



Water Quality Protection Lands Annual Report

FY 2015

The goal of the Water Quality Protection Lands is to optimize the quality and quantity of water from project lands to recharge the Barton Springs segment of the Edwards Aquifer.

Photos, from top to bottom: Managed live oak woodland; summer prescribed burn; *Liatris* blooming seven months after prescribed burn; recharge into Cripple Crawfish Cave; Birthday Rattler Cave.





Executive Summary

The Water Quality Protection Lands (WQPL) program began in 1998 with the passage of Proposition 2 of the May 2, 1998 Bond Election. The goal of the WQPL is to optimize the quality and quantity of water from project lands to recharge the Barton Springs segment of the Edwards Aquifer. The program accomplishes this goal by protecting and managing land in the recharge and contributing zones of the Barton Springs segment via conservation easements and fee simple purchases.

The City of Austin acquired two tracts in the Upper Bear Creek management unit, together 51.8 acres, for the WQPL this year. These brought the WQPL to 28,358.27 acres – 17,526.15 acres under 18 separate conservation easements and 10,832.13 acres in fee simple ownership.

Conservation easements allow families to maintain possession of their land while at the same time keeping it undeveloped in partnership with the City. The WQPL ensures that the terms of these easements are met and provides technical guidance to landowners when requested.

Fee simple lands are more directly managed. The land is protected from development, but oftentimes it has been degraded by past land-use. In such cases, in order to deliver the services for which the land was purchased - clean, natural water available to recharge Barton Springs- the biotic communities must be restored. Even when ecosystem function is intact or restored, active management is still necessary to keep them in functioning condition.

This year the WQPL treated 968.5 acres with prescribed burns, thinned brush on 191.5 acres, and seeded 123.4 acres. We continued the sediment removal from major recharge features as well as maintained patrols on roughly 15 square miles of fee simple lands and 75 miles of perimeter fencing. Two public trail systems continue operation through public-private partnerships in accordance with memoranda of agreement.

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Lands Protected

The WQPL protects land to benefit Barton Springs in two ways. One is simple purchase, called fee simple acquisition. On these lands, ecological restoration and management protect improve water quality, aquifer recharge, and concurrently many other ecosystem services such as wildlife habitat and carbon sequestration.

The other method of protecting land is with conservation easement agreements whereby the City purchases the development rights on private land from willing landowners and works cooperatively with them to ensure that the land is managed according to the terms and conditions of the agreement. Such easements convey with the title of the land and are perpetual. They do not expire regardless of any change of ownership.

