



Horseshoe Bay

NATURE PARK



Master Plan

November 2020



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Highland Lakes Birding and Wildflower Society: led by Sherry Bixler
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Sandra Nash, planner
Sheri Pollard, bees
Bill Teeter, water conservation
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Kerri Craig, webmaster

For more information:

<https://www.horseshoe-bay-tx.gov/675/Horseshoe-Bay-Nature-Park>

Table of Contents

Chapter One: Overview

- Introduction
- Project Vision and Purpose
- Park Location

Chapter Two: Context

- A Brief History of Llano County
- Park History
- Conservation Goals
- Reflecting a Granite Past

Chapter Three: Site Analysis

- Field Analyses
- Geographical Setting
- Watershed & Landforms
- Geology & Soils
- Ecological Zones

Chapter Four: The Plan

- The Planning Process
- Site Conceptual Plan
- Fundraising
- Final Master Plan

Chapter Five: Land Management Plan

- Goals
- Trees
- Grasses
- Invasive Plants
- Brush and Rock Piles
- New Plantings & Seedlings
- Ecological Zones

Appendices

- A: Viewed Bird Species
- B: Potential Birds
- B: Plant Species Identified
- C: Recommended Plant Species Enhancement



Chapter One

Overview

Chapter One

Overview

INTRODUCTION

The Horseshoe Bay Nature Park Master Plan guides current and future decisions by providing the framework for decisions. The Master Plan establishes project goals and objectives, describes site resources and conditions, and summarizes the planning process. The plan also outlines the conservation strategy and identifies approximate access and trail locations. The efforts have all been guided and funded through the nonprofit HSB Park, Inc.

Once the Nature Park opens to the public HSB Park, Inc. will manage and maintain the developed park facilities and natural resources. The goal is to preserve and enhance a beautiful piece of the Texas Hill Country.

PROJECT MISSION AND VISION

The mission of Horseshoe Bay Nature Park is: Restore and preserve an indigenous habitat inspiring appreciation of nature. Its vision is: To be the Highland Lakes leader connecting people to native plants, wildlife, and conservation.

PARK LOCATION

The address of Horseshoe Bay Nature Park is 1514 Golden Nugget, Horseshoe Bay, Texas 78657. The 10.948 acre Nature Park is situated in the Horseshoe Bay West subdivision. The city of Horseshoe Bay is a unique Texas Hill Country destination resort and retirement community. The City boasts five world class golf courses, championship tennis and pickleball facilities, and the constant level Lake Lyndon B. Johnson provides year-round activities for residents and guests to enjoy. The addition of the Nature Park compliments the City's desire to promote conservation, education, and outdoor exercise to inspire an appreciation of nature.



Location of Horseshoe Bay Nature Park



Chapter Two
Context

Chapter Two

Context

A BRIEF HISTORY OF LLANO COUNTY

The location of the city of Horseshoe Bay is about six miles west of Marble Falls. It sits on the south banks of the Colorado River at Lake Lyndon B. Johnson. Horseshoe Bay straddles two counties: Llano to the west and Burnett to the east. Horseshoe Bay Nature Park is located in Llano County.

One of the earliest reports of Llano County came from Bernardo de Miranda y Flores as he led a 1756 expedition to assess silver mining potential on Honey Creek. In the 1830s, the Texas land speculator, John Charles Beales, purchased a land grant that would one day contain Horseshoe Bay. Due to the constant threat from Penateka Comanches, many settlements in the region failed. Eventually the Adelsverein, a German colonization company, bought the Fischer-Miller grant to the west in 1844. Through diplomacy, John O. Musemeche negotiated a treaty with the Penateka Comanches in 1847. The treaty permitted Germans to settle without adversity.

In 1856, Llano County became a county of Texas. The region, based on ranching and farming, began to grow in the late 1870s. When the Austin and Northwestern Railroad extended to Llano in 1892, the economy boomed. At its heyday, 52,700 cattle and 24,000 sheep were reported in Llano County alone. Towards the end of the 1800s, Llano even attracted attention as a potential health resort. However, the county's economy took a downward turn between 1900 and 1920.

The completion of the Highland Lakes system of dams by the Lower Colorado River Authority in the mid-1900s gave Llano County a much-needed boost. The Wirtz Dam, completed in 1951, held back the waters that formed Lake Lyndon B. Johnson.

Seeing the opportunity to develop a lake frontage community, cousins Norman Hurd and Wayne Hurd searched for land for sale along the lake. What they found was not for sale, but they were determined to purchase it. The ranch property, consisting of 3000 acres straddling Llano and Burnett counties, was owned by John T. Lupton II. Lupton was the American heir to the Coca-Cola bottling fortune. For this reason, the ranch was often called the Coke Ranch. Finally, in 1970, the Hurd cousins convinced Lupton to sell the land to them. The Hurds set up the development as a Municipal Utility District (MUD) until 2005 when Horseshoe Bay became a city.

PARK HISTORY

When Horseshoe Bay West was platted, developers zoned the park site as a multi-family, high-density condominium community. Striving to maintain a more open landscape, the community expressed strong opposition to the land use.

John W. Smith, Jr. and his wife, Sandra, saw the value of the property. Therefore, in August 2017, Whitney Shelley Properties LLC (WSP) purchased the property from Lake LBJ Improvement Corporation and conveyed it to their daughters, Whitney and Shelley. Following negotiations, the Smith family entered a 20-year lease with HSB Park, Inc. to use the property as a nature park for the Highland Lakes community. The lease was eventually extended to 25 years.

HSB Park, Inc. was established November 4, 2019 as a 501(c)3 nonprofit corporation to hold, develop, and manage the Nature Park's property. The city of Horseshoe Bay and HSB Park, Inc. entered a public-private partnership to help meet the costs of developing, operating, and maintaining the Nature Park. The Nature Park will be open to the public with no charge for admission.

CONSERVATION GOALS

The Horseshoe Bay community has a reputation for loving nature and supporting conservation efforts. This reputation is evidenced by the Mayor's Monarch Pledge, Dark Sky Community Designation, Scenic City Certification, and green space commitment. Further, the City plans to apply to Texas Parks & Wildlife to become a certified Bird City.

The Nature Park will strive to preserve and enhance a beautiful piece of Texas Hill Country to inspire citizens and increase the appreciation of native plants, animal life, and conservation. Horseshoe Bay Nature Park, unlike most outdoor areas around the city, is an upland site far from Lake Lyndon B. Johnson. The rough, rolling terrain of the Nature Park contains an existing and potential array of ecological systems to attract more wildlife. By developing different management strategies, habitat diversity and the ability to attract wildlife will increase.

The Nature Park will enhance native flowers and native grass to attract butterflies, bees, and birds of all species with special bird blinds and screen for observation and outdoor photography. Benches and tables will be scattered along trails to allow for rest, nature observation, or watching a sunset. An outer loop, half mile walking trail, part of which contains a less challenging easy access segment for those in need. Future goals anticipate an upland nature observation deck. This deck would provide a place to teach school children and a platform to observe nature or locate favorite star constellations during special star events.

Horseshoe Bay Nature Park will assume a leadership role to educate the Highland Lakes community about the need for and benefits of wildlife habitats and water conservation. Special focus will be water conservation and the importance of birds and pollinators.

The Master Plan considers Horseshoe Bay Nature Park will soon become part of a city-wide trail network. A network would link open space and public parks with neighborhoods as per the vision of one Horseshoe Bay founder, Wayne Hurd and his wife Eileen. Such a network will protect natural resources, enhance the outdoor experience, serve as flood control, and celebrate the Texas Hill Country.

REFLECTING A GRANITE PAST

Initially, planners for the Texas State Capitol wanted a limestone exterior. Unfortunately, the limestone chosen had high iron pyrite levels that rusted when exposed to moisture and air.

The owners of Granite Mountain quarries in Marble Falls offered to donate Texas pink granite to construct the Capitol in exchange for a new rail line to Marble Falls. The agreement resulted in the extension of a narrow-gauge railroad from Austin to Granite Mountain. Some 4000 train car loads of Texas pink granite were transported from Marble Falls to Austin to help build the State Capitol, which opened to the public on May 16, 1888

Because the history of the Highland Lakes is intertwined with the State Capitol's pink granite, Horseshoe Bay Nature Park will embrace the past by using granite boulders from the same Granite Mountain to mark the Nature Park's boundary. These boulders will be used for fundraising.



Granite Mountain workers loading cut granite blocks and columns onto a flatbed train car.



