ST. EDWARD'S UNIVERSITY

Wild Basin Creative Research Center

Wild Basin Wilderness Preserve
2020 Annual Report

(October 1, 2019 – September 30, 2020)

Submitted by

Wild Basin Creative Research Center and St. Edward's University

to

Travis County Commissioners Court
and Transportation and Natural Resources

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Overview of Preserve Management and Operations

Wild Basin Wilderness Preserve is jointly owned and managed by St. Edward's University and Travis County (Appendix A). Wild Basin's mission is to protect and maintain its urban wilderness, and to promote the importance of environmental education, research, conservation and preservation.

Situated at the edge of the Texas Hill Country and surrounded by commercial and residential growth in west Austin (see Appendix B), Wild Basin is a unique conservation property for Travis County and the larger Balcones Canyonlands Preserve (BCP) system. As an urban and publicly accessible preserve, Wild Basin provides authentic environmental education and recreation experiences for the community. The preserve's location near a major urban area also brings challenges in the form of invasive species, water pollution, noise pollution, and litter. Wild Basin strives to incorporate these challenges into learning opportunities about our urban environments for students and the public.

Since its merger with St. Edward's University in 2009, Wild Basin remains an important resource to the local community and continues to build on its rich history of promoting conservation, research, and environmental awareness. Wild Basin aspires to become a model for urban preserves, a hub for stewardship, creative research, and environmental education, and a gateway to the BCP.

In addition to helping implement preserve management, St. Edward's University operates the Wild Basin Creative Research Center based at the preserve, which houses a Visitor Center with environmental exhibits, staff offices, an Artist in Residence space, a classroom, a lab, and meeting spaces. The Research Center is a key resource for educating university level as well as K-12 students and provides a platform for public outreach and engagement.

Wild Basin's education, art, research, and preserve management programs are designed to promote conservation and environmental awareness, while encouraging and demonstrating land stewardship practices. From October 2019 to March 2020, Wild Basin hosted stewardship days for students, the public, and community groups. Wild Basin provided two trail guide trainings (K – 12 and early childhood), organized environmental educational and interpretive tours and events, coordinated student internships and research activities, hosted undergraduate and graduate classes, maintained public trails, managed invasive species, performed restoration work,

monitored and reported on water quality, hosted public and inter-agency meetings, workshops, and trainings, and hosted an Artist in Residence Program.

On March 24, 2020, Wild Basin was closed to the public due to the Covid-19 pandemic for the safety of preserve staff and visitors and to help reduce the spread of the coronavirus. The preserve reopened to the public on September 17, 2020. Upon reopening, visitors were allowed to access the preserve by reservation only, on Wed through between 8am and 1pm (two hiking periods of two hours each – from 8am to 10am and from 11am to 1pm). Trails were marked to allow one-way hiking traffic only, with visitors entering the trail system on the lower parking lot trail head and exiting behind the visitor center at the upper parking lot trail head.

Wild Basin Vision

The vision of Wild Basin is to inspire conservation by connecting communities to a dynamic urban preserve. Together with our partners, we focus on the following goals for Wild Basin:

- Managing and restoring a mosaic of habitats indigenous to Wild Basin, including oak-juniper woodlands, riparian corridors, semi-open grasslands and cedar breaks;
- Protecting native biodiversity;
- Protecting habitat for the federally endangered Golden-cheeked warbler;
- Protecting habitats to support threatened and rare plant and animal species;
- Controlling non-native and invasive species;
- Protecting soil profiles and unique geologic features;
- Monitoring water quality relative to watershed inputs, runoff, and erosion;
- Protecting prehistoric and historic cultural sites;
- Managing a trail system that presents the regional flora and fauna, while minimizing impacts to the preserve's biotic community and inherent beauty; and
- Providing stewardship opportunities, research opportunities, and educational resources for students and the community.

Trail Maintenance, Restoration, and Construction

Wild Basin continued to work with trained stewardship volunteers and other volunteer groups (e.g., Boy Scouts, community groups, school groups) to incorporate trail maintenance techniques that minimize erosion and lead to more sustainable trails as well as to perform minor construction and restoration projects. Wild Basin held

workdays every Thursday, and most Saturdays (with the exception of during the Covid-19 shutdown period). Wild Basin contracted with American Youthworks for construction/restoration on a section of Arroyo Vista trail.

