Rewilding Zilker Park

A VISION FOR PEOPLE AND THE PLANET

Austin, Texas • October 2021 (updated January 2022)

Roadrunner in Zilker Park's Austin Nature Center. Courtesy of George Afghan.

None of Nature's landscapes are ugly so long as they are wild.

— *John Muir, Our National Parks 1901*

* This vision plan is a dynamic document that will evolve with public input and new information. *

Please visit the Save our Springs Alliance website
for a link to this presentation, references cited, and additional information

Cover image by Julie Mak. Source: Shutterstock.com.

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'Cedar Infiltration' by Elizabeth McGreevy

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EXECUTIVE SUMMARY

PROJECT BACKGROUND

Parts of Barton Springs Pool are currently integrated with wild areas.

Parts of Zilker Park are being loved to death, while other parts are being under-utilized due to a lack of shade.

A 2020-2021 city-wide survey revealed 82% of Zilker Park survey respondents supported expanding natural areas in the park. Hundreds expressed concern about the negative impacts of large events and commercialization. Climate mitigation and post-Covid public health have become URGENT priorities. Water quality and quantity issues are also of paramount concern.

To address these needs, Save Our Springs Alliance, with support from Zilker and Bouldin Creek Neighborhood Associations, sponsored this project to rewild Zilker Park. We invite everyone to actively engage with us in the Zilker Park vision plan process.

EXECUTIVE SUMMARY

REWILDING EXAMPLE IN ZILKER PARK

A small portion of Zilker Park, along Azie Morton Road, has already been rewilded, mostly by community volunteers. With volunteer effort and reduced mowing, rewilding took place quickly, at low cost and with great benefits.

Little Zilker Creek at Azie Morton Road prior to starting the project in 2012.

Area was allowed to rewild using adaptive vegetation management. Clustered plantings were added as needed to boost species richness and non-native plants were consistently removed. Follow up photo taken in 2018.

EXECUTIVE SUMMARY

GOALS

Child picking a sunflower in a Zilker Park wooded prairie

- Support physical and mental health by connecting people to nature
- Give people what asked for– nature, trails, and water features
- Help implement the recently adopted Austin Climate Equity Plan [ACEP, 2021]
- Reduce erosion, enhance wildlife habitat, and protect water resources.

EXECUTIVE SUMMARY

OBJECTIVES

- Return at least 75 acres (21% of the park) to a natural state using the principles of rewilding. Will include reducing mowing and parking.

- Use rewilding to decrease erosion, downslope flooding, and improve water quality. Where erosion has been found to be significant, such as along lower Barton Creek, restoration efforts should begin *immediately*. [Fowler, 2021; Siglo Report 2021]

- Greatly increase tree canopy shade to enhance recreation and movement for people and benefit wildlife.

- Strategically use vegetation and soil microbes to reclaim the Butler Landfill (phytoremediation).

- Incorporate engineered systems and increase old-growth forests to reduce erosion and improve groundwater quality and vegetation health (green infrastructure).

EXECUTIVE SUMMARY

REWILDING BASICS

Red Buckeye in Zilker, source iNaturalist

American Goldfinch in Zilker, by George Afghan

Chantrelle near Zilker, source: iNaturalist

Rewilding is a process in which nature takes the lead but is guided by adaptive vegetation management. The process will:

- Enhance Park Experience and Mental Well-being
- Reduce the Heat Island Effect
- Reduce Erosion and Downslope Flooding
- Improve Water Quality and Quantity
- Increase Wildlife Diversity
- Reduce Maintenance Costs over the Long-term

EXECUTIVE SUMMARY

THE REWILDING PLAN

Aerial photo of Zilker Park overlaid with proposed areas to rewild (shown in solid green). Source: Zilker Park Metropolitan Park Vision Plan, 2021

At least 75 acres of Zilker Park's 350 acres should be rewilded to increase the overall percentage of wild areas.

Rewilded areas will include a mix of forests with meadows, open woodlands, and savanna wetlands to accommodate different soils, slopes, and everyday park needs.

PROJECT CONTEXT

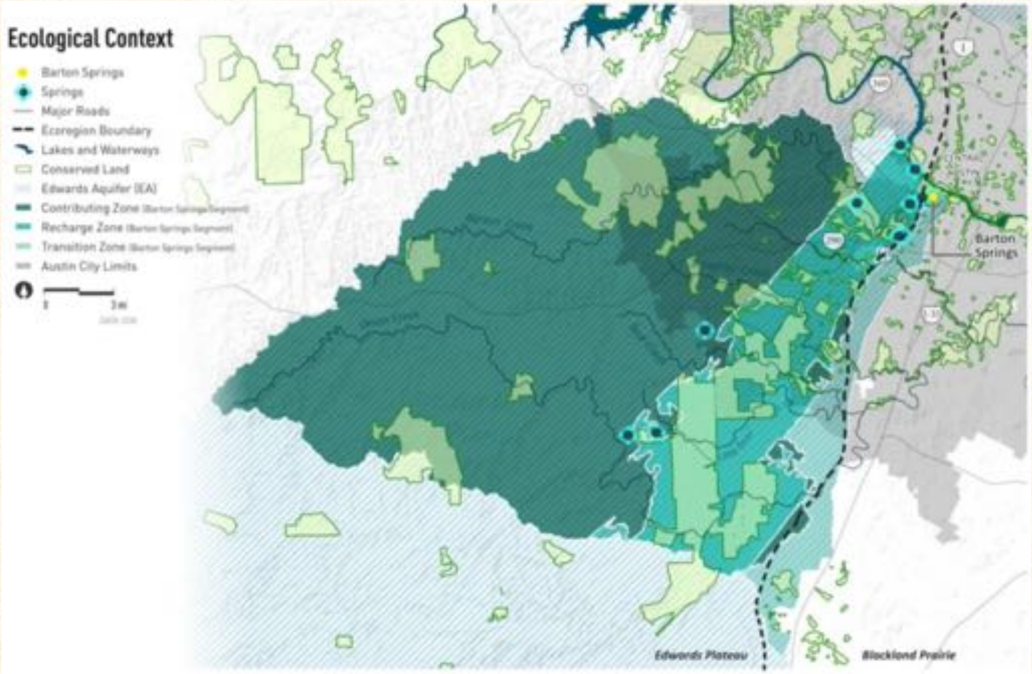
O V E R V I E W

'Cedar Infiltration' by Elizabeth McGreevy

1. The Barton Creek Watershed
2. Barton Springs – A Life Source
3. Historically, Zilker Park Was More Forested

PROJECT CONTEXT

THE BARTON CREEK WATERSHED



Map produced by Siglo Group, 2021. Source: Zilker Park Metropolitan Park Vision Plan, 2021