Chapter Three

Site Analysis



Chapter Three

Site Analysis

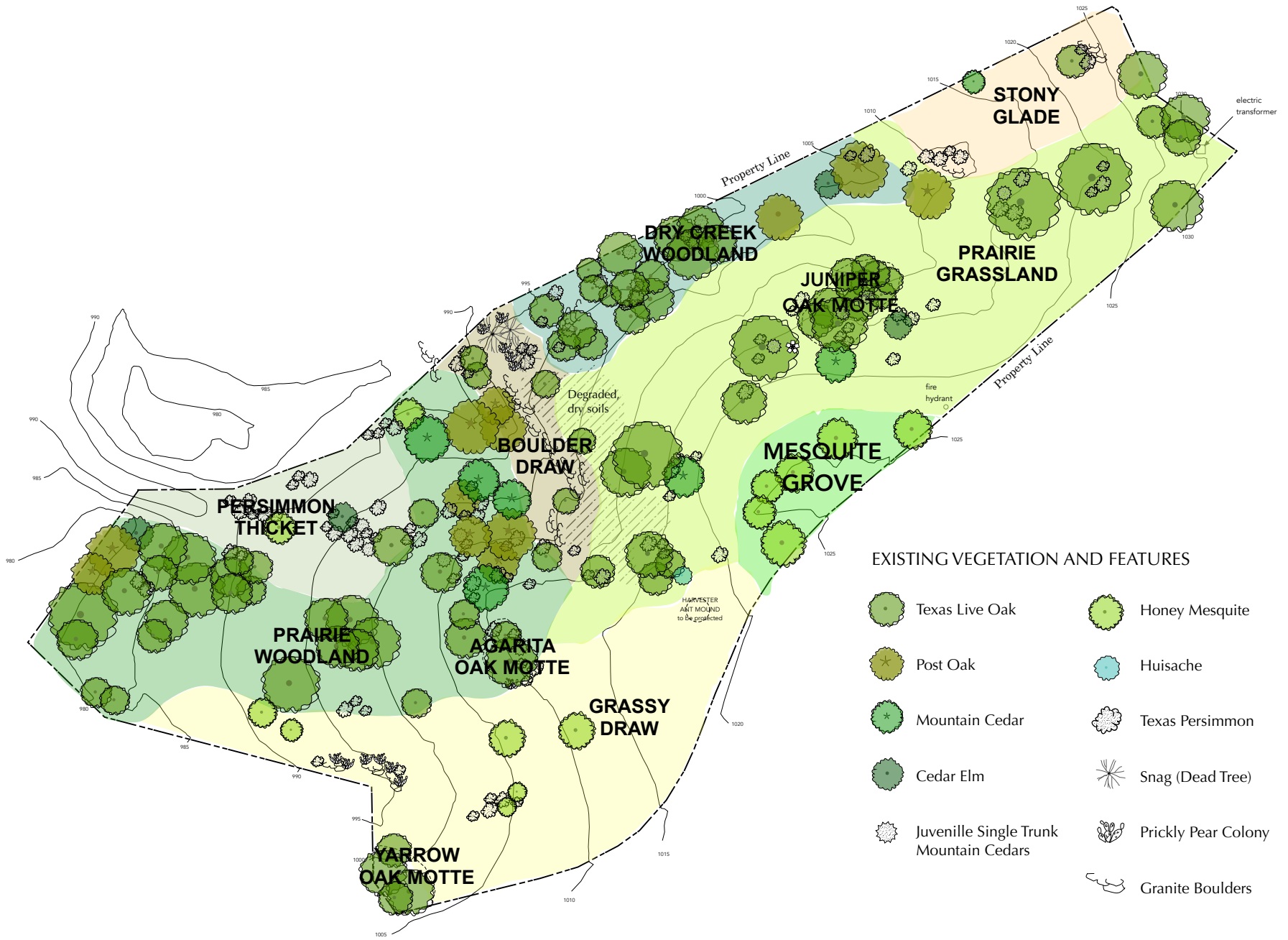
FIELD ANALYSES

On May 26, 2020, the Highland Lakes Master Naturalist Land Management Assistance Program conducted a vegetation analysis. The analysis was followed by a detailed written report and photographs of plants. The Nature Park's Environmental Planner, Elizabeth McGreevy, with the assistance of the city of Horseshoe Bay planner, Sandra Nash, conducted another site assessment on June 8, 2020. They focused on the vegetation, ecological zones, views, soils, trail layout, erosion, restoration needs, and potential uses. A month later, McGreevy followed up a second soil and vegetation analysis on July 13.

The site analyses were complimented by a bird assessment by Audubon Society birders, Andy and Ellen Filtness. During that time, Sheri Pollard and Taylor Hall visited the site and marked up a site map to indicate potential bee hive and bee box locations. Vicki Adcock, along with the Filtness's and other birders from the Highland Lakes Birding and Wildflower Society, later provided input on best bird blind and bird screen locations based on water sources and different wildlife habitat types.

GEOGRAPHICAL SETTING

The Nature Park site exists at the southeastern corner of Llano County. Llano County is bounded on the north by San Saba County, on the east by Burnet County, on the south by Gillespie County, and on the west by Mason County. Llano, the county seat, is seventy-two miles northwest of Austin and near the center point of the county, which lies at approximately 98'40° west longitude and 30'45° north latitude. Llano County comprises 941 square miles of the Llano Uplift, or Granite Region, of the eastern part of the Edwards Plateau, aka the Texas Hill Country.



WATERSHED & LANDFORMS

The Nature Park is part of the Colorado River watershed. The site contains an ephemeral creek that feeds into an off-site impounded pond. Currently, the Nature Park has no permanent standing bodies of water. However rains do stand for a few days in the ephemeral creek located in the Dry Creek Woodland Ecological Zone. Surface runoff from the creek and site feeds into Walnut Creek. Walnut Creek then feeds into Sandy Creek, which subsequently feeds into the Colorado River at Lake Lyndon B. Johnson.

A rolling terrain best describes the site topography. The highest point occurs along the south-central boundary. Due to its level nature, it was chosen for the parking lot. Because of the high vantage point and proximity to the parking lot, a nature observation deck seemed advantageous. It would provide a 180-degree view of the surrounding landscape, a high vantage point for nature observation, and a viewing platform for special star events. Two shallow, small valleys, called draws, occur in the Nature Park. The first draw exists in the eastern Prairie Grassland Ecological Zone (see below). The second occurs in the Boulder Draw Ecological Zone.

The trail system was mapped out during the June site analysis. On-site layout allowed for erosion reduction and maximizing aesthetic viewsheds. It also made it easier to avoid sensitive areas such as the ephemeral creek and sensitive vegetation. Since it is vital to allow vegetation to become more dense to stabilize and enhance the ephemeral creek, on-site trail layout also made it possible to provide a protective buffer between the trail and creek.

GEOLOGY & SOILS

The site contains a number of clustered, small granite outcroppings. These are concentrated in the Boulder Draw and the east end of the Prairie Grassland Ecological Zones (see below) Small pieces of white marble are embedded into the soil throughout.

The Nature Park soils are classified as rangeland soils. These soils originated from upland Lignon-Katemcy type soils. About 95 percent of the site contains Lignon Cobbly Fine Sandy Loam (LCFSL) soils. The remaining 5 percent contains the Lignon Fine Sandy Loams (LFSL).

Both soils occur over weathered gneiss or schist bedrock that is typical of the Llano Uplift region of the Texas Hill Country. The bedrock starts 26 to 60 inches down for LCFSL soils; and 23 to 52 inches for LFSL soils. The depth to the water table for both is about 80 inches. Between the bedrock and topsoil, both soils consist of clay-based soils. LCFSL topsoils are more cobbly, while the LFSL are not. LCFSL



Left: white marble in soil. Right: pink granite boulder covered with lichens.



Left to right: 1) taken near a Cedar Elm in the upper Prairie Grassland; 2) taken under the large Post Oak at the western end of the Dry Creek Woodland; 3) taken near the Dry Creek Woodland between the Boulder Draw and Prairie Grassland; 4) taken in the Prairie Woodland under the largest Ashe Juniper; and 5) taken in the Persimmon Thicket.

soils occur on 5 to 12 percent sloped terrain. LFSL on the other hand is found on more level terrain with 1 to 5 percent slopes. Although both soils are classified as well-drained with a low water capacity, LCFSL soils tend to produce higher runoff than LFSL soils.

During the site analysis, five soil samples were taken. Soils 1, 2, and 4 (see photos) possessed good organic matter. Soil 1 had slightly less moisture than soils 2 and 4. Soils 5 had the medium organic matter, but low soil moisture. Soil 3 had the lowest organic matter-

moisture content. Based on the low organic matter content of several soil samples, minor rill erosion, and the low water holding capacity of the soils, it was determined a series of contour-swailes would be added to improve site infiltration.

ECOLOGICAL ZONES

Since one of the Nature Park's goal is to enjoy and observe nature, it is rational to diversify and maximize different wildlife habitats. Nine existing and potential ecological zones were identified. Each zone was delineated based on topography, rock outcropping, soils, and vegetation cover.

Dry Creek Woodland

Lowest area of Nature Park. Contains an ephemeral creek that feeds into an off-site pond. This zone has slightly deeper, healthy soils and taller trees. The trees include Post Oaks and Texas Live Oaks. Ground level vegetation is lush and supports plants such as Grass-leaved Rush, Virginia Wildrye, and juvenile Ashe Juniper (Mountain Cedar) trees. The zone lacks canopy diversity, horizontal layers, and vegetative density.

Boulder Draw

Shallow ravine defined by numerous small granite outcroppings. Contains much tree debris, fallen trees, and standing snags. Of particular interest is the colony of Woolly Lip Ferns growing along the granite outcropping ledge and the few Limes Prickly Ash shrubs. The zone contains excellent diversity, but could be enhanced further with herbaceous and thicket-like plants.



View from inside the Dry Creek Woodland. The Prairie Grassland zone can be seen in the distance.



A view of the Prairie Grassland ecological zone.



View from the Boulder Draw of the Prairie Woodland ecological zones

Grassy Draw

Sloped, dry shortgrass prairie. Has numerous emergent honey mesquite trees and a large colony of prickly pear. Other vegetation includes Three Seed Croton, Beebush, Zexmenia, and Antelope Horns. A few plants that resembled Lotebush were also seen, but identification was not confirmed. Should continue to be managed for its short grass for ground dwelling wildlife such as lizards and quail. However, due to the potential for erosion and degraded soils, contour-swailes should be added. Of particular note is the Harvester Ant mound located on the upper east corner. This should be allowed to exist without disturbance.