Trail Maintenance and Monitoring Activities:

- Weekly trail patrols were conducted along the entire trail system (Appendix A) to monitor trail conditions and identify potential hazards. These patrols are documented in the land management quarterly reports, effective Feb. 15, 2020 as per Travis County.
- Visitation is counted to document the total number of preserve visitors as well as temporal patterns in activity. These counts were achieved by newly installed Trafx trail counters installed at each trailhead as well as through manual counts by WB Security. Housing and installation of trail counters occurred in January of this year.
- Second and Third Saturday stewardship days, Thursday workdays, and were conducted for the first half of the year. All onsite volunteer activities were suspended from March to July. Thursday workdays resumed and Saturday invasive species workdays began in July on a restricted basis.
- Days prior to the Covid-19 closure, a new group of 15 volunteers had been formed and trained called “Wild Basin Trail Patrol”. The closure has postponed most of the activities of this group until it is safe to interact with the public on the trails again.
- Vegetation adjacent to designated trails was pruned throughout the year to maintain a visible trail for visitors and for safety purposes. Well-maintained trails minimize confusion about trail edges so the public can easily and efficiently hike to scenic areas. This maintenance is completed regularly to keep up with vegetative growth and done in accordance with Texas Agrilife protocols.
- Social trails continued to be a challenge for the first half of the year, and all social trails were brushed off several times over the course of the year, including around the parking lot. Brushing off consists of strategically placing dead, downed tree branches in these trails to conceal the trails and deter foot traffic by humans and wild animals. Signage was added in a few new locations to further limit access and impact. Social trails experienced a period of recovery for the second half of the year due to the preserve closure and very limited visitation upon reopening post-Covid-19.
- Staff and volunteers installed and improved on berms and swales, water bars, and drains on the trail system at locations where rainfall runoff caused significant trail erosion to reduce trail erosion.

- Several limb blowdowns were removed across the Creek, Possum and Back Gate trails.
- Weathered trail markers and signage were replaced in several locations.
- Trees in danger of impact by vehicles around the parking lot were pruned.
- The unused compost enclosure from behind the Visitor Center was removed.
- Trees and vegetation were removed or pruned back from the Visitor Center following Westlake fire wise management recommendations.

Trail Construction and Restoration Activities

- Wild Basin, in partnership with Travis County, contracted with American Youthworks to restore the three eroded slopes where previous restoration work had failed. Additionally, obstacles over 2" in height were removed, drainage was improved, and several steps at the trailhead and crossovers from the scenic view were installed and filled with stalok material. A new section of handrail was also added to the downslope side at the beginning of the walk bridge.
- Native material was added to a berm and a low spot along upper Arroyo Vista trail to facilitate proper drainage.
- A trail reroute around a low spot along the creek trail was completed, and the original trail restored by brushing it off in such a way that allowed for regrowth of native vegetation. The original trail has almost fully recovered.
- New signage was installed including new rules signage, signage stating that Arroyo Vista trail is not wheelchair accessible, and signage indicating that there are steep slopes past the intersection of Arroyo Vista/Triknee/Overlook and following marker #5 on Arroyo Vista. Other signage was updated around the parking lot and back gate.
- Created and installed Covid-19-related signage including social distancing, rules, hours and days of operation, trail directional signage (one way), etc.
- A new bench was added to the eastern slope of Yaupon trail.
- Two sections of rotted railings were replaced on the Arroyo Vista walk bridge.

Boundary Management

Boundary Management Activities

- Wild Basin staff monitors the preserve's entire perimeter at least bi-annually. The entire perimeter was patrolled at least three times this FY, with more frequent visits to certain "problem" areas.
- Staff and volunteers picked up trash in the eastern right-of-way of Hwy 360 on multiple occasions to prevent it from traveling into the preserve and Bee Creek.