Any vision for Zilker Park's future must start with the necessity of urgent action to minimize development upstream through science based regulations (e.g. Clean Water Act, Endangered Species Act, and the SOS Ordinance) and rapid permanent watershed land protection with public and private funds.

The most important part of a Zilker Park Vision Plan must look and take action upstream of the park, to preserve natural areas and ranchlands in southwest Travis and northwest Hays counties.

PROJECT CONTEXT

BARTON SPRINGS – A LIFE SOURCE

The reverence for Barton Springs was expressed through community baptisms. Reverend C. R. Bullock performed this group baptism at Barton Springs in 1924. Source: the Church on Congress Avenue.

Barton Springs is the life source of Austin. Long before it became known as Barton Springs, it served as source of water and spiritual healing for Native Americans. The springs was depicted as part of a spiritual journey on the 4,000-year-old White Shaman panel near the Rio Grande River.

Some of the most public battles fought by Austin-based environmental advocates have revolved around Barton Springs.

> [Barton Springs] is a sacred space [that] ought to belong to all the people of Austin.
>
> — *Andrew Jackson Zilker, 1917*

PROJECT CONTEXT

ZILKER HISTORICALLY WAS MORE FORESTED

Zilker Park was dominated by dense riparian woodlands and forests when Europeans started settling the region in the early 1800s.

> Barton's Creek empties into the Colorado on the west side, near Austin… the water is pure and cold, and, lending its temperature to the stream, it is a favorite resort for bathing in summer … the country on this creek presents an extensive range of [Mountain] cedar hills and is much broken.
>
> *— Jacob Raphael de Cordova, 'Land Merchant of Texas' and state representative to the Second Texas Legislature, 1828*

PROJECT CONTEXT

HISTORICALLY, ZILKER PARK WAS MORE FORESTED

Much of original vegetation was removed to make room for livestock, mills, and recreation. These actions resulted in a loss of tree canopy and wildlife habitat and significantly increased erosion. [Siglo Group, 2021]

Upper Barton Creek Bridge, late 1800s, shows bank erosion from lack of dense tree cover. Source: Chalberg Collection of Prints and Negatives at the Austin History Center.

BENEFITS OF REWILDING

OVERVIEW

'Cedar Infiltration' by Elizabeth McGreevy

1. Enhances Park Experience and Well-being
2. Increases Diversity for People and Wildlife
3. Reduces the Heat Island Effect
4. Reduces Erosion and Improves Water Quality

BENEFITS OF REWILDING

ENHANCES PARK EXPERIENCE AND WELL-BEING

Bicyclist taking a break on Barton Creek.

As nature protection and rewilding initiatives gain momentum around the globe, there is renewed focus on the potential health and social benefits of interactions with nature for individual people and communities. [Maller et al., 2019]

Group of hikers in Zilker Park.

> Scientists found that when people swap their concrete confines for a few hours in more natural surroundings - forests, parks and other places with plenty of trees - they experience increased immune function.
>
> — *Anahad O'Connor, The New York Times, 2010*

BENEFITS OF REWILDING

INCREASES DIVERSITY FOR PEOPLE AND WILDLIFE

Mother and daughter hiking along a nature trail. Source: Dreamstime.

Wildlife habitat is enhanced by more diversity and connectivity. Increasing wildlife habitat also attracts urban nature enthusiasts and hiking.

Urban birders in Central Park, New York. Source: J. Burger for Audubon New York.

Ringtail in the Austin Greenbelt. Courtesy of Robby Deans.

BENEFITS OF REWILDING

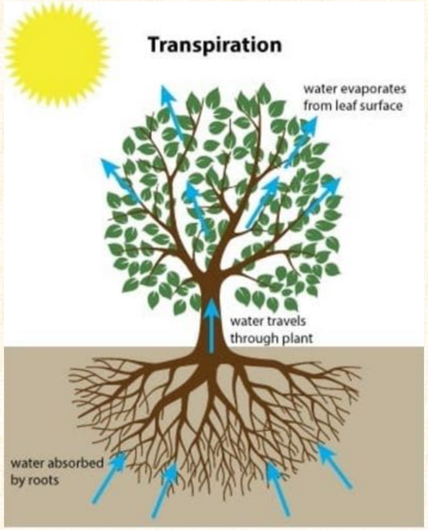
REDUCES THE HEAT ISLAND EFFECT

Urbanized areas tend to be hotter than outlying areas. This effect causes heat islands. If not reduced, hardscape alone could drive city temperatures up 7 degrees by 2050 as our changing climate grows warmer, according to a City of Austin report. [Nature in the City 2015] Wild areas mitigate the heat island effect by shading hardscapes, sequestering carbon dioxide, and filtering air pollutants. [Haynie, 2021; EPA, 2021]

Hill Country tree cover reduces the heat island effect. Most of the Hill Country sits on a type of limestone bedrock with caves and aquifers, called karst. Karst serves as massive carbon sinks worldwide. [Zhou, 2015] Where soils are more shallow over karst, the roots of tree cover will sink carbon deeper to prevent evaporation back to the atmosphere. Groundwaters will increase the most with tree cover over karst. [McGreevy, 2021]

BENEFITS OF REWILDING

REDUCES THE HEAT ISLAND EFFECT



The urban heat island effect is also mitigated when tree cover uses water. When tree roots bring up deeper, cooled groundwaters and release the moisture through their leaves, the air can be cooled by 2 to 9 degrees. [EPA, 2021] The older and more intact the tree cover, the better it is at cooling. Transpiration also benefits public health by removing air pollutants. [Weyens, et al., 2015]

> Next to ice-covered areas, forests are the most important factor for keeping [the planet] cool.
>
> *— Marina Richie, science writer and author of "The Secret Power of Old-Growth, 2020*

BENEFITS OF REWILDING

REDUCES EROSION AND IMPROVES WATER QUALITY

'Cedar Infiltration' painting by Elizabeth McGreevy illustrates the downward movement of rainwater into the ground.