Mesquite Grove

The highest point of the Nature Park has a broad level area with a grove of established Honey Mesquite trees. This zone will cater more to park users than wildlife since it will contain the parking lot, future nature observation deck and bathrooms, and the trailhead. The Honey Mesquite trees should be retained for their light, airy shade. Focus areas may eventually be planted and irrigated as needed to enhance the visitor's experience upon arrival.

Oak Mottes (small groves of oak trees) (Agarita, Juniper, and Yarrow)

Three clusters of Texas Live Oaks possess a diverse array of understory and juvenile shade trees. Each cluster contains a subordinate plant species and has the potential to develop into highly diverse, dense oak mottes. The Yarrow Oak Motte in the far west corner of the site just west of the Grassy Draw has Lignon Fine Sandy Loams and supports a large colony of yarrow. A second potential oak motte is near the south end of the Boulder Draw. It is more exposed and drier and will most likely develop into a more stunted oak motte. The third motte is the largest and is located in



Grass leaved Rush in the Dry Creek Woodland.



Pearl Milkweed Vine in the Prairie Woodland.



Canadian Wildrye in the Prairie Grassland.



Brown Bitterweed in the Stony Glade.

the heart of the Prairie Grassland. Numerous, single trunk Ashe Junipers are growing up under the large Texas Live Oaks and should be retained to increase diversity and density.

Prairie Grassland

This zone runs from east to west lengthwise for most of the Nature Park. The zone exists as a lush expanse of prairie grasses defined by canopy trees. The area has an abundance of taller prairie plants such as Canada Wildrye, Little Bluestem, Prairie Parsley, Skeleton Plant, Red Lovegrass, Gummy Lovegrass, Green Milkweed, Coreopsis, and Silver Bluestem. A developing large oak motte in the center provides cover for wildlife. Just downslope of this motte there is some minor rill erosion. A single contour-swale and extra seeding should address this issue. The area closest to the Boulder Draw has extremely degraded, dry soils.



Woolly Lip Fern colony in the Boulder Draw.

Prairie Woodland

Flanked by the lower Boulder Draw and Grassy Draw, the established clusters of canopy trees have the potential to develop into a more dense, upland woodland. The canopy consisted of Post Oaks, Ashe Juniper, Cedar Elm, and Texas Live Oak. Currently, mid-horizontal layers are completely lacking although a few Agaritas, Texas Persimmon, Catclaw Mimosa, and Evergreen Sumac show potential. Also, the canopy density is too open and therefore does not offer shelter, feeding, and nesting habitat for a variety of birds and other wildlife. More understory plants and mid-story plants need to be seeded and planted. Of special note is the healthy soil and a nice colony of Lace Cactus.



Yarrow colony in an Oak Motte.

Persimmon Thicket

Numerous young Texas Persimmons dominate this flat area. Agaritas and Catclaw Mimosa are also common. These are both

thicket forming plant species. Low thickets provide excellent dense cover for nesting wildlife. The soils are thin and very dry and not as suitable to prairie grass growth. The dominant groundcover is King Ranch Bluestem. This is invasive. As this zone will be allowed to develop into a larger thicket, the King Ranch will likely disappear over time since it needs full sun.

Stony Glade

This zone is in the back-northwest corner along the adjacent landowner's fence. On the other side of the fence, multiple trunk bushy Ashe Junipers are common and provide dense cover for wildlife. The vegetation is similar to the Grassy Draw, but is more broken. Where the Stony Glade meets the Prairie Grassland, there is a colony of Buckley Yuccas and small granite outcroppings.



Antelope Horn in the Prairie Grassland

INVASIVE PLANT SPECIES

The United States Department of Agriculture (USDA) defines "invasive" plants as non-native, aggressive plants that cause real damage and harm to native ecosystems, waterways, and farmlands. Species on their list included the well-known Chinese Tallow, Zebra Mussels, and Kudzu. Following the site analysis, the following invasive plants were discovered:

- Beggar's Ticks (*Torilis arvensis*): low threat
- Dodder (*Cuscuta sp.*): low threat
- Johnson Grass (*Sorghum halepense*): moderate to high threat
- King Ranch bluestem (*Bothriochloa ischaemum var. songarica*): moderate threat
- Malta Star-Thistle (*Centaurea melitensis*): high threat
- Thunberg's Brome (*Bromus japonicus*): low threat
- Vasey Grass (*Paspalum urvillei*): low threat



Lime Prickly Ash in the Boulder Draw



Chapter Four

The Plan

Chapter Four

The Plan

THE PLANNING PROCESS

The planning process started with a meeting April 2020 at the Nature Park site. The purpose of the meeting was for the Nature Park board to meet environmental planner from Austin, Elizabeth McGreevy. Once McGreevy was approved to do the work, a site analysis was conducted in June 2020. A meeting at City Hall followed to coordinate needs and to listen to birding experts, Andy and Ellen Filtness explain needs of both birds and birders.

In July 2020, Nature Park board President, Steve Jordan, along with board member Kyle Womack, presented a PowerPoint to City Council to explain the needs and goals. They requested a transfer of \$20,000 from the 2020 budget and \$25,000 from the 2021 city budget for the Nature Park. A workshop took place a few days later at the HSB Police Headquarters. The workshop was led by McGreevy and was attended by the Nature Park board and city planner, Sandra Nash. McGreevy presented a broad range of ideas and images that conveyed potential amenities, character, and layout. McGreevy concluded by showing a plan that broke the Nature Park into different ecological zones to create more wildlife habitat diversity and enhance land management. Stan Smith also presented what the Nature Park would need to incorporate to garner Texas Parks & Wildlife and the Lower Colorado River Authority funding. Following the workshop, Vicki Adcock met with Andy and Ellen Filtness from Travis Audubon and Sherry



HSB Park, Inc. Board President, Steve Jordan

Bixler and other representatives from Highland Lakes Birding and Wildflower Society at the Nature Park to review potential bird blind and bird screen locations. She then sent the data to McGreevy.

Based on decisions made during the first workshop, McGreevy returned in August 2020 for a second workshop, also at Police Headquarters. Sheri Pollard was present to provide feedback on bee hives and bee boxes to mitigate potential conflict. The purpose of this workshop was to decide the Nature Park character and finalize materials and trail and parking lot layouts. It was also decided to add a small catchment pond as a feature to attract wildlife, especially birds. Also discussed was incorporating elements and amenities that could serve as the basis for fundraising.



