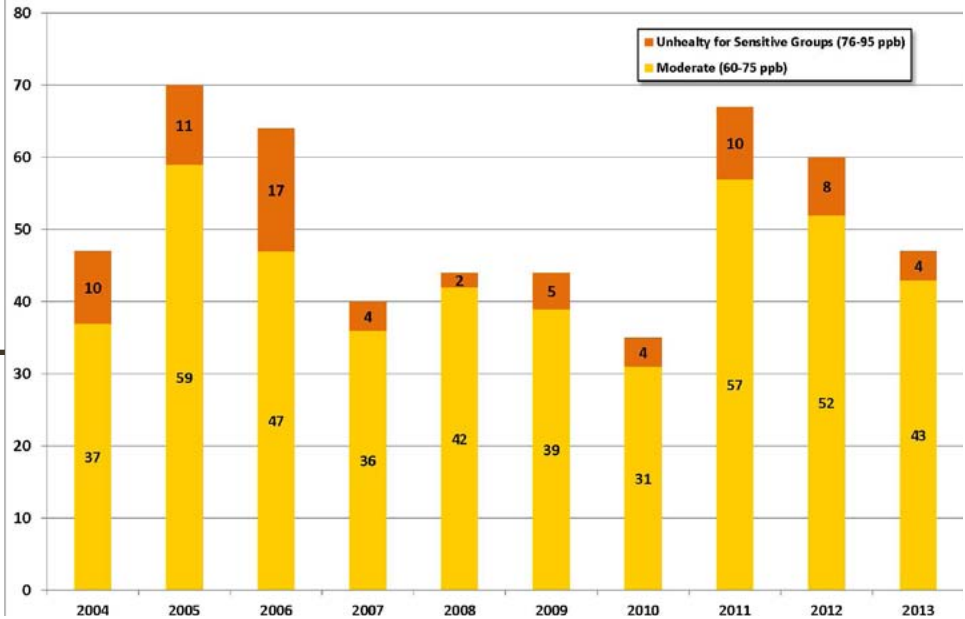
Taking voluntary actions now to reduce ozone and precursor emissions through the Ozone Advance Plan is expected to benefit public health while minimizing the region's regulatory burden. The plan also provides the City with the opportunity to maximize ozone reductions while reaping the additional benefits of reduced carbon emissions, cleaner fleets, and less traffic congestion.

Ozone Advance is the latest in a series of regional ozone reduction initiatives. It builds on the region's previous successes under the 1-hour Ozone Flex Program, the Early Action Compact, and 8-hour Ozone Flex Program. This new voluntary initiative allows the City to take early action toward improving the current ozone pollution problem rather than wait for a required and prescribed federal nonattainment process. The City of Austin has committed to more than thirty emission reduction activities in the new plan. Emissions reduction measures included in the plan include:

- Evaluate and improve City of Austin fleet and fuel efficiencies.
- Implement a commuter trip reduction program for City of Austin employees.
- Regularly plan for transportation emission reduction measures within the community and report to the Capital Area Metropolitan Planning Organization annually.
- Re-commit to enforcement of heavy duty idling restrictions.
- Implement an ozone action day program for City of Austin employees.
- Implement energy efficiency, renewable energy, and resource conservation policies.
- Implement measures to cool developed areas and reduce the urban heat island effect.
- Implement special event air quality emission reduction policies.
- Participate in regional emission reduction measures and activities.
- Provide annual tracking and reporting of the status of emission reduction measures to CAPCOG for inclusion in Ozone Advance Plan report and performance evaluations.

This plan will continue through 2018 and will ensure that the City of Austin remains a leader in efforts to improve air quality in Central Texas. More information about the region's Ozone Advance Plan can be found on the CAPCOG website: www.capcog.org/divisions/regional-services/ozone-advance/

Figure 3.
Number of Days with Unhealthy Ozone Levels
in Austin-Round Rock MSA





100% Recycled



2013