Well-vegetated wild areas restore and maintain healthy, spongy soils. Vegetation with deeper, woody roots increases porosity of the limestone bedrock by sinking rainwaters and carbon.

Together, these factors increase the amount of rainwater that enters the soil and reduces the overland flows that cause erosion and flooding. As more rainwater soaks into healthy soil, the soil and plant roots filter groundwaters.

References: Berardelli, 2010; Birdsey, 1992; Dasgupta et al., 2006; Hester et al., 1997; Knight et al., 1984; Magdoff et al., 2009; McGreevy, 2021; Nelle, 2014; Slaughter, 1997; Sorenson, 2004; Taucer et al., 2006; Urich, 2002; Wilcox et al., 2010; Zhou, et al., 2015.

REWILDING RECOMMENDATIONS

OVERVIEW

'Cedar Infiltration' by Elizabeth McGreevy

1. How Areas Were Selected
2. Butler Landfill: a Case for Phytoremediation
3. The Rewilding Plan
4. Proposed Cover Types
5. Parking Reductions

REWILDING RECOMMENDATIONS

HOW AREAS WERE SELECTED

Park visitors spread out and walking in the sun on a hot summer day.

Large open areas require park visitors to walk long distances in full sun across regularly mowed grass. Without a continuous tree canopy or wild areas, wildlife habitat is also fragmented in these areas.

The solution is to use rewilding to develop shaded, woodland corridors to enhance and guide pedestrian movement and increase wildlife habitat connectivity.

REWILDING RECOMMENDATIONS

HOW AREAS WERE SELECTED

Severe rill and sheet erosion is occurring in the riparian forest downslope of the landfill parking lots. Sheet and rill erosion are severe.

Erosion is most severe along Barton Creek and Lady Bird Lake, caused in part by mowed upslope areas. These areas can be rewilded to reduce erosion without affecting daily park use.

For detailed riparian erosion management strategies, reference the Siglo Report prepared for the Barton Springs Conservancy and the report by Dr. Norma Fowler produced for the SOS Alliance.

> Soil erosion is threatening the large trees along the creek…continuing erosion could eventually kill these trees…or could cause them to topple over.
>
> *— Dr. Norma Fowler, University of Texas biologist, Fowler, 2021*

REWILDING RECOMMENDATIONS

HOW AREAS WERE SELECTED

One of the numerous gullies that starts at the Great Lawn.

Dramatically expanding vegetated buffers along lower Barton Creek and Lady Bird Lake will decrease erosion. Rewild and improve upland soils and incorporate green infrastructure. Reduce the eastern section of Lou Neff Road to a single lane and replace with pervious pavers.

More than 24" of soil has eroded under this pecan tree just below the Great Lawn.

REWILDING RECOMMENDATIONS

HOW AREAS WERE SELECTED

Caliche (top) and exposed bedrock (bottom) at the main entrance

Mowed, degraded grass cover does not help rainwaters to soak into the ground to recharge groundwaters; instead it causes erosion and downslope flooding where shallow soils exist over limestone bedrock. [McGreevy, 2021] Dense tree cover is more beneficial.

Areas that showed caliche and/or exposed limestone bedrock were marked as areas to be rewilded (polo field and main entrance). These areas have soils less than 14″ deep over bedrock (see the Map of Soils and Topography).

REWILDING RECOMMENDATIONS

HOW AREAS WERE SELECTED

The presence and age of native plants provided clues to which areas should be wooded or open. More than 12 cover types were identified and referenced (see Existing Wild Areas section).

White Shin Oak at Macbeth

American Elm thicket at the west Butler Landfill

Western Soapberry inside a Texas Live Oak thicket

Mountain Cedar, +200 years old, at main entrance

Yellow Passion Vine and Cedar Sedge

REWILDING RECOMMENDATIONS

BUTLER LANDFILL: A CASE FOR PHYTOREMEDIATION

A large portion of the landfill is currently a dusty, overflow parking lot.

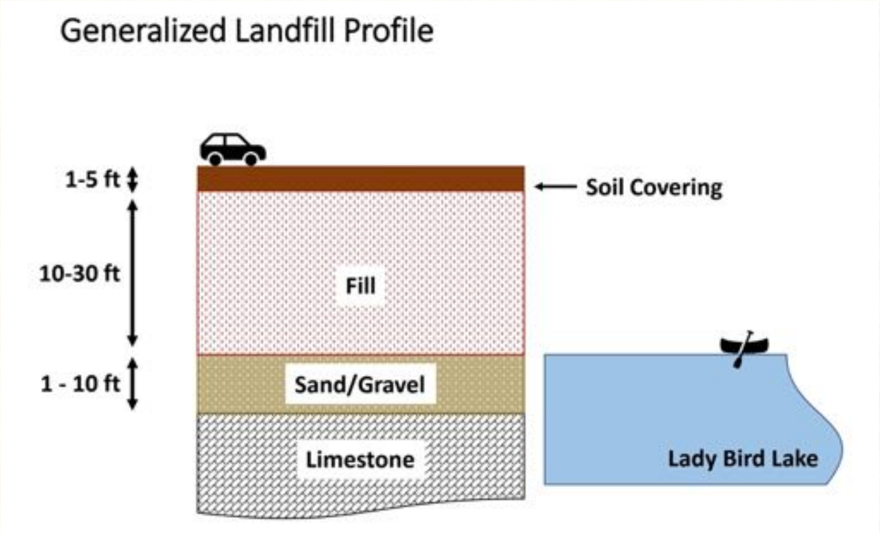
The Butler Landfill consists of 27 acres along Lady Bird Lake. Although the riparian edge has returned to forest, 18 acres of the landfill are degraded, over-mowed or serving as a parking lot.