Planning workshops

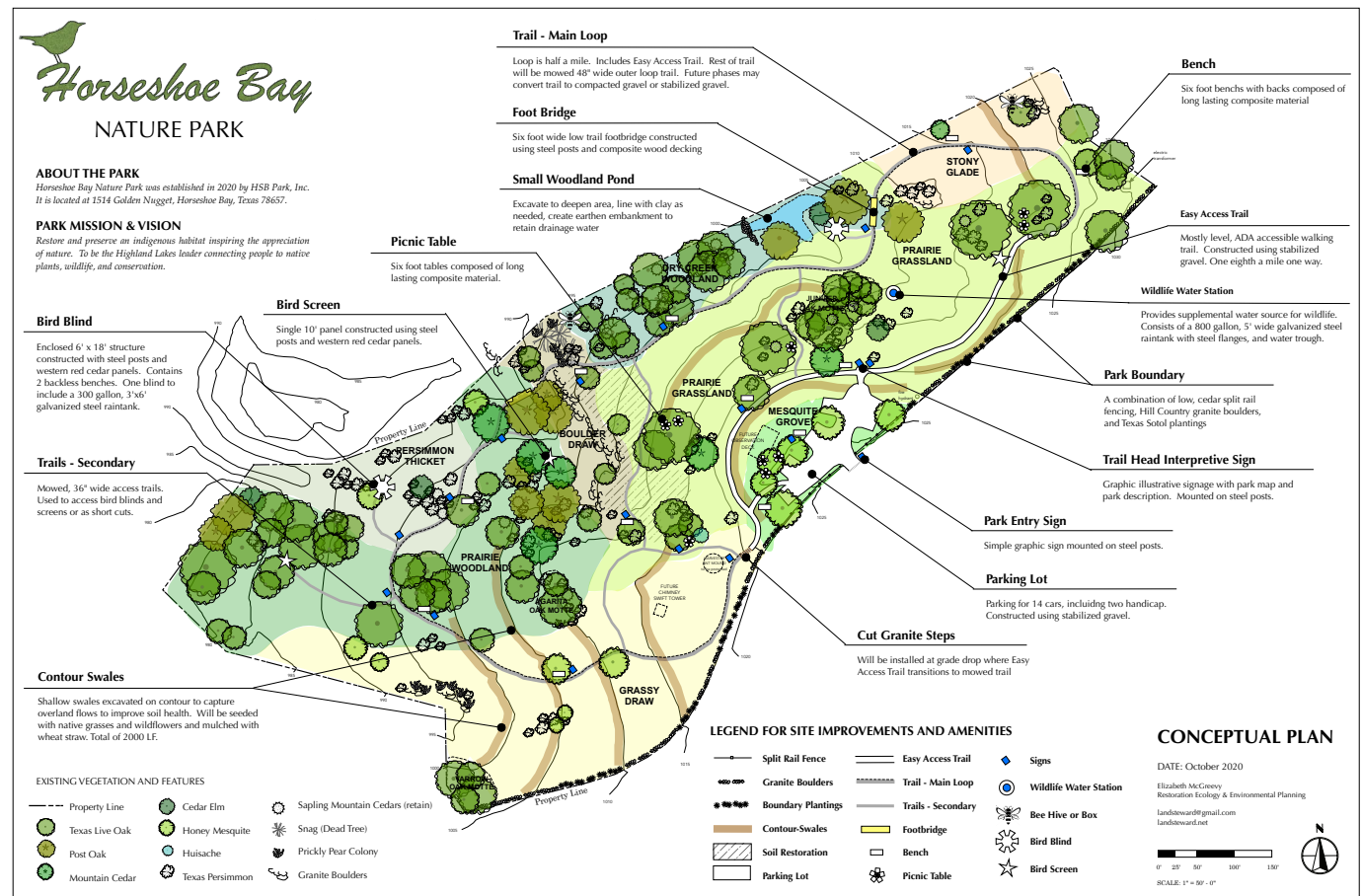


SITE CONCEPTUAL PLAN

The primary goal that drove the Conceptual Plan was to serve the community while enhancing wildlife habitat. The Nature Park was first divided into Ecological Zones. Next, the planner laid out a half-mile outer loop walking trail and a parking lot with two accessible parking spots. The outer loop trail section contained an Easy Access Trail that included trail access to a bird screen. Following the layout of the outer loop, the remaining connecting trails were added. Within this context, the plan received the general location of amenities such as the park boundary, nature observation structures, rest stops, footbridges, potential bird towers, bee structures, and interpretive signs. Additionally, contour-swales were added to the plan to decrease overland flows and increase infiltration for degraded soils. To enhance water for wildlife in the Nature Park, it was decided to add rainwater tanks at the bird blinds, a wildlife water station in the Prairie Grassland Ecological Zone, and add a small catchment pond to retain rains for a few days in the ephemeral creek located in the Dry creek Woodland.

Next, the Nature Park board was presented with various images that conveyed different characters, such as primitive rustic, modern, refined, and ranch. A refined rustic character was ultimately decided upon and guided the design and materials used for signs, park boundaries, benches, picnic tables, structures, and hardscape surfaces.

Once the Conceptual Plan was complete, the board asked the City to set up a page for the Nature Park on their website. Having a website page will increase park exposure and provide more information to citizens.

































FUNDRAISING

During the Horseshoe Bay Nature Park planning process, many ideas were submitted to garner monetary support from community members. Some ideas included a donor recognition wall, larger amenities named for donors, engraved bricks, engraved plaques on smaller amenities, and leadership gifts. A Conceptual Plan brochure was then developed for fundraising purposes. The inside of the brochure showed the Conceptual Plan; the backside listed amenities with associated prices.

Once the Conceptual Plan brochures were completed and printed, fundraising efforts began via personal contacts, the City's website, the press, and email to tell the story of this exciting project and to request citizen participation. The Nature Park board outlined four different ways to support Horseshoe Bay Nature Park. All donations are 501c3 tax

				
PARK ENTRY SIGN price: \$3,000	INTERPRETIVE SIGNS WITH GRAPHICS price: \$2500 each	ADVISORY SIGNS price: \$300 each	WAYFINDING SIGNS price: \$500 each	BIRD CALL SIGNS price: \$300 each 16 signs per post
				
PARK BOUNDARY SPLIT RAIL FENCE price: \$5,000 (220 LF)	PARK BOUNDARY GRANITE BOULDERS price: \$20,000 (580 LF) *A Piece of the Rock* \$300	PARK BOUNDARY PLANTS price: \$4,500 (425 LF)	CONTOUR SWALES price: \$12,000	WATER FOUNDATION price: \$1,000
				
PARKING LOT STABILIZED GRAVEL price: \$57,000	EASY ACCESS TRAIL price: \$25,000	MOWED TRAILS price: \$2,000	FOOT BRIDGE price: \$4000 each	CUT GRANITE STEPS price: \$4,000
				
BLUEBIRD BOX ON POST price: \$250 each	SCREEN OWL BOX price: \$250	BEE BOX price: \$250 each	BEE HIVE price: \$1000 each	DOG WASTE STATION price: \$300 each
				
BENCH price: \$1500 for backless; \$3000 for benches with backs	PICNIC TABLE price: \$5000 each	BIRD BLIND RAIN TANK price: \$3,500	WILDLIFE WATER STATION price: \$7,500	CHIMNEY SWIFT TOWER price: \$10,000
				
BIRD BLIND price: \$10,000	BIRD SCREEN price: \$4,500	NATURE OBSERVATION DECK price: \$50,000		

deductible:

- Honorary Giving, for someone special in your life to whom you would like to express your gratitude and honor with a gift.
- Memorial Giving, to celebrate the memory of a loved one through a memorial gift.
- Community Partners, individuals or groups who volunteer to perform activities or host fundraising events
- Corporate & Foundation Giving, for companies, organizations, and individuals to provide lasting community support

FINAL MASTER PLAN

Once fundraising efforts started, a Final Master Plan book was developed to provide a narrative of the information gathered, ideas generated, and plans made to develop a beautiful, community-oriented Nature Plan for the City of Horseshoe Bay.

To complement the Final Master Plan book, the Conceptual Plan was expanded upon to create the Final Master Plan:



Horseshoe Bay

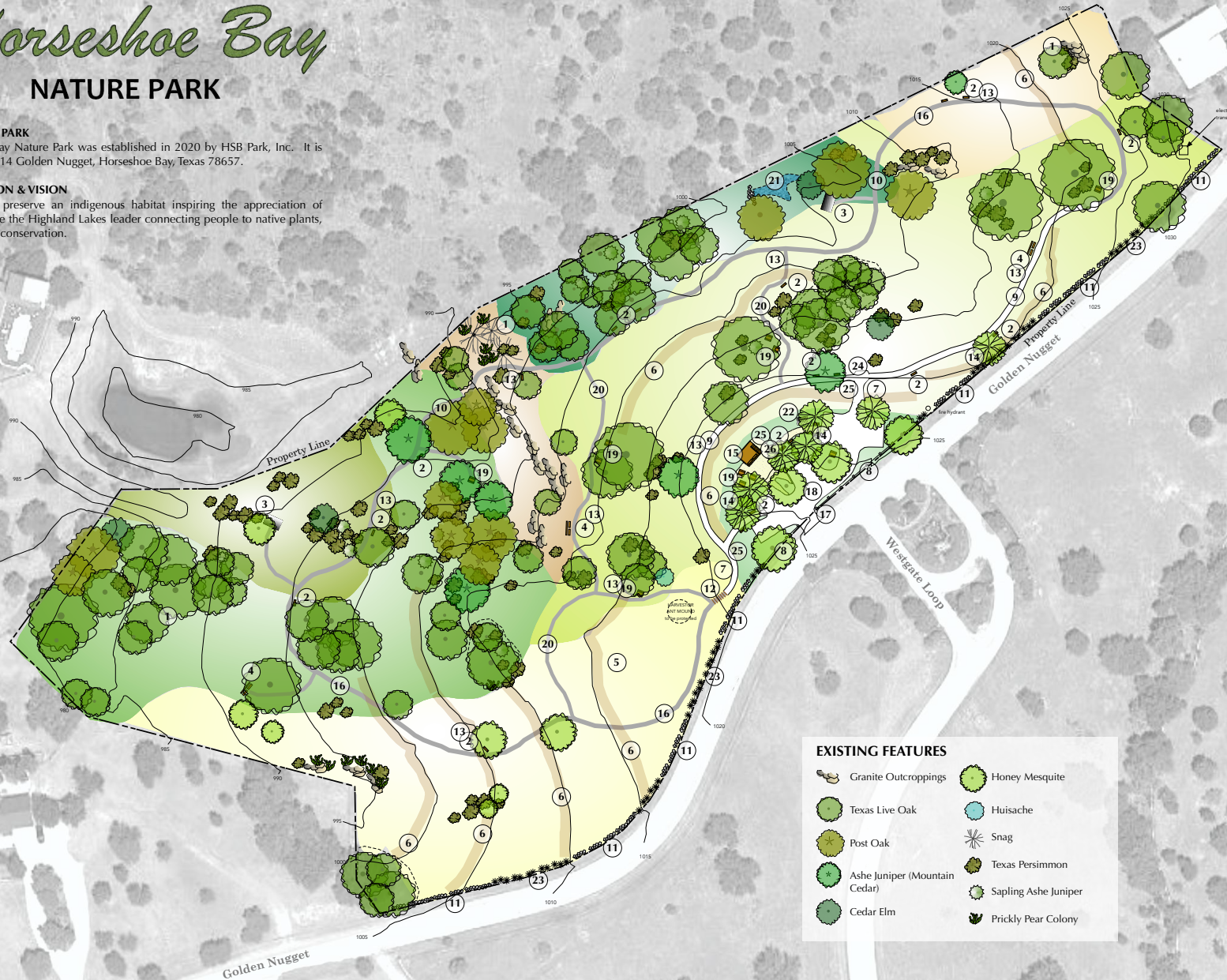
NATURE PARK

ABOUT THE PARK

Horseshoe Bay Nature Park was established in 2020 by HSB Park, Inc. It is located at 1514 Golden Nugget, Horseshoe Bay, Texas 78657.