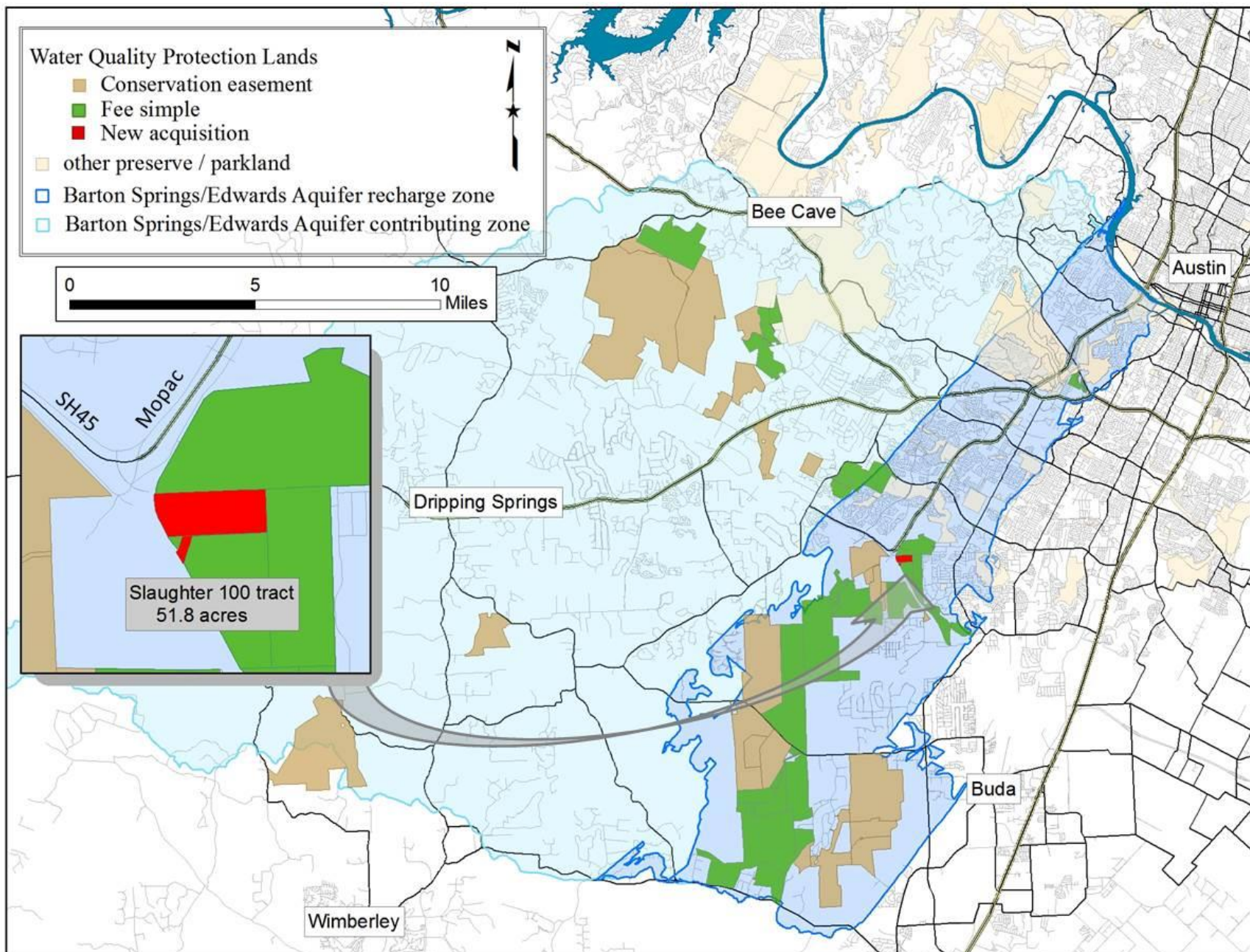
Currently the WQPL protects 28,358.27 acres – 17,526.15 acres under 18 separate conservation easements and 10,832.13 acres in fee simple land holdings. These lands encompass 24.5% of the Barton Springs/Edwards Aquifer recharge zone and 7% of the contributing zone.

Conservation Easements

On conservation easements, the WQPL conducts annual on-site reviews and bi-annual photo points. WQPL staff also provide technical assistance on a variety of land management topics to landowners on an as-requested basis. A portion of the Shield Ranch conservation easement falls under WQPL oversight and the balance is overseen by the Nature Conservancy of Texas. The Storm Ranch, Historic Gibson/Ragsdale, and new Ruby conservation easements are overseen by the Hill Country Conservancy with support from the WQPL. The Dahlstrom Ranch conservation easement is also administered by the Hill Country Conservancy and supported by Hays County and the WQPL.

Fee Simple Lands

Fee simple lands are owned outright. The City bears all operations and management obligations on these tracts. Almost all of the WQPL's fee simple acreage is located outside of the Austin city limits and much of it is located in Hays County. The majority of these lands extend between the cities of Bee Cave and Kyle. Thus, our operations depend on, and are affected by, many public safety and regulatory jurisdictions. In our land management and security operations, we interface with seven fire departments, two county sheriff's offices, the Austin Police Department, TPWD state game wardens in Travis and Hays counties, as well as several federal and state regulatory entities such as the US Fish and Wildlife Service, the Texas Department of Agriculture, Texas Parks and Wildlife, and the Texas Commission on Environmental Quality. We also have wildland fire cooperative agreements with federal, state, and non-profit entities.



Land protected by the Water Quality Protection Lands as of October 2015.