Return this area to forest, using phytoremediation and rewilding to reduce leachate (contaminated landfill water/soil) if found, buffer Mopac noise, reduce riparian erosion, and enhance wildlife habitat.

> The highest and best use for this area from an ecological perspective – considering its adjacency to the Lake and location with Zilker Park – is to … restore the area to a woodland and/or savanna.
>
> — *Siglo Group, Zilker Park Natural Resource Inventory, 2021*

REWILDING RECOMMENDATIONS

BUTLER LANDFILL: A CASE FOR PHYTOREMEDIATION



Cross section of the landfill shows only a "soil covering," not a cap or liner. Source: Herrington, 2018.

Phytoremediation cleans up contaminated sites, including Texas superfund sites.

The Butler Landfill is a good candidate for phytoremediation because it has no clay cap or geomembrane liner. As it exists, much of the landfill is a hotspot devoid of life that contributes to erosion and could pollute waters.

References: EPA, 2005; Zalesny et al., 2006; Leggette, Brashears, & Graham, Inc., 2012; Corbin et al., 2016; Banegas, 2021

> The landfill was not capped per current standards, but just covered with soil.
>
> — *Chris Herrington, former City of Austin Environmental Officer*

REWILDING RECOMMENDATIONS

BUTLER LANDFILL: A CASE FOR PHYTOREMEDIATION

Phytoremediation of an uncapped Meadowlands, New Jersey landfill. A study concluded that it "demonstrated that reforestation of even severely degraded habitat can be achieved with minimal management after site preparation and cluster planting." [Corbin, et al., 2016.]

The landfill in 1991. The site was covered with 24" of subsoil and 12" of topsoil. Source: Corbin et al., 2016.

The landfill in 2010 following 19 years of phytoremediation. Trees were planted in dense clusters and allowed to spread to jumpstart the rewilding process. Source: Corbin et al., 2016.

REWILDING RECOMMENDATIONS

Phyto-cap over an abandoned, uncapped landfill in Virginia owned by a chemical company. The area was planted with more than 18,000 poplar cultivars bred to handle leachate in 2001 by Roux, Inc.. The tree cover can treat up to 15,000 gallons of leachate and stormwater runoff each day. Source: Roux, Inc.

REWILDING RECOMMENDATIONS

BUTLER LANDFILL: A CASE FOR PHYTOREMEDIATION

Plantings (top) and forest rewilding (bottom) have occurred on the Butler Landfill

An area of the landfill that runs along the Butler Trail just east of Mopac is called Zilker Bluffs. It was planted in 2006 by the Trail Foundation and Austin Parks and Recreation. The plantings include many trees on low berms.

Also, along the northern edge of the landfill, the vegetation cover has been allowed to return to forest.

Both of these areas demonstrate that rewilding the entire landfill with forests and woodlands is feasible.

REWILDING RECOMMENDATIONS

THE REWILDING PLAN

PROPOSED COVER TYPES

- Forest (25 acres)
- Phytoremediation (+ forest and woodland cover types) (15 acres)
- Dense Woodland (8 acres)
- Open Woodland (23 acres)
- Green Parking Woodland (3 acres)
- Savanna Wetland (1 acre)

TOTAL: 80 acres minimum (22% of park)

REWILDING RECOMMENDATIONS

PROPOSED COVER TYPES

Forest *(characterized by a 85% to 100% canopy closure)*
Multiple horizontal and vertical layers of understory trees and vines. Clustered mid-understory shrubs and unmowed groundcovers with infrequently mowed small grassy meadows. Contains fallen debris and snags. Used for trails, passive recreation, and nature observation.

Dense Woodland *(characterized by a 70% to 85% canopy closure)*
Multiple horizontal and vertical layers of understory trees and vines. Dense mid-understory with grassy or woody thickets. Used for trails and nature observation.

Open Woodland *(characterized by a 50% to 70% canopy closure)*
Small clusters of mid-understory shrubs and small trees with continuous cover of unmowed groundcovers or infrequently mowed grassy meadows. Where established canopy is present, mowing should be reduced by at least 75%. Used for trails and recreation.

Green Parking Woodland *(characterized by a 70% to 85% canopy closure)*
Densely planted trees and wide parking islands (15′ minimum) to produce a robust canopy cover and support clustered understory trees and a continuous, unmowed groundcover.

Savanna Wetland *(characterized by the presence of wetland vegetation)*
Savanna with infrequently mowed grassy meadow. Contains stand-alone trees and forbs that tolerate seasonal poor drainage or wetland conditions. Used for trails and nature observation.

REWILDING RECOMMENDATIONS

PROPOSED COVER TYPES

Mowed nature trail through a regenerating Bald Cypress forest.

Forests and Dense Woodlands can be used for quiet nature observation and hiking.

Black-chinned Hummingbird and Red Shouldered Hawk in the Austin Nature Center. Source: Gary St. Clair

Open Woodlands can be used for informal, shaded recreation activities and gatherings such as picnics, walking, reading, and outdoor photography.

Park users gathered for a picnic in the shade of an open woodland adjacent to a large mowed recreation area. Source: Wikipedia Commons by Mænsard vokser.

REWILDING RECOMMENDATIONS

PROPOSED COVER TYPES

Green Parking Woodlands are rewilded and/or reforested areas that are designed to accommodate parking spaces. They will contain a significant tree canopy and pervious hardscape to reduce temperatures and overland flows. [Nature in the City, 2015]

Partially mowed parking merged with forest edge to accommodate overflow parking.