PARK MISSION & VISION

Restore and preserve an indigenous habitat inspiring the appreciation of nature. To be the Highland Lakes leader connecting people to native plants, wildlife, and conservation.



Proposed Amenities

- 1 Bee Hive or Bee Box (3)
- 2 Bench with Back (21)
- 3 Bird Blind with 3 benches (2)
- 4 Bird Screen with 2 benches (3)
- 5 Chimney Swift Stone Tower (1)
- 6 Contour-swale
- 7 Dog Waste Station (2)
- 8 Double Split Rail Fence
- 9 Easy Access Trail
- 10 Footbridge (2)
- 11 Granite Boulders
- 12 Granite Steps
- 13 Interpretive Sign (9)
- 14 Mesquite (thornless) trees (7)
- 15 Nature Observation Deck (1)
- 16 Outer Loop Trail
- 17 Park Entry Sign (1)
- 18 Parking Lot
- 19 Picnic Table (11)
- 20 Secondary Trail
- 21 Small Catchment Pond (1)
- 22 Restroom (1)
- 23 Texas Sotol Boundary
- 24 Trailhead Sign (1)
- 25 Trash Receptacle (3)
- 26 Water Fountain (1)
- 27 Wildlife Water Station (1)

EXISTING FEATURES

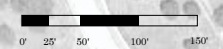
- Granite Outcroppings
- Texas Live Oak
- Post Oak
- Ashe Juniper (Mountain Cedar)
- Cedar Elm
- Honey Mesquite
- Huisache
- Snag
- Texas Persimmon
- Sapling Ashe Juniper
- Prickly Pear Colony

FINAL MASTER PLAN

DATE: December 2020

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Restoration Ecology & Environmental Planning

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Chapter Five
Land Management Plan

Chapter Six

Land Management Plan

OVERVIEW

To increase wildlife habitat diversity, ecological zones were established. Boundaries were loosely drawn based on topographical features, exposure, existing large shade trees, and elevation. Each zone was named based on its potential habitat enhancement. To develop each zone's potential, each will be managed differently so as to develop and enhance Horseshoe Bay Nature Park wildlife diversity. The following goals were established based on the site analysis and input from the Highland Lake Master Naturalists. These goals will be used to guide land management strategies:

- ▶ increase cover for wildlife and perches for birds
- ▶ increase food sources for wildlife and pollinators
- ▶ increase tree canopy diversity and continuity
- ▶ promote growth of late-succession grasses
- ▶ increase soil health and infiltration
- ▶ reduce invasive species without using toxic chemicals



MANAGEMENT STRATEGIES FOR EACH ECOLOGICAL ZONE

NOTE: Percent (%) cover provided below are long term maintenance goals and not always the existing cover.

Dry Creek Woodland: 100% closed canopy (tree canopies form continuous understory cover)

The goal is to manage for a closed canopy woodland and increase horizontal layers. Do not mow. Allow for regrowth of understory. Thin woody plants as directed under tree management below. Obtain advice of Highland Lakes Master Naturalists as needed. Retain straight cedars at least 5 feet from larger trees. May include spreading mushroom compost as needed. Provide upkeep of cages around new plants. The main outer loop trail leaves a buffer between the trail and ephemeral dry creek. Doing this will protect vegetation in the buffer to increase riparian health. If people leave the trail to gain access to the riparian buffer, it may be necessary to construct a low cedar post and rail fence to keep people on the trail.

Boulder Draw: 50% open

Currently this zone has a lot of wildlife activity due to the fallen tree, snags, and granite rock outcroppings. The vegetation should be unevenly reduced using a brush cutter every 3-4 years. Thicket clusters should be retained and planted to increase low nesting cover. Where the Boulder Draw meets the Prairie Grassland there is a significant area with severely degraded soils (indicated on the conceptual plan by a hatched pattern). Due to the proximity of the granite boulders, no contour-swale was added. Instead, 1/2" inch of cow manure compost should be brought in and spread prior to seeding to boost soil health and increase infiltration.

Grassy Draw: 90% open

This zone will be managed to promote short grasses and forbs, such as crotons. Such habitat is favored by quail. Mow every 3 years. Spray area with cow manure compost tea every 6 years after mowing. Retain Honey Mesquites shown on plan. Remove other mesquites as needed to maintain only 10-15% wooded cover.



Mesquite Grove: 75% open

Due to parking lot proximity, this zone gets a more regular mowing schedule at 1-2 times a year. Add drip irrigation to this zone to maintain a greener appearance. Irrigation will also keep vegetation hydrated to reduce fire risk from concentrated vehicular and pedestrian activities. Once irrigation is installed, areas can be planted to demonstrate regional, native plants that are beneficial for pollinators and wildlife.

Oak Mottes: 100% closed canopy

Oak mottes should be dense. Do not mow. Thin only as needed to maintain at least 5 feet between shade tree trunks (see notes below regarding Ashe Junipers). If desired, wrap entire mottes, following the dripline, with 48" tall welded wire fencing to reduce deer browsing to boost diversity.

Prairie Grassland: 80% open

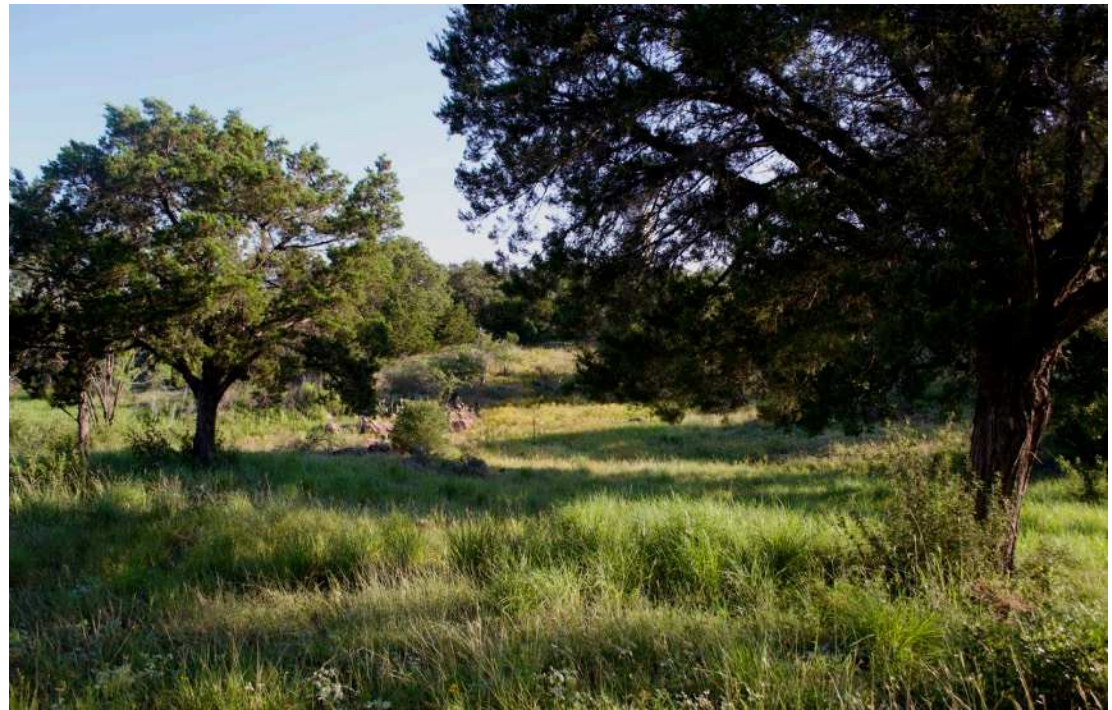
The goal is to promote lush, dense growth of late succession native prairie grasses. Such grasses do not respond well to frequent mowing. Mow every 6 years. Spray area with cow manure compost tea after mowing. Keep the woody plant cover to about 20-25%.

Prairie Woodland: 80% closed canopy

Like the Dry Creek Woodland, the goal here is to create more horizontal layers to increase wildlife habitat. Unlike the Dry Creek Woodland, this woodland will be managed to have a somewhat more open canopy to allow for a greater diversity of woodland plants. Use a brush cutter to shred growth in openings every 10 years. Allow for regrowth of native understory. Add cages as needed to protect plants from deer. As with oak mottes, wrap sections with 48" welded wire to protect plants from deer. Retain straight cedars at least 5 feet from larger trees.

Persimmon Thicket: 60-80% closed canopy-varies

This zone needs to be managed as a thicket. Do not mow. When woody vegetation gets higher than 6 to 8 feet, cut the trees down to 36"-48" height. Cutting down will cause most to resprout at the base to increase thicket density. Leave cut parts in place or use



The Prairie Woodland Canopy is too open to provide enough cover, so the management goal will be to allow for woodland regrowth.

branches, etc to form new wildlife brush piles on the property (see below). Over time, cut parts may need to be mulched and spread.

Stony Glade: 50% open

The goal is to maintain this area as a rocky area dominated by short prairie grasses and wildflowers adjacent to a thick cover of brush. Mow every 2-3 years. Spray area with cow manure compost tea every 4-6 years.

SNAGS AND WILDLIFE PILES

To attract wildlife it is vital to provide cover and perches. One way to do this is to retain standing dead trees. These are called snags. Snags are used as perches, especially by predatory birds. Larger snags can be used by cavity nesters. Bee boxes can also be mounted to snags to eliminate the need for a separate post. Since snags can be visually messy, smaller twigs and branches can be removed. Planting vines at the base will allow vines to grow up snags to increase diversity.