New Acquisitions

The City of Austin acquired two tracts totaling 51.8 acres known as Slaughter 100. Acquisition of these tracts is important for the Water Quality Protection Lands because given their location relative to other WQPL tracts, their development would have significantly hindered management on much of the Upper Bear Creek management unit. In addition, by “filling a gap” in the Upper Bear Creek management unit, acquisition of these tracts reduced the WQPL property boundary by 4,700 feet which will assist with any future boundary conflicts and reduce fencing needs.



This area of the Little Bear Creek management unit was mechanically thinned in 2009, then treated with prescribed fire in 2010 and again in 2014. It was seeded with native grasses in 2011 and 2012. From this point, the restoration process can be continued with less intensive management consisting primarily of prescribed burning every four to seven years.

Restoration and Land Management

The City of Austin pays appraised value to willing sellers for the lands it buys as part of the WQPL program. That value is based on its development potential which has little or nothing to do with its ecosystem functions. Once purchased, however, the land’s value to Austin becomes instantly welded to its natural resource performance - its ability to provide a suite of services that Austinites cannot acquire by other means. It is then up to Austin, via the WQPL, to maximize the ecosystem return on its own monetary investment.

Unfortunately, the land we buy rarely performs the way we need it to at the time of purchase. We have protected the land from development, but the primary ecosystem service for which the land was purchased – clean water to recharge Barton Springs – has, in many cases, been degraded by past land-use. In such cases the biotic communities, along with their ecosystem functions, must be restored and once restored must be maintained.

Thus, when the real estate deal closes and we have the key to the gate, the work at that point is only half-finished. Restoring functional ecosystems can be decades-long process and managing them is never-ending. And it’s where the WQPL program’s daily work begins.

In fiscal year 2015, the WQPL applied active ecological restoration treatments to 1,281.2 acres. The following is a more detailed look at that work.

Brush Management

The WQPL program completed the thinning of Ashe juniper trees on 191.5 acres, mostly on the Lower Bear Creek management unit. This work was conducted largely by private contractors, although 6.2 acres of juniper was thinned by American Youthworks as part of their annual chainsaw training.

Using an approach that minimizes negative impacts to soil, water, wildlife, and desirable vegetation while accomplishing the task of removing targeted trees, the program was able to initiate the process of restoring this land to prairie or oak savanna. All brush thinning operations are conducted in concert with prescribed burn plans which helps to ensure our preparation for both prescribed burns and potential wildfires.

Prescribed Fire

Five prescribed burns were conducted across 968.5 acres in FY 2015. A particular milestone is that each of these burns was a repeat treatment. Three represented the second burn on the unit and two represented the third burn treatment on the unit. This is an example of how management burns are being implemented as part of a continual *process* of ecological restoration.

Invasive Species

Our primary invasive species management action this year involved the application of 494 acres of growing season prescribed burns. This treatment method has been shown to be as effective as herbicide at long-term control of King Ranch bluestem (*Bothriochloa ischaemum*) which can reduce plant and animal diversity, particularly that of grassland birds, and can compromise water quality through poor fire adaptability. Follow-up seeding treatments, described below, will improve native grass diversity and place increased competitive pressure on King Ranch bluestem.

Two salt cedar (*Tamarix sp.*) were hand pulled from the Wenzel quarry. When the City of Austin acquired this property, salt cedar had spread across approximately 50 acres. In the early 2000's, plants were hand- or mechanically-pulled or treated with herbicide. Dozens of plants had established high up on the quarry walls and could be reached only by extension ladder or by rappelling down to them from above. Today, the population of this noxious weed has been mostly eradicated, although one or two individuals are discovered every few years.

Additionally, about 100 Tree of Heaven (*Ailanthus altissima*) trees were hand-pulled from a recently-burned area of the Little Bear Creek management unit. Such early detection and removal will help to prevent the establishment of a new population of this invasive tree.



Wildland Conservation Division staff ignite and patrol a section of the Wyldwood prescribed burn.

Seeding

Seeding native herbaceous species after prescribed burns helps to boost plant diversity and improve ecosystem resilience to disturbances such as drought and flooding. This ultimately improves and protects water quality.