Green parking with pervious pavers. Source: buildabetterburb.com.

REWILDING RECOMMENDATIONS

PARKING REDUCTIONS

- The bulk of the Butler Landfill should be phytoremediated and rewilded to accommodate forests and woodlands. A strip of Green Parking Woodland along Stratford Drive could be beneficial.
- Remove 15 spots in the northeast corner of the Mopac parking lot and install green infrastructure to handle landfill subsidence and severe erosion.
- Much of the Polo Fields should be rewilded. Some areas could accommodate soccer fields with most rewilding occurring in the western half.
- Remove the 80-space parking lot near the main park entrance and adjacent to Barton Springs Road and the portion of Andrew Zilker Road leading to the parking lot to dramatically increase the Barton Creek riparian buffer and remove the jarring visual of a parking lot at the main entrance.

NOTE: This vision plan doesn't detail all parking issues. However parking within Zilker Park should be dramatically reduced while increasing other forms of park access.

EXISTING WILD AREAS IN THE PARK

OVERVIEW

'Cedar Infiltration' by Elizabeth McGreevy

1. Why Look at Wild Areas?
2. Map of Topography & Soils
3. Surveyed Plant Communities
4. Map of Surveyed Plant Communities
5. Examples of Surveyed Plant Communities

EXISTING WILD AREAS IN THE PARK

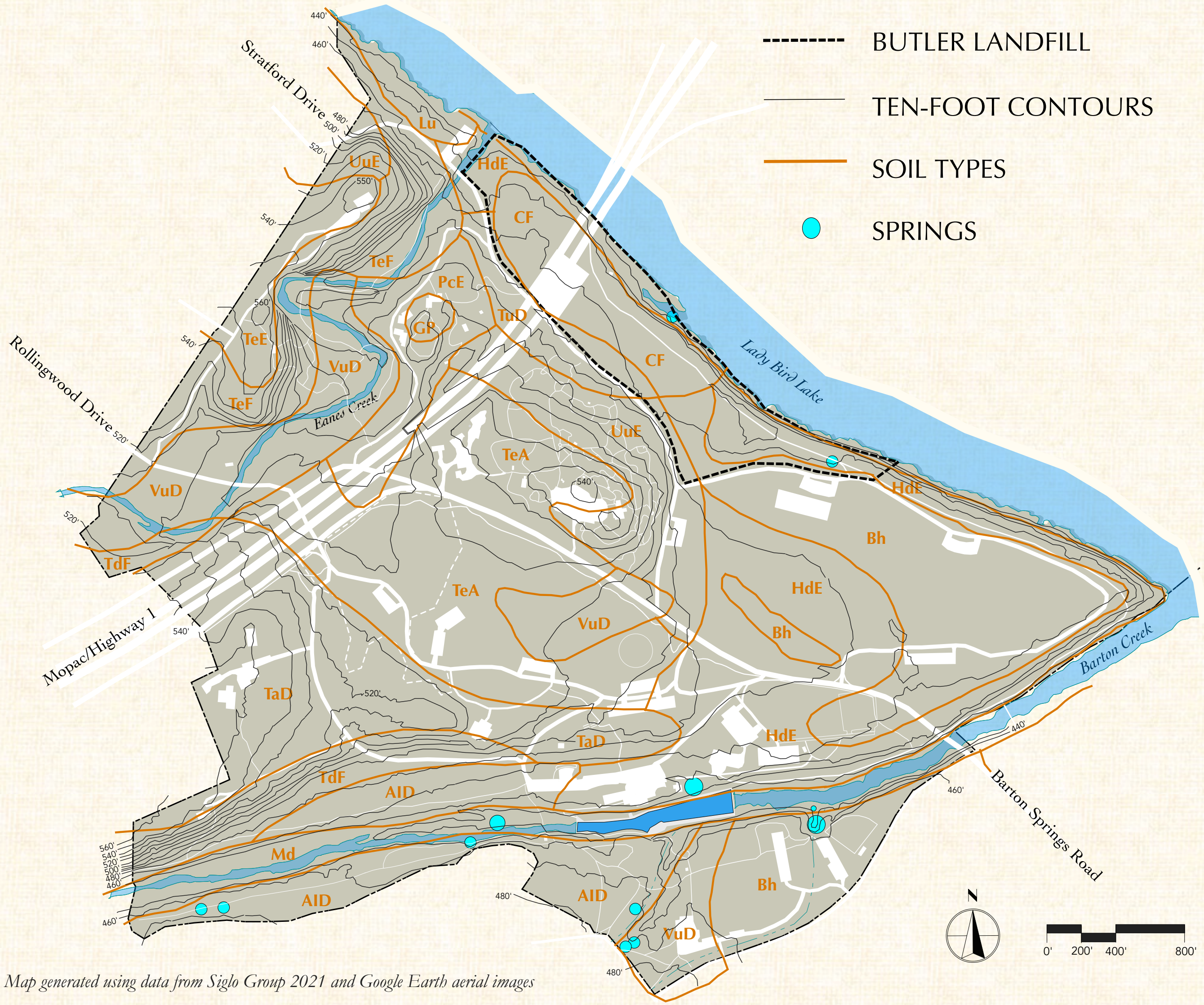
WHY LOOK AT WILD AREAS?

Existing wild areas guide restoration by providing clues to what potential rewilding can look like at different stages. Remnant native habitats inside the park were used to guide this effort.

Wild areas with soils that were similar to proposed rewilding areas were studied to obtain clues to guide recommendations. For instance, an area of AID soil (see Map of Topography and Soils) that is covered with a pecan forest suggests that a nearby area north of the creek with AID soils could also be pecan forest.