As lower areas of woody and herbaceous plants develop overtime in each Ecological Zone, more cover will be created. Until then, wildlife brush piles and rock piles will provide wildlife cover. The focus should be adding this wildlife cover wherever cover is significantly lacking.

Fallen tree trunks should remain where they fall. Branches can be removed to reduce visual clutter and to allow trunk to rest on the ground. Some branches should be left to provide perches. Cut branches should be mulched and spread or formed into wildlife brush piles. A typical brush pile consists of branches dumped into a pile. Wildlife brush piles are strategically



Example of a well formed wildlife brush pile. Note the gaps along the bottom that provide wildlife access.



Standing dead trees (snags) in the Boulder Draw and a large Prickly Pear thicket in the Grassy Draw enhance wildlife habitat

formed to allow wildlife to access the interior. The same approach is used to create rock piles. Again, rocks are not just dumped, they are arranged to provide interior spaces for smaller wildlife.

For more information on how to locate and configure brush or rock piles, the NRCS has a fact sheet titled “Fish and Wildlife Structure—Wildlife Brush and Rock Piles. website link: http://www.nrcrd.org/files/8714/1875/2798/Brush_Piles.pdf

BIRDS AND BEES

Bluebird and Screech Owl nesting boxes will be installed throughout the Nature Park site. Each box will need to be cleaned each year as follows:

Bluebird boxes: Place 10”—15” away from other trees in an open area on Bluebird Poles (to keep away from wrens that will kill the bluebirds). Boxes should face away from the road, ideally east or northeast, facing trees or low vegetation. They begin to house hunt starting in November and begin nesting in February. Start with wood chips in the bottom of the box. Remove nest material after birds have fledged (no need to use bleach solution if we purchase cedar boxes). Put fresh wood chips in bottom of box. The bluebirds may have 3 broods per year, so remove nest material up to 3 times per year after fledging. Boxes should be monitored for activity and fledging. Wood chips may be purchased online.

Screech Owl boxes: Should be mounted high in tree facing southeast with a large branch below for young birds to jump out and land. Use strap around tree trunk to secure the box. Put wood chips in bottom of box. They have one brood per year and they will stay near nesting area year-round. The juveniles will disperse in the autumn, so the nest should be cleaned each year after juveniles have left. New chips should be placed in the bottom of the box.

Bee boxes and a single bee hive will be installed and maintained by Sheri Pollard with the City. If successful, one or two more hives might be added.

HARVESTER ANTS

There is a Harvest Ant mound located at the east end of the Grassy Draw Ecological Zone just south of the single Huisache tree. Any construction, maintenance, and management should take care not to disturb or cover up this mound. Harvester Ants are seed collectors that serve as the primary source of food of Texas Horny Toads.

Harvester Ants live in surprisingly large colonies. It has been estimated that a particular nest may house over 20,000 individuals. The colony is accessible by only a single nest opening, and all of the plant matter, including the root systems, is cleared away around it. This perimeter is about 3 feet or so, making the nest easily recognizable. The nest itself can descend for 20 feet below the surface, and there are many times multiple side systems that can extend out for a dozen or more feet. The benefits of a single nest are obvious, the most important being the soil aeration.



Harvest Ant mound in the upper Grassy Draw

WATER CATCHMENT POND

Following the construction of the small water catchment pond in the Dry Creek Woodland Ecological Zone, obtain maintenance instructions from the contractor. Maintenance details will be based on whether or not a lining is used, how long the water is expected to be detained, and whether or not wetland vegetation will be planted along the edge.

NEW PLANTINGS & SEEDINGS

Appendix C provides a list of native species that can be seeded or planted for each Ecological Zone. The goal is to increase food sources and increase the number of low and middle horizontal layers to increase cover. It is best to plant and seed in early fall to take advantage of fall rains. Wild harvested seed is preferred. Seeding and planting can also occur in late winter to make use of spring rains.

Seedings and plantings in the areas dominated by prairie grass cover should be mulched with wheat straw. This product is different from hay since it does not contain Bermuda Grass seed (very invasive). Also, wheat straw consists of hollow base stems that absorb rainwater. Where seedings and plantings are installed in woodland and thicket Ecological Zones, use mushroom compost to improve the soil and cover new seedings and plantings with a native oak-cedar wood mulch.

As plant species richness increases, White-tailed Deer will likely begin browsing new plants. Care needs to be taken to protect newly planted trees and emerging seedlings to protect them from deer. Cut branches can be used to form deer enclosure around newly planted areas in woodland Ecological Zones. Deer enclosures need to be about 4 feet wide and 4 feet high. Steel welded wire cages can also be added. These need to be 4' tall with at least a 36" diameter to accommodate growth. Where possible, vulnerable seeds and plants can be planted inside existing clusters of Texas Persimmon, Agarita, Ashe Junipers, or cacti for protection.

Woody plant saplings can be purchased or ordered through Madrone Nursery in San Marcos (512.353.3944). Any sedges or grasses can be grown as plugs by McNeal Growers near Bastrop (512.294.4133). Seeds can be wild-harvested or purchased from Native American Seed (800.728.4043), Granite Seed (801.768.4422), Douglass King Seeds (210.661.4191), and Turner Seed (800.722.8616).

TREE MANAGEMENT

Tree pruning should be limited to dead growth and any branches that hinder trail or parking lot access. The goal should not be to "clean up" or "prune up" the trees. It is more desirable for wildlife habitat to retain lower branches and allow branches to droop. When this happens, grass growth is reduced and this reduces fire risk. Any vines planted at the base of trees should be located at snags or interior trees since vines can act as ladder fuels that increase fire risk.

The dominant trees on site are Texas Live Oaks. These are susceptible to oak wilt. Oak wilt has been found in Llano County, so it is important to remain vigilant. Contact Robert Edmonson of the Texas Forest Service, redmonson@tfs.tamu.edu or 830-868-7949. if signs appear (for instance yellow leaf veins).

Ashe Junipers (also called Mountain Cedars) are native woodland and forest trees. Where soils are degraded, they will spread as pioneering bushy-cedars. The only bushy-cedars on the site are located in the Stony Glade Ecological Zone along the northern



Left: The three potential oak mottes for selected based on the prevalence of Texas Live Oak suckers. When no longer mowed, these will grow into new oak trees. Right: Example of a juvenile single trunk Ashe Juniper that should be retained to increase habitat diversity and increase canopy cover in designated Ecological Zones.

property line. Single trunk, sapling Ashe Junipers are growing up under shade trees, especially Texas Live Oaks. They constitute true woodland regrowth. As such, they should be managed as woodland regrowth. Selectively thin to remove those with low forked trunks and those coming up right under a large branch and/or within five feet of an existing larger tree's trunk. The plan shows the location of desirable single trunk Ashe Junipers located during the Site Analysis.

Honey Mesquite trees at the parking lot and along trails should have all thorny branches removed. These branches can be worked into wildlife brush piles or mulched. The Honey Mesquite trees will eventually get supplemental irrigation to increase growth and maintain health during droughts. These will be managed as shade trees. Honey Mesquites growing throughout the rest of the site should be removed as needed to retain the percent of cover outlined for each Ecological Zone.

Post Oaks trees are not susceptible to oak wilt. However, they have very sensitive roots. It is imperative to be careful when installing any project around and under the trees.

Texas Persimmons are small trees that will form thickets when cut back. Thicket habitat can be taken advantage of for the Persimmon Thicket and Prairie Woodland to increase understory growth.

PRAIRIES GRASS AND FORB MANAGEMENT

The primary goal for the prairie grasses and forbs is to reduce mowing. Also, incorporating cow manure compost tea hydro-spray will boost soil bacteria to promote the development of late succession species and reduce woody plant spread. The general goal of reduced mowing and adding manure is to mimic the process of rotational grazing. Late successional grass dominance will ultimately outcompete the stands of non-native King Ranch Bluestem.

Cow manure compost and cow manure compost tea can be obtained from Green Cow Compost in Dublin (website: greencowcompost.com).



A regular part of the land management will be to have cow manure compost tea sprayed following any mowing to enrich soil health.

MISTLETOE MANAGEMENT

Mistletoe is a native parasitic plant. It can be noticeably problematic on hackberry and mesquite trees. As parasites, they can negatively affect tree health.

The best and easiest solution starts with knocking off the mistletoe in winter. Mistletoe is evergreen and therefore easier to spot on deciduous hackberries and mesquites in winter. One option is to remove an infected branch if it won't affect the overall appearance of the tree. Another option is to knock off or cut the mistletoe so only the roots remain. Then wrap the cut site with black polyethylene, black plastic or a similar material, and loosely secure the material in place with twine or tape. After two years, the mistletoe should be dead due to a lack of sunlight.

INVASIVE PLANT MANAGEMENT

Most of the Nature Park plants are regionally native. However, at least six species are not native. It is the land manager's responsibility to learn what is native and not native. The following list includes non-native, invasive plants that were identified during the 2020 site analysis. Prescriptions for each species is based on best removal techniques and species aggressiveness:

- ▶ Beggar's Ticks (*Torilis arvensis*): monitor populations to prevent spread
- ▶ Japanese Brome (*Bromus arvensis/japonicus*): typically disappears with heat, monitor populations to prevent spread
- ▶ Johnson Grass: Cut seed heads and discard in bags, dig out and remove following periods of rain when ground is softer; do not use chemicals
- ▶ King Ranch (KR) bluestem: exists where soils are degraded as an early succession grass; seed over heavily with Silver Bluestem.
- ▶ Malta Star-Thistle: thrives whether it's dry or wet, will outcompete native plants, use gloves to dig out and remove following periods of rain when ground is softer, place in bags and throw away, best time to remove is December to March.
- ▶ Vasey Grass: pull out and discard when the ground is wet.