Volunteers distributed native grass seed across 123.4 acres of the Little Bear Creek and Onion Creek management units which had been treated with prescribed fire.

Seed collecting

2015 saw a continuation of a volunteer seed collecting effort that began in earnest last year. The goals are to:

- a) Improve the success of seed treatments,
- b) Enhance the diversity of the WQPL seed mix, and
- c) Reduce the amount of commercial seed the WQPL purchases each year.

We are accomplishing these goals by recruiting volunteer teams to collect native seed from WQPL lands as it becomes viable throughout the year. This seed is then stored, cleaned, and shipped to the seed vendor who mixes it with the purchased commercial seed mix before it is bagged and delivered.

This year our seed vendor incorporated 60 lbs of seed that had been collected by volunteers. As we continue to build our volunteer pool, improve our collection methods, and utilize equipment such as seed harvesters and seed cleaners, we expect to dramatically increase the volume and diversity of local, native seed collected from, and then applied back to, the WQPL each year.

Karst Management

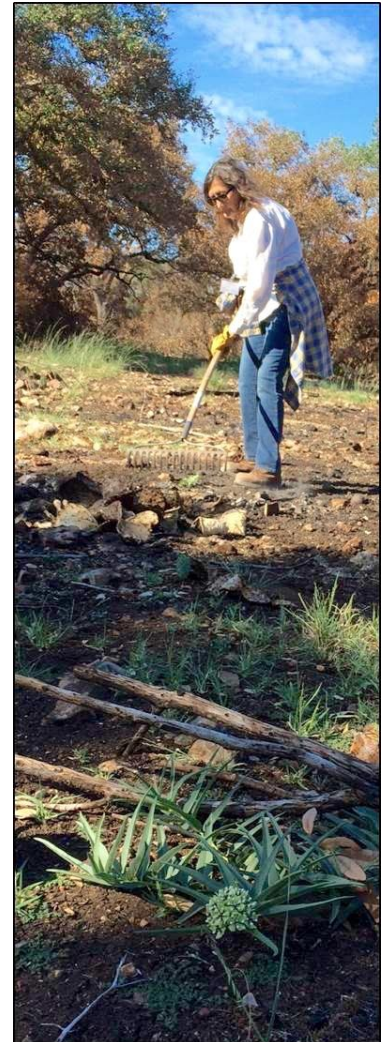
2015 was a big year for karst. Volunteers continued excavations of Birthday Rattler cave while a contractor excavated 8 feet from Cripple Crawfish cave. Birthday Rattler cave was also mapped by contractors.

Excavations continued at Tabor Crevice by the Watershed Protection Department and a cave gate was installed.

Onion Creek received substantial flow this year and cave grates were kept clean to allow continual recharge. After 12 years of hand excavation, one cave was finally able to be opened during a flood event and for the first time we witnessed this cave recharging water.

With assistance from Balcones Canyonlands Preserve biologists, cave faunal surveys were conducted at five caves in support of research led by James Reddell at UT Austin. Additionally, faunal surveys were conducted at Flint Ridge cave pursuant to the BCCP 10a permit.

WCD facilities staff intensified patrols and boundary enforcement at Flint Ridge in response to increased trespass.



Volunteer Robin Shaver rakes in native grass seed to replace the invasive King Ranch bluestem killed by a prescribed burn. In the foreground, antelope horn milkweed has re-sprouted and flowered.

This year we also saw the benefits of work in previous years. We documented the first significant recharge into Crooked Oak Cave since the addition of specialized grates and substantial excavation.

Lastly, with support from the Watershed Protection Department, extensive karst surveys were conducted along re-routed segments of the planned Violet Crown Trail corridor.

Wildlife Management

No whitetail deer management occurred on the WQPL this year. Years of broad-scale restoration treatments along with a sustained reduction in deer density have improved forage quality across the WQPL which results in reduced browse impact per deer. It is anticipated that deer management on the WQPL will remain suspended for the foreseeable future.