EXISTING WILD AREAS IN THE PARK

MAP OF TOPOGRAPHY & SOILS



Map generated using data from Siglo Group 2021 and Google Earth aerial images

- BUTLER LANDFILL
- TEN-FOOT CONTOURS
- SOIL TYPES
- SPRINGS

SOIL TYPES

AlD	Altoga-Urban, >80″ to bedrock
Bh	Bergstrom-Urban, >80″ to bedrock
CF	Cut and fill
HdE	Hardeman-Urban, >80″ to bedrock
Lu	Gaddy-Urban, >80″ to bedrock
Md	Mixed Alluvial, <48″ to bedrock
PcE	Patrick-Urban, >80″ to bedrock
TaD	Eckrant Stony Clay, < 30″ to bedrock
TdF	Eckrant Rock Outcrop, < 14″ to bedrock
TeA	Eckrant-Urban, < 14″ to bedrock
TeE	Steep Eckrant-Urban, , < 14″ to bedrock
TeF	Steepest Eckrant-Urban, < 14″ to bedrock
TuD	Travis-Urban, >80″ to bedrock
UuE	Urban-Brackett, <20″ to bedrock
VuD	Volente-Urban, >80″ to bedrock

EXISTING WILD AREAS IN THE PARK

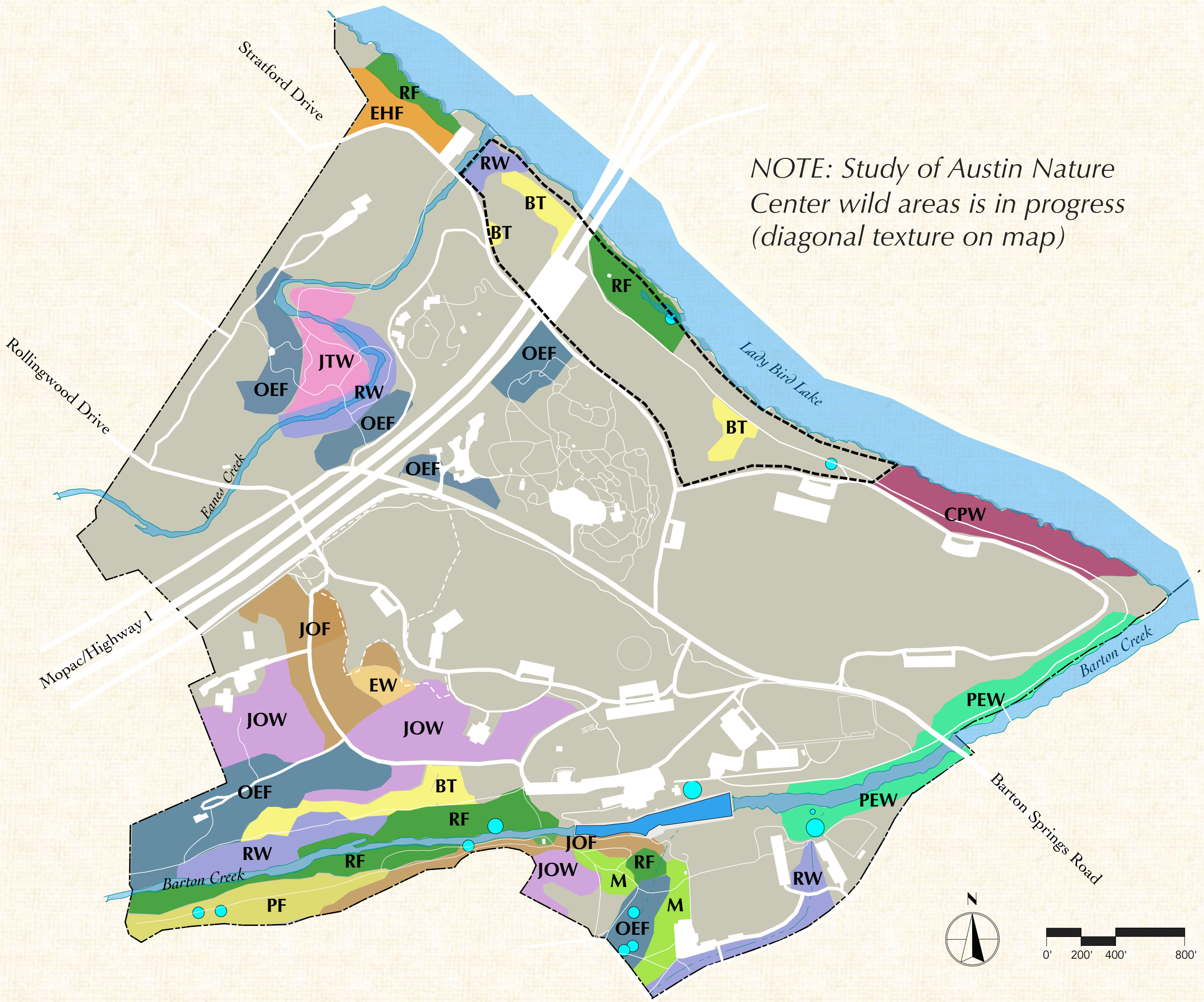
SURVEYED PLANT COMMUNITIES

Wild areas in the park were assessed to identify different plant communities based on location and dominant plant cover. Woodland was defined as having a 50 to 85 percent canopy closure; a forest, 85 to 100 percent closure. Eleven communities were identified. The plant community of each area surveyed was also characterized based on age, understory species, and the presence of non-native invasive plants.