Appendices

APPENDIX A

Viewed Bird Species

Local birders conducted three bird census studies the mornings of June 8, July 1, and November 19 of 2020. The purpose was to assess bird presence throughout the year at the Nature Park. Bird sightings were recorded on the Horseshoe Bay Nature Park eBird Hotspot.

June 8, 2020, 11:32 AM

Protocol: Traveling, 0.1 mile(s)

18 species

Birders:

Travis Audubon Society Andy & Ellen Filtness

Mourning Dove 2
Yellow-billed Cuckoo 2
Black-chinned Hummingbird 2
Great Blue Heron 1
Black Vulture 45
Turkey Vulture 5
Eastern Phoebe 1
Scissor-tailed Flycatcher 1
Bell's Vireo 4
Purple Martin 4
Blue-gray Gnatcatcher 1
Bewick's Wren 1
Nother Mockingbird 4
House Sparrow 5
Lesser Goldfinch 2
Brown-headed Cowbird 1



Summer Tanager 1
Painted Bunting 1
July 1, 2020, 6:53 AM - 8:58 AM
Protocol: Traveling, 1.136 mile(s)

25 species

Birders:

Travis Audubon Society Andy & Ellen Filtness

Highland Lakes Birding and Wildflower Society: led by Sherry Bixler

Black-bellied Whistling-Duck 2

White-winged Dove 15

Mourning Dove 15

Yellow-billed Cuckoo 2

Black-chinned Hummingbird 9

Green Heron 5 We assume a family group four flew out all at the same time. Later found a single bird on the tank just off the property.

Turkey Vulture 3

Eastern Phoebe 1 On the barbed-wire fence by the pond.

Scissor-tailed Flycatcher 1

Bell's Vireo 5 Feeding a fluttering fledgling

Purple Martin 5

Barn Swallow 6

Blue-gray Gnatcatcher 1

Carolina Wren 1

Bewick's Wren 2

Northern Mockingbird 7

House Sparrow 10

Lesser Goldfinch 6

Black-throated Sparrow 1

Lark Sparrow 5

Orchard Oriole 2

Red-winged Blackbird 1

Brown-headed Cowbird 4

Northern Cardinal 6



November 19, 2020, 8:06AM

Protocol: Traveling, .3 mile(s)

23 species

Birders:

Travis Audubon Society Andy & Ellen Filtness

Highland Lakes Birding and Wildflower Society: led by Sherry Bixler

Gadwall 2
Green-winged Teal 1
White-winged Dove 8
Killdeer 1
Black Vulture 3
Turkey Vulture 1
Osprey 1
American Kestrel 1
Eastern Phoebe 1
Carolina Wren 2
Northern Mockingbird 2
American Robin 33
House Sparrow 6
House Finch 3
Lesser Goldfinch 3
American Goldfinch 1
Lark Sparrow 2
White-crowned Sparrow 6
Vester Sparrow 2
LeConte's Sparrow 1
Savannah Sparrow 5
Song Sparrow 2
Northern Cardinal 1



APPENDIX B

Potential Birds

HOT SPOTS:	Granite	Horseshoe	Ferguson	Sandy	
BIRDS	Shoals	Creek Trail	Plant	Creek	HABITAT
American Coot		35	4		eats aquatic vegetation (+ponds)
American Crow		5		6	fields, woods, cities
American Goldfinch	x	4	5	3	overgrown fields
American Kestrel	x	1			poles, short grass, few trees, cavity nester
American Robin	x	3	20		woodlands with open fields
American Wigeon		1			grazes on land and in water
Barn Swallow	1	8	1	1	insects over ponds, nests in and under structures
Bell's Vireo	1		1	1	dense, brush near water
Bewick's Wren	1	1	1	1	dry brush, thickets, open woods near water
Black Tern	x				ponds and marshy, fish and insects
Black-crested Titmouse	1	12	1	1	brushy
Black-throated Sparrow	1	1			open desert scrub
Blue Grosbeak				1	overgrown fields, brush. hedgerows
Blue-gray Gnatcatcher	x	1		1	woods, brushy
Blue-winged Teal		4		8	shallow marshy forager
Bobwhite Quail					open brushy, low grasslands
Brown-headed Cowbird	x	2	3	1	open woods, woodland edges
Cactus Wren	2		2	1	dry brush, with dead perches
Carolina Chickadee	x	3		2	woodlands
Carolina Wren	4	3	3	1	dense brush, brush piles, pipes
Cave Swallow	5			1	insects over water, nests in caves & under structures
Cedar Waxwing		35	4		woodland edges, open woods, leafless trees
Chimney Swift	x				nests in chimneys

Chipping Sparrow		2	1		small trees and grassy
Cinnamon Teal		8			shallow marshy
Common Ground Dove				7	open brush with tall grass and tree groves, savannas
Common Raven	x		2	1	open woods and fields, brush
Crested Caracara					brushy lowlands along roadways, eats lizards and snakes
Eastern Bluebird	2	1	1		fields and open woods
Eastern Phoebe	2	2	1	1	nests under eaves, flycatcher
Field Sparrow	12	10	10		overgrown, brushy
Gadwall		x		2	eats water plants
Golden-fronted Woodpecker	2	1	2	2	open woods, dry brush, cavity nester
Great Blue Heron	x	4	2		marshy, fish
Great Egret	x	1			shallow marshy, fish
Great Horned Owl	1				dense woods, open prairies with trees
Great Roadrunner	1				open brush, small posts
Great-tailed Grackle		10	3		marshy, fields, lawns
Greater Yellowlegs	1			1	marshy invertebrate eater
House Finch	3	20	1		open woods, brushy fields
House Wren			1		open brush, overgrown, dense brush fence posts
Killdeer			1	1	Open areas near and along water
Ladder-backed Woodpecker	2	1		1	dry brush and woodlands, cavity nesters
Lesser Scaup		5			dives for invertebrates
Lark Sparrow		2	2	1	open woods, brushy areas
Lesser Goldfinch	x	6	9	1	brush, overgrown fields, stream side trees
Lincoln's Sparrow	1	1	4	4	thickets and shrubby
Loggerhead Shrike				5	open brush and grassland, tall poles
Mourning Dove	1	8	3	1	forest edges, not dense
Nashville Warbler	x				woodlands, trees, large shrubs, brush
Northern Cardinal	4	30	2	1	dense brushy
Northern Mockingbird	7	40	3	1	bushes and trees
Northern Pintail		3			marshy area forager
Northern Shoveler		1			sifts water
Olive-sided Flycatcher				1	tall pole, open areas in woodlands, open woods
Orchard Oriole	x				open woods, water edges,
Orange-crowned Warbler		1	1	1	shrubs along woods, low thickets
Painted Bunting	x		4	2	woodland/forest edges, shrubby, overgrown fields with trees
Pyrrhuloxia	1				brush, dry

Red-bellied Woodpecker	x				deciduous woodlands/forests
Red-shouldered Hawk	x				deciduous woodlands/forests with tall perches
Red-tailed Hawk		2		1	pole perches
Red-winged Blackbird		2			marshy, shrubby
Ring-billed Gull		6		4	rivers, ponds, fields, eat anything
Ruby-crowned Kinglet	x	1	2	1	old cedar woods (breed), brushy
Rufous-crowned Sparrow		3			brushy, dry
Rufous Hummingbird				1	woodlands, brush, grassy areas
Sandhill Crane		2			marshy
Savannah Sparrow			1		open grassy areas
Scissor-tailed Flycatcher	x		2	1	open grass areas with or without trees
Song Sparrow		2	1		brushy
Spotted Sandpiper	1		1		invertebrates eater along water
Summer Tanager	x		1	1	woodland and forests with junipers
Verdin	x	1	3		dry brush
Vesper Sparrow	x		9		open grasslands
Western Kingbird			1		open brush with trees
White-winged dove	6	15	1	16	dry habitats
White-crowned Sparrow	1			3	brush, low shrubs
White-eyed Vireo	x	1	1	1	dense brush, overgrown areas, woodland edges
White-throated Sparrow	3			4	woodlands, forest edge, thickets, open brush
Woodhouse's Scrub Jay		1			oak-juniper woodlands
Yellow Warbler	x				woodlands, brushy, near ponds, marshy
Yellow-bellied Sapsucker		1			cavity nester, attracts insects with sap holes
Yellow-billed Cuckoo			1	1	dense woodlands and forests
Yellow-headed Blackbird			1		marshy
Yellow-rumped Warbler		2	5	4	forests with junipers, open wood and shrubby
Screech Owl					woodlands and trees near water

APPENDIX C

Plant Species Identified

This list was developed based during the Site Inventories conducted in spring 2020.