Feral hog management, however, continued on the Onion Creek, Little Bear, and Lower Bear management units from which a total of 101 hogs were removed.

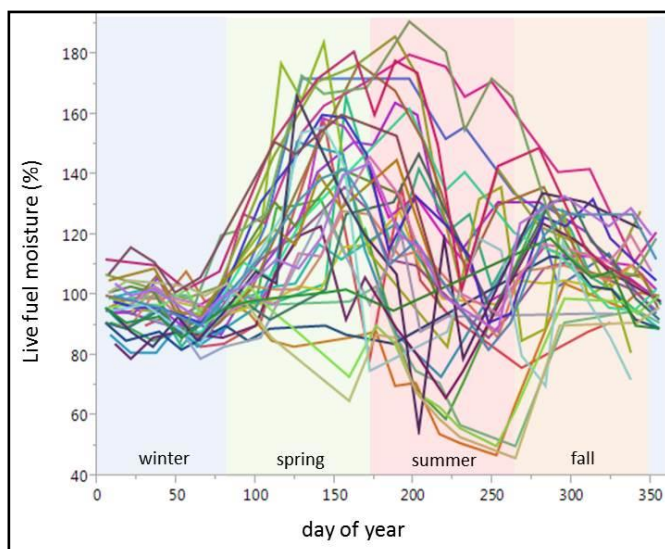
Research and Monitoring

Outside entities as well as WQPL staff conduct research on WQPL land. This year saw a continuation of projects started in preceding years by researchers from the University of Texas, the Barton Springs Edwards Aquifer Conservation District, the US Geological Survey, Texas Water Development Board and the City of Austin Watershed Protection Department.

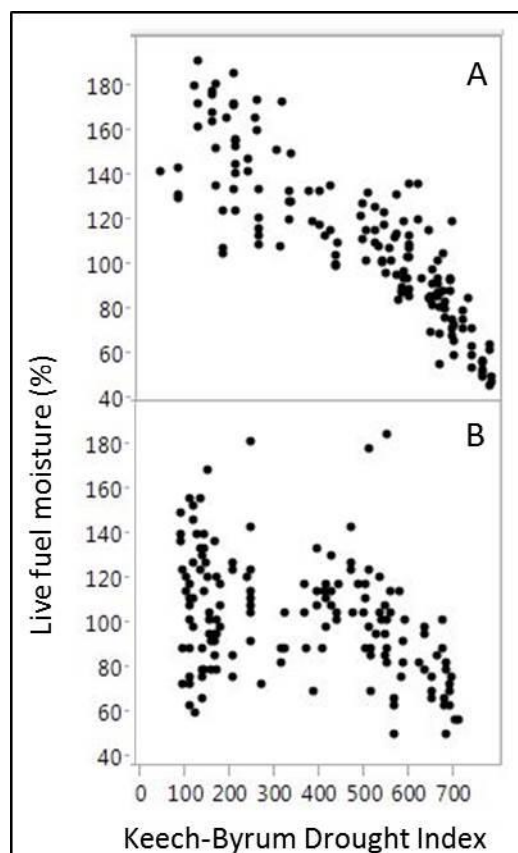
Vegetation monitoring also occurred at 11 locations on three management units to evaluate the effects of land management and restoration activities.

WQPL staff also began analyzing eight years of live fuel moisture data taken from the WQPL and BCP lands. In 2007, a dedicated volunteer team began monitoring Ashe juniper live fuel moisture. This is the amount of water contained in the living leaf tissue relative to the amount of dry matter. This information is an important component of prescribed burn planning as it indicates the types of fire behavior that can be expected in juniper canopies.

Analysis reveals a significant seasonal difference in the response of leaf moisture to soil moisture. Academically, what



Since 2007, regardless of rainfall, juniper live fuel moisture has tapered to a relatively narrow range during the winter months.



Eight years of data indicate that drought influences juniper live fuel moisture, and by extension fire behavior, more significantly in the summer (A) than in the winter (B).

this means is that the ecosystem may shift from energy-limited in the winter to water-limited in the summer. Practically, for fire planning, this analysis introduces some predictability to the seasonal variation of live fuel moisture and also provides some trigger points for when drought levels may correspond to critical tipping points in fire behavior.