- Juniper-Oak Woodland
- Meadow
- Elm-Hackberry Forest
- Riparian Forest
- Pecan-Elm Woodland
- Cypress-Pecan Woodland
- Elm Woodland
- Juniper-Oak Forest
- Bottomland Thicket
- Oak-Elm Forest
- Pecan Forest

EXISTING WILD AREAS IN THE PARK

MAP OF SURVEYED PLANT COMMUNITIES



NOTE: Study of Austin Nature Center wild areas is in progress (diagonal texture on map)

JOW	Juniper-Oak Woodland
JTW	Juniper Thicket Woodland
EW	Elm Woodland
M	Meadow
JOF	Juniper-Oak Forest
EHF	Elm-Hackberry Forest
BT	Bottomland Thicket
RW	Riparian Woodland
RF	Riparian Forest
OEF	Oak-Elm Forest
PEW	Pecan-Elm Woodland
PF	Pecan Forest
CPW	Cypress-Pecan Woodland

EXISTING WILD AREAS IN THE PARK

EXAMPLES OF SURVEYED PLANT COMMUNITIES

Juniper-Oak Woodland

Elm Woodland

Meadow

Juniper-Oak Forest

EXISTING WILD AREAS IN THE PARK

EXAMPLES OF SURVEYED PLANT COMMUNITIES

Elm-Hackberry Forest

Bottomland Thicket

Riparian Forest

Oak-Elm Forest

EXISTING WILD AREAS IN THE PARK

EXAMPLES OF SURVEYED PLANT COMMUNITIES

Pecan-Elm Woodland

Pecan Forest

Cypress-Pecan Woodland

BASIC RESTORATION STRATEGIES

OVERVIEW

'Cedar Infiltration' by Elizabeth McGreevy

1. Boost Soil Health
2. Reduce Mowing and Impervious Hardscape
3. Engage Volunteers
4. Speed Rewilding with Clustered Plants-Seeds
5. Add Boundaries and Signs
6. Boost and Protect Wildlife Habitat
7. Phytoremediate the Butler Landfill
8. Incorporate Green Infrastructure
9. Use Adaptive Vegetation Management
10. Estimated Costs

BASIC RESTORATION STRATEGIES

BOOST SOIL HEALTH

Healthy soils protect groundwaters, reduce erosion and downslope flooding, enable the storage of deep carbon, and keep plant cover hydrated.

Most areas in Zilker Park with rewilding potential have been mowed and compacted for decades. Most soil has less than 2% organic matter content (need at least 5%). The Butler Landfill has the most degraded and compacted soils.

After a squeeze, degraded (left) fall apart because they lack SOM, while healthy soils (right) retain a loose ball.

Mushrooms under an old-growth juniper-oak forest in the BCP indicate healthy soils. Source: Lisa O'Donnell.

BASIC RESTORATION STRATEGIES

BOOST SOIL HEALTH

Prior to any rewilding, the soils of each area must be analyzed to determine soil biology and mineral contents. A soil restoration strategy will follow.

Some strategies will be more extreme, such as implementing contour-swales. Other areas may just need some extra compost added to each planting hole. Any Harvester Ant mounds encountered should be preserved since they improve soil conditions and potentially provide food for Texas Horny Toads.

Contour-swales can be added to compacted soils that include shallow caliche. Source: Drought Proof Texas at Austin's Festival Beach Food Forest.

Spray compost tea (aerated liquid compost) to boost soil biology.

BASIC RESTORATION STRATEGIES

REDUCE MOWING AND IMPERVIOUS HARDSCAPE

Excessive mowing at the park has caused many soils to erode and become compacted. Near riparian areas, their deteriorated state causes overland flows to increase thereby increasing downslope erosion.

Parking lot adjacent to Barton Springs Road near the main park entrance is unattractive and does not allow for shade or green infrastructure to reduce overland flows.

BASIC RESTORATION STRATEGIES

ENGAGE VOLUNTEERS

Volunteers planting new trees. Source: Festival Beach Food Forest

Most park professionals understand the value of engaging and educating community members through hands-on service and are dedicated to cultivating stewards within their communities.

Bring in organizations such as the Native Plant Society, Tree Folks, and Master Naturalists. Many of these people have extensive knowledge of native plants and natural ecosystems, especially Master Naturalists whose members gain credit through volunteering to maintain their MN status.

Engage youth to serve as volunteers. An excellent resource is American Youthworks.

BASIC RESTORATION STRATEGIES

SPEED REWILDING WITH CLUSTERED PLANTS-SEEDS

Seeding and planting should ONLY take place in late fall. Species should be indigenous (Siglo Report, 2021 provides a detailed list and implementation instructions). Removal of non-native, invasive plants will be on-going.

Forests
Plant dense clusters of tree and shrub saplings (mottes) and stop mowing the spaces in between. Manage plantings as they spread out. Once cover starts to establish (5-10 years), add groundcovers and vines. Remove non-native species.

Dense Woodlands
Stop mowing and manage what comes up. Once the vegetation community starts to emerge (3-10 years), start adding seeds and plants to increase diversity. Always overplant and overseed. Remove non-native species.

Open Woodlands
Reduce mowing by at least 75%. Plant new shade trees to increase canopy cover and add clusters of understory trees and shrubs. Remove non-native species.

BASIC RESTORATION STRATEGIES

SPEED REWILDING WITH CLUSTERED PLANTS-SEEDS

A Savanna Wetland is proposed for this area located at the west entrance of Andrew Zilker Drive.

Savanna Wetland

Install a seasonal wetland to handle overland flows using native vegetation, especially milkweeds, to benefit monarch and other pollinators. Allow the perimeter to rewild, adding clustered plantings and seedings as needed to boost diversity. Remove non-native species.

BASIC RESTORATION STRATEGIES

ADD BOUNDARIES AND SIGNS

Boundaries will identify and protect areas being rewilded. Signs need to be incorporated to explain the process.

Rock walls can define areas and provide habitat for smaller wildlife.

Post-and-rail fences are currently being used at Zilker Park to define areas.