Forbs/Vines

Antelope Horns
Arkansas Leastdaisy
Basil Beebalm
Beggar's Ticks
Brown Bitterweed
Buffalo Gourd
Bundleflower
Coreopsis
Cow Itch Vine
Dodder
Doveweed
Drummond Phlox
Dwarf White Aster
Georgia Sun-rose
Green Carpetweed
Green Milkweed
Greenbriar
Greenthread
Ground Cherry
Gumweed
Hierba de Zizotes
Indian Blanket

Indian Mallow
Knotweed Leafflower
Lazy Daisy
Longleaf Wild Buckwheat
Indian Mallow
Malta Thistle Star
Mexican Hat
Mistletoe
Noseburn
Pearl Milkweed Vine
Pennsylvania Pelitory
Pennyroyal
Peppergrass
Ponyfoot
Prairie Parsley
Purple Milkweed Vine
Ratany
Rock Cress
Rose Gentian
Rosemary Sun-rose
San Saba Pinweed
Sensitive Briar
Sida

Silver Leaf Nightshade
Skeleton Plant
Snow-on-the-Mountain
Sow Thistle
Spiderwort
Texas Bedstraw
Texas Bindweed
Texas Bluebonnet
Texas Croton
Texas Dandelion
Texas Parsley
Texas Star
Texas Thistle
Three Seed Croton
Toothed Spurge
Texas Vervain
Wavy Leaf Milkweed Vine
Western Ragweed
White Evolvulous
Widow's Tears
Wild Carrot
Winecup
Yellow Wood Sorrel

White Yarrow
Yellow Flax
Zexmenia

Grasses, Sedges, & Rushes

Cedar Sedge
Canada Wild Rye
Carolina Canarygrass
Dichanthelium
Flat Sedge
Grass-leaved Rush
Gummy Lovegrass
Hairy Grama
Heller's Rosette Grass
Japanese Brome
Johnson Grass
King Ranch Bluestem
Little Bluestem
Melic
Ozark Grass
Plains Lovegrass
Purple Threeawn
Red Lovegrass

Rye Grass
Scribner's Dichanthelium
Shortspike Threeawn
Sideoats Grama
Silver Bluestem
Switch Grass
Tall Dropseed
Texas Cottontop
Texas Grama
Texas Wintergrass
Thunberg's Brome
Tumble Lovegrass
Vasey Grass
Virginia Wild Rye
White Tridens
Willman Lovegrass
Witch Grass

Woody Plants

Agarita
Catclaw Mimosa
Cedar Elm

Elbow Bush
Evergreen Sumac
Eve's Necklace
Honey Mesquite
Lime Prickly Ash
Ashe Juniper (Mountain Cedar)
Netleaf Hackberry
Post Oak
Texas Live Oak
Texas Persimmon

Succulents & Yuccas

Buckley's Yucca
Lindheimer's Prickly Pear
Lace Cactus
Nipple Cactus
Tasajillo

Ferns

Woolly Lip Fern

Fungus

Puffball Fungus

APPENDIX D

Recommended Plant Species Enhancement

Dry Creek Woodland: DCW
 Boulder Draw: BD
 Grassy Draw: GD

Mesquite Grove: MG
 Oak Mottes: OM
 Prairie Grassland: PG

Prairie Woodland: PW
 Persimmon Thicket: PT
 Stony Glade: SG

PLANTS		ECOLOGICAL ZONES									AVAILABLE FORMS
		DCW	BD	GD	MG	OM	PG	PW	PT	SG	
AMERICAN BASKETFLOWER	<i>Centaurea americana</i>	X					X				seed
ANTELOPE HORN	<i>Aclepias asperula</i>		X	X	X					X	seed
AROMATIC SUMAC	<i>Rhus aromatica var. trilobata</i>	X	X		X	X		X	X		roots or plants
BARBARAS BUTTONS	<i>Marchallia caespitosa</i>	X	X	X	X		X	X		X	seed
BEE-BRUSH	<i>Aloysia gratissima</i>		X	X			X	X		X	seed
BLACK WILLOW	<i>Salix nigra</i>	X									cuttings or seedlings
BLACK-EYED SUSAN	<i>Rudbeckia hirta</i>		X	X	X		X	X			seed or plant
BLACKJACK OAK	<i>Quercus marilandica</i>		X			X		X	X		plants
BLUE CURLS	<i>Phacelia congesta</i>	X			X	X		X			seed
BUCKLEY'S YUCCA	<i>Yucca constricta</i>		X	X	X		X			X	plants
BUSHY BLUESTEM	<i>Andropogon glomeratus</i>	X									seed, roots, or plants
BUTTONBUSH	<i>Cephalanthus occidentalis</i>	X									seed, roots, or plants
CEDAR ELM	<i>Ulums crassifolia</i>	X				X		X			seedlings or plants
CHICKASAW PLUM	<i>Prunus angustifolia</i>	X	X			X	X	X	X		seedlings or plants
COMMON YARROW	<i>Achillea millefolium</i>	X				X		X			seed or plants

COWPEN DAISY	<i>Verbesina encelioides</i>			X	X		X	X	X	X	seed or plants
CURLY MESQUITE	<i>Hilaria belangeri</i>		X	X	X					X	seed
DOTTED GAYFEATHER	<i>Liatris punctata v. mucronata</i>		X	X	X	X	X	X		X	seed or bulbs
EASTERN GAMA GRASS	<i>Tripsacum dactyloides</i>	X					X	X			seed, roots, or plants
EMORY SEDGE	<i>Carex emoryi</i>	X									roots or plants
ENGELMAN DAISY	<i>Engelmannia peristenia</i>	X			X	X	X	X			seed
ERYNGO	<i>Eryngium leavenworthii</i>	X					X	X			seed
FROGFRUIT	<i>Phyla nodiflora</i>	X									plants
FROSTWEED	<i>Verbesina virginica</i>	X				X		X			seed
GREEN MILKWEED	<i>Asclepias viridis</i>		X	X	X		X			X	seed or plants
GREEN SPRANGLETOP	<i>Leptochloa dubia</i>			X			X	X			seed
HOODED WINDMILL GRASS	<i>Chloris cucullata</i>		X	X	X		X			X	seed
HUISACHE DAISY	<i>Helenium setigerum</i>		X	X	X		X			X	seed
ILLINOIS BUNDLEFLOWER	<i>Desmanthus illinoensis</i>	X									seed or plants
INDIAN BLANKET RED	<i>Gaillardia pulchella</i>		X	X	X		X		X	X	seed or plants
INDIAN GRASS	<i>Sorghastrum nutans</i>	X					X	X			seed, roots, or plants
LAZY DAISY	<i>Aphanostephus sp.</i>		X	X	X					X	seed
LEMON MINT	<i>Monarda citridora</i>		X	X	X		X	X	X	X	seed
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i>	X				X	X	X			seed, roots, or plants
MAXIMILIAN SUNFLOWER	<i>Helianthus maximiliani</i>	X									seed, roots, or plants
MEADOW SEDGE	<i>Carex perdentata</i>	X									plants
MEALY BLUE SAGE	<i>Salvia farinacea</i>			X	X	X	X	X			seed or plants
MEXICAN BUCKEYE	<i>Ungnadia speciosa</i>	X				X		X	X		seed or plants
PIGEONBERRY	<i>Rivina humilis</i>		X		X	X	X	X	X		seed
PLAINS COREOPSIS	<i>Coreopsis tinctoria</i>		X	X	X		X			X	seed
PRAIRIE VERBENA	<i>Glandularia bipinnatifida</i>		X	X	X					X	seed or plants
ROUGHLEAF DOGWOOD	<i>Cornus drummondii</i>	X						X			roots, cuttings or plants
SAND DROPSEED	<i>Sporobolus cryptandrus</i>		X	X	X		X			X	seed
SIDE OATS GRAMA	<i>Bouteloua curtipendula</i>		X	X	X	X	X	X	X	X	seed, roots, or plants
SLEEPY DAISY	<i>Xanthisma texanum</i>		X	X	X		X			X	seed

SNAILSEED VINE	<i>Cocculus carolinus</i>	X	X			X		X	X	seeds
SPANISH GRAPEVINE	<i>Vitis cinerea</i> var. <i>helleri</i>	X				X		X		seeds
STANDING CYPRESS	<i>Ipomopsis rubra</i>					X	X	X		seed or plants
SWITCH GRASS	<i>Panicum virgatum</i>	X								seed, roots, or plants
TALL GOLDENROD	<i>Solidago altissima</i>	X					X			seed, roots, or plants
TEXAS BLUEBONNET	<i>Lupinus subcarnosus</i>			X	X					X seed
TEXAS BLUEGRASS	<i>Poa arachnifera</i>	X					X	X		plants
TEXAS GRAMA	<i>Bouteloua rigidiset</i>			X	X					X seed
TEXAS KIDNEYWOOD	<i>Eysenhardtia texana</i>				X	X		X	X	seed or plants
TEXAS SOTOL	<i>Dasyilirion texana</i>		X		X					X plants
THORNLESS TEXAS MESQUITE	<i>Prosopis glandulosa</i> v. <i>glandulosa</i>				X					plants
TRACY HAWTHORNE	<i>Crataegus tracyi</i>		X			X		X	X	seed or plants
WESTERN IRONWEED	<i>Vernonia baldwinii</i>					X	X	X	X	X seed or plants
WESTERN SAGEWORT	<i>Artemisia ludoviciana</i>		X			X	X	X	X	seed, roots, or plants
WESTERN SOAPBERRY	<i>Sapindus saponaria</i>	X						X		seedlings or plants
ZIZOTES MILKWEED	<i>Asclepias oenotheroides</i>		X	X	X		X			X seed or plants

Seed Sources: Native American Seed, Douglass King Seed, Granite Seed, and wild harvested

Root Sources: Native American Seed and wild harvested

Plant Nursery Sources: McNeal Growers, Madrone, Far South, Barton Springs Wholesale, LBJ Wildflower Center, Oaks of the Wildwest