This research will be presented at the 6th International Fire Ecology and Management Congress in November 2015 and will also be written as a peer-reviewed paper, submitted for journal publication and co-authored with the team of volunteer field monitors.

Maintenance and Patrol

Maintenance activities and patrols occurred on all tracts. Primarily facilities staff patrolled almost 15 square miles of fee simple lands and maintained over 75 miles of boundary fencing, 95 miles of roads, 67 gates, 4 office buildings, 3 residences, and 2 other structures used for events.

Approximately 2.5 miles of Wildland Urban Interface (WUI) and several other areas around buildings were mowed through a contract with the Health and Human Services Department's Austin Youth Development Program. This is done to a) provide emergency vehicle access in the event of a wildfire or other emergency incident in the area, b) reduce the likelihood of a wildfire moving from the neighborhood to WQPL land, c) reduce the intensity of a wildfire moving from WQPL land to the neighborhood, and d) provide access for staff patrols in the area. The added presence in these areas as well as the visual cue (mowed grass) that the areas are being "maintained" have also reduced boundary issues such as cut fences and dumping.

The program created a total of 2,345 feet of new travel corridor/WUI shaded fuel breaks on the Slaughter Creek management unit this year. The purpose of this project was the same as the WUI mowing described above. The work was conducted by the Austin Fire Department Wildfire Division according to the Guidelines for Fuel Treatment on Water Quality Protection Lands adapted from The City of Austin Fuel Treatments Best Management Practices within the Balcones Canyonlands Preserve as well as the National Fire Protection Association emergency vehicle clearance standards.

Endangered Species

This year, 2,768 acres of endangered species (black-capped vireo and golden-cheeked warbler) surveys were contracted across four management units. These surveys, the tenth conducted on the WQPL since its inception in 1998, documented the presence of each of these species and the locations and sizes of individual breeding territories. Such surveys are a key step in a continual process of updating our understanding of how the WQPL can accomplish its water quality and quantity missions without negatively impacting endangered species habitat.

Illegal Activities

Every year, Wildlands staff – primarily our Land Management Rangers – must deal with various types of illegal or unauthorized activities from relatively benign issues such as off-trail

use and illegal dumping to more serious threats such as poaching, looting, and homeless encampments. We take all illegal or unauthorized activity seriously and do our best to address it quickly and effectively.

The argument is often made to approach seemingly benign issues such as off-trail use and trespass on publicly-owned land with leniency. After all, most of these issues are harmless, at least acutely. There are, however, three strong motivations for maintaining a firm posture with respect to trespass and enforcement of trail rules:

The first relates to public trust. The WQPL program was created with voter-approved bond funds for the chief and express purpose of protecting natural resources, namely water quality. Thus, upholding public trust in a functional democracy dictates that this voter directive be followed. Recreational activities can be accommodated within a conservation mission, and indeed public access was part of the language of successive WQPL bond propositions, but conservation must remain the priority. Where there is a conflict between the two, conservation should take priority. Hence, property boundaries and trail rules must be stringently enforced in order to avoid the environmental damage such as soil erosion, trash dumping, damage to endangered species habitat, and human health impacts (ex. fecal coliform in creeks) that can result from unfettered public access.

The second is another, and perhaps stronger, public trust argument. It concerns the limitation of resources. Time and money spent addressing serious and widespread illegal activity on the WQPL means less time and money for our primary mission of conservation. If the conservation mission is not being fulfilled, then the resources we are tasked to restore and maintain will degrade. Slowly and imperceptibly we will fail the public by not delivering the environmental services we have been contracted to deliver. Thus, taking illegal or unauthorized activity seriously and addressing it early will keep it small and isolated and will allow more resources for our conservation mission.