- WB continued to experience a few vendor issues after new No Parking signage was erected along the boundary with Hwy 360, but after some repeated attempts to discourage and report these vendors, the activity has ceased.
- Staff and volunteers “undecorated” 15 trees along the WB/Vireo boundary along 360 in December 2019.
- Several new developments along Wild Basin’s boundary were monitored during this FY for posing possible threats to the ecological integrity, mostly due to the threat or occurrence of sedimentation of Bee Creek and its tributaries (see “Water Quality” for more details).
- Boundary signage or marking around inholding property was found to be lacking in some areas.
- Trash was found to be washing in from two residences along the southeastern portion of this boundary. Wild Basin Staff picked up the trash – it is due to a continuing construction project and will likely cease when construction is finished.
- Old brush piles exist in several places inside the preserve along the perimeter, mostly along the southern portion. It is unclear whether some of these were from fence building or neighbors. These may need to be addressed for fire prevention.
- Clippings of Sago palm were found to have been deposited along the eastern boundary across the fence from neighbors.
- A leaking water pipe was found and reported along the Southeastern boundary. The water line belongs to Travis County and the proper authorities have been notified.
- Several locations have downed trees laying across the fence line, especially along the portions of the southern boundary that have not had clearing for shaded fuel breaks. These had been slated to be taken care of by a County crew, but due to Covid-19 never transpired. This will likely be addressed when Covid-19 restrictions allow.
- Large pockets of invasive species continue to be a problem adjacent to most residences along the perimeter. Treatment by Wild Basin and Travis County staff, interns, and volunteers continued and current interpretive materials, workshops, and research were developed that will be utilized next FY to provide information and education on invasive species and their impacts.
- Possible feral hog scat and light rooting was discovered along the perimeter between Bee Creek and South Hollow. A day following this discovery a neighbor independently reported a possible hog sighting on Bee Creek. This information was reported to Travis County and camera monitoring has begun.

- Two incidents of possible encroachment into the preserve by “homeless” persons through the adjacent Westlake neighborhood was reported. These incidents were investigated by WB staff and no signs of encroachment or encampments were found in this area.
- Only one fence cut was found (and repaired) during this FY, however, signs of “fence jumping” were noticed in several spots and addressed with signage and “brushing off”. Wild Basin plans to implement more No Trespassing signs and purple paint in the upcoming FY.
- Austin Energy submitted a work plan to Travis County and Wild Basin for tree removal and pruning along electric lines. Work was slated to begin October/November but has not yet begun.

Vegetation Management

Vegetation Management Activities

- Vegetation mapping. Wild Basin staff, volunteers, and researchers use the citizen science platform iNaturalist to map the distribution of plants within the preserve. iNaturalist is accessible via a smartphone app or on the web from a computer. The app allows users to document locations, photos, and relevant notes about plant species on-site. Currently, we have two projects established in iNaturalist: one project for the public to report their observations along the trails (Wild Basin Biodiversity Project), and a second project for staff, researchers, and trained volunteers to report observations of rare plants and invasive species in off-trail locations (WBCRCMappingProject). In the case of rare or endangered species, all coordinates are obscured from the public so as not to encourage iNaturalist users to leave the trail. All iNaturalist observations can be exported and then uploaded to ArcGIS or Google Earth for mapping or further analysis. The iNaturalist Wild Basin Biodiversity Project currently has 1,176 Research Grade observations of 431 floral and faunal species. The project currently has a catalogue of 244 Wild Basin plant species.

- Rare plant species. All rare plant locations described are documented in the iNaturalist WBCRCMappingProject or, if done through Coordinates are obscured from the public when sightings are off-trail. A report from volunteer Master Naturalists monitoring rare plant species in Wild Basin can also be found in the research section of this report. Wild Basin also maintains a Google Calendar of bloom periods to assist with focusing monitoring efforts.

Unfortunately, due to the Covid-19 pandemic preserve closure, volunteers engaged in this monitoring project had to cease work in March 2020. Although processes were adopted later in the year to allow access, monitoring essentially ceased in March and has not resumed. We expect rare plant monitoring to resume in early in 2021.

- Target rare and unusual plant species:

  Primary Species of Interest
  - Naked broom-rape (*Orobanche uniflora*): No monitoring.
  - Shooting-star (*Primula meadia*, formerly *Dodecatheon meadia*): No monitoring of this spring bloomer.
  - Texas Madrone (*Arbutus xalapensis*): No monitoring.

  Secondary Species of Interest
  - Canyon mock-orange (*Philadelphus ernestii*): No monitoring.

  Tertiary Species of Interest
  - Glass Mountain coral-root (*Hexalectris nitida*): No monitoring of this fall bloomer.
  - Crested coral-root (*Hexalectris spicata*): None were observed in March before the closure, which is still early for this species.
  - Heller's marbleseed (*Onosmodium helleri*): No monitoring.
  