BASIC RESTORATION STRATEGIES

BOOST AND PROTECT WILDLIFE HABITAT

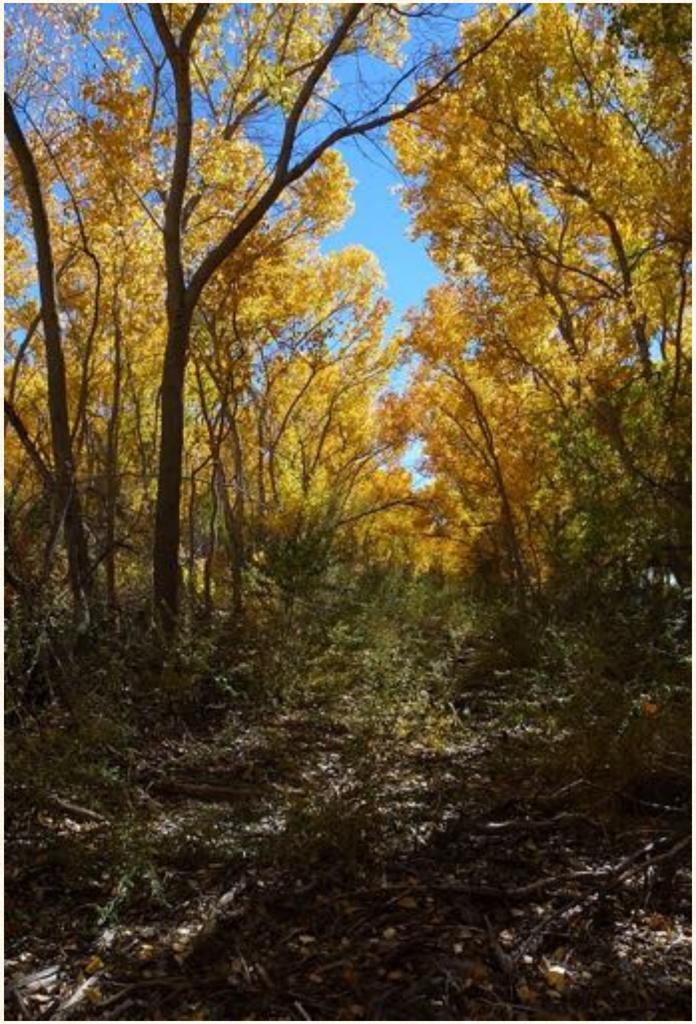
This old Mountain Cedar near the disc golf course provides valuable nesting material and rich duff for insects.

Select plant species that provide food, shelter and nesting materials for native wildlife. Add nest boxes, wildlife brush piles, and low rock piles. Retain a few larger dead trees (snags) as bird perches. Leave fallen debris in place, especially larger trunks, so it can be used as shelter, contribute to deep carbon storage, and boost soil microbe activity.

Fallen log south of Barton Springs Pool fostering a rich micro-habitat for smaller wildlife, mushrooms, and insects.

BASIC RESTORATION STRATEGIES

PHYTOREMEDIATE THE BUTLER LANDFILL



Cottonwood trees near the Rio Grande River. Source: Chris English

Use phytoremediation to reestablish the riparian forest and create green parking woodlands. The objective is to reduce/mitigate both overland and subsurface flows, according to Dr. Ronald Zalesny, USDA phytoremediation expert. [personal communication]

Increase depth of subsoil as needed, then add 12 inches of topsoil. Add soil microbes, then plant trees that pull up and filter landfill leachate. [Ma, 2017]

Add constructed wetlands and green infrastructure as needed to provide additional filtering and/or bank stabilization.

BASIC RESTORATION STRATEGIES

INCORPORATE GREEN INFRASTRUCTURE

Once revegetated, rewilded areas can reduce erosion and downslope flooding. But when surrounded by mowed, compacted areas and hardscape, it might be necessary to incorporate green infrastructure.

Green Infrastructure consists of old-growth forests and wetlands or a system engineered to mimic natural systems to handle stormwater at the source instead of piping it elsewhere. [EPA, 2021b]

> The primary causes of soil disturbance in Zilker Park are stormwater flow, poorly functioning or absent infrastructure, mowing and use of other heavy machinery, off-trail recreation, formal recreation without suitable supporting infrastructure, and erosion of trail material. Soil disturbance is problematic in all areas but is particularly concerning along environmentally sensitive waterways.
>
> — *Siglo Group, Zilker Park Natural Resource Inventory, 2021*

BASIC RESTORATION STRATEGIES

INCORPORATE GREEN INFRASTRUCTURE

Examples of green infrastructure are contour-swales, bioretention ponds, rainwater collection, infiltration trenches, pervious pavement, and old-growth and regenerating forests and woodlands.

Bioretention pond outside Austin Watershed Protection building. Source: City of Austin website

Old-growth cedar brake forest in Oak Hill acting as green infrastructure.

BASIC RESTORATION STRATEGIES

USE ADAPTIVE VEGETATION MANAGEMNET

Ligustrum tagged for preservation across from the MacBeth Center. These non-native, extremely invasive trees need to be removed, not preserved.

Adaptive Vegetation Management is the systematic approach for improving resource management by learning from outcomes.

Such a management approach will necessitate the continuous monitoring and removal of non-native species as ecological habitats and functions reestablish. Adaptive management will also require dedicated personnel with detailed knowledge of natural ecosystems management, native plants, soil biology, and wildlife habitat.

BASIC RESTORATION STRATEGIES

ESTIMATED COSTS

Revegetation/basic soil amendments estimated costs (not including engineered green infrastructure, associated hardscapes, or phytoremediation studies):

- Forest $10,000/acre
- Dense Woodland $5,000/acre
- Open Woodland $10,000/acre
- Green Parking Woodland $25,000/acre
- Savanna Wetland $20,000/acre

- Approximate revegetation cost: $1 million

- Contour-swales (max. 10 acres): $5000 per acre

Plan on utilizing volunteers to reduce labor costs and instill a sense of park ownership

Monarch in Zilker. Courtesy of Gary St. Clair.

Rewilding is not about abandoning civilization but about enhancing it.

— George Monbiot, Feral: Rewilding the Land, Sea, and Human Life, 2013

We invite the community to join us in a conversation
to further explore the many benefits of rewilding Zilker Park.

Please visit the Save our Springs Alliance website
for a link to this presentation, references cited, and additional information

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