The third concerns public safety. Unenforced boundaries or trail rules can enable access in places and at times that are unexpected. Much of our work such as prescribed fire, heavy equipment operation, herbicide application, and wildlife management can pose significant danger to people who are located where they are not known or expected to be. County, State, and National parks and forests employ their own commissioned peace officers who carry sidearms and write citations. In contrast, our rangers at the WQPL are not commissioned, so we do not have the luxury of allowing illegal activity to escalate. We must act quickly to keep illegal activity relatively benign so that an unarmed City employee with no law enforcement authority can deal with it safely and effectively in order to keep our lands safe for staff, volunteers, and abiding trail users.

Trespass

In total, 220 hours were spent on patrols at the Slaughter Creek management unit alone. This is 80 fewer hours than last year. Even though the commitment of the stakeholder groups to maintaining the trail itself is almost unparalleled in our area, trespass on this management unit has increased since the opening of the Slaughter Creek hike and bike trail. Land Management Rangers maintain 5 motion-activated cameras to detect and track trespass and other unauthorized activities.

The Shudde Fath tract adjacent to the Barton Creek Greenbelt near Mopac and Loop 360 is a perennial source of trespass problems. Land Management Rangers, alongside Austin Police, spent 230 hours conducting quarterly sweeps of homeless camps. Land management rangers also spent an additional 30 hours facilitating the cleanup of a sewage spill on this tract.

The Upper Bear Creek management unit south of the Wildflower Center between Mopac and Shady Hollow is also seeing more trespass. This year numerous individuals were encountered on the property without proper authorization.

Public Access and Involvement



Outreach & Education Activities

The education and volunteer staff facilitated over 96 volunteer and educational events in support of the WQPL. Of these, 65 events were held on WQPL lands. These events reached 2,836 individuals, including 1,353 youth.

Volunteers performed valuable tasks such as leading educational hikes, seeding native grasses, collecting native grass and wildflower seed, assisting with vegetation surveys, and collecting and processing juniper live fuel moisture samples. Over 270 people participated in interpretive hikes on the WQPL, over 870 students from all across Austin visited the WQPL and learned about ecology and conservation from staff biologists, and over 100 people participated in volunteer workdays in which they helped further the WQPL mission and also forged their own connections to the lands and waters we manage.

Stakeholder Projects

From the Stakeholder Steering Committee, two coalitions of stakeholders have continued to operate multi-use trails on two WQPL properties. The Bull Creek Foundation continues to operate the trail on the Bull Creek Management Unit with few issues. The primary violations tend to be associated with trail users leaving the trail and accessing Bull Creek. This activity often leads to the creation of unauthorized trails which can damage riparian vegetation and lead to a cycle of erosion and sedimentation.

The Slaughter Creek Trail continues to be operated by a group of stakeholders led by the Austin Ridge Riders. To help users stay updated on the status of the trail (closures are required after significant rain events) Twitter and Facebook are utilized to inform users of the trail status and have allowed some instant feedback as well as additional information about the trail. There have been some problems associated with this trail, primarily an observed increase in the incidence of off-trail use which required over 200 hours of staff time to address (see Illegal Activities, above).

Overall, despite the numerous trespass and unauthorized use violations, the trails themselves have been well-maintained and managed by each of the MOA signatory groups. Minor issues have been promptly addressed. The commitment of the Slaughter Creek trail stewards has been remarkable.

Other Activities

Central Texas Flood Response

Two WQPL staff members along with four other Wildland Conservation Division staff spent three days aiding in the search and rescue effort after the Memorial Day floods along the Blanco River. The assistance of the Wildland Conservation Division was requested by the Hays County emergency operations coordinator.

Division staff responded with chainsaws, ATVs, portable radios, and other equipment. Near the town of Kyle, staff worked with the Kyle Fire Department, the National Guard, and statewide search and rescue teams to provide wildland navigational and mapping expertise to a large, remote search and rescue operation. Near Wimberley, staff worked as a technical saw team to facilitate the efforts of Wimberley emergency services and K9 search teams in victim recovery. Many of the most valuable skills the team utilized in this effort – skills such as technical falling, knowledge of incident command systems, portable radio programming and operation, and fluid crew dynamics - had been acquired and honed during prescribed burn training and operation.

As neighboring landowners in Hays County, we were proud to be able to provide assistance to our neighbors in a time of need.



Two WQPL staff along with four others from the Wildland Conservation Division spent three days aiding the search and rescue effort after the Blanco River floods. Even with photos, the size and extent of the flood debris is difficult to convey. Here, three members of the Wildland team (yellow shirts) take a break from chainsaw work while Wimberley firefighters (navy shirts) dig away loose sediment and flood debris.

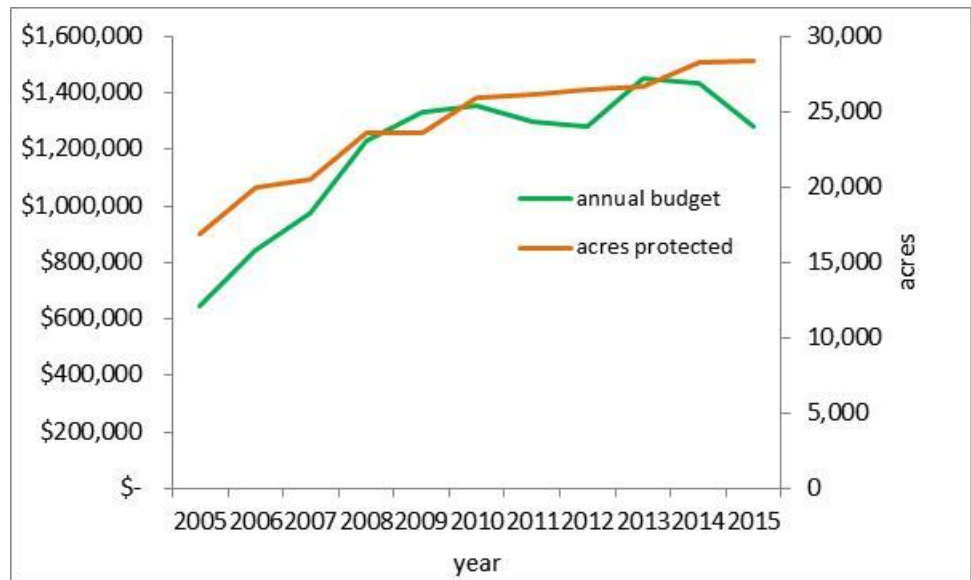
Budget

The WQPL began the year with a budget of \$1,280,513 across four expenditure categories; personnel, services, contractual, and commodities.

Budget Area	2015 Amended Budget		Spent	
Personnel	\$823,166	64.3%	\$874,819	70.9%
Services	\$209,186	16.3%	\$170,893	13.8%
Contractual	\$159,892	12.5%	\$138,836	11.2%
Commodities	\$88,269	6.9%	\$49,985	4.0%
Total	\$1,280,513	100%	\$1,234,533	100%

This year's budget was an almost 11% decrease from FY 2014. We are currently operating at the spending level of FY 2008/2009.

Additionally, since this time the amount of land the program protects and manages has increased almost 20% and personnel costs have increased 25%.



Staffing

As of October 1, 2014, our organizational chart is as follows:

The WQPL mission is implemented by:

- Kevin Thuesen, Ph.D. Environmental Conservation Program Manager
- Matt McCaw, Biologist Sr.
- Devin Grobert, Biologist

The program is supported by the following Wildland Conservation Division staff:

- Willy Conrad, Wildland Conservation Division Manager
- Luke Ball, Fire Management Specialist
- Kimberlee Harvey, Environmental Regulatory Specialist
- Rick Hudson, Facilities Supervisor
- Jesus Borja, Heavy Equipment Operator Lead
- Rob Brooks, Land Management Ranger
- Hunter Denham, Building and Grounds Lead

Johnny Ross, Land Management Ranger
Robbie Boyer, Building and Grounds Lead
Monica Pauliuc, Administrative Senior
Amanda Ross, Education and Outreach Coordinator
Cait McCann, Volunteer Coordinator

All staff are housed at Reicher Ranch, 3621 South FM 620, Austin TX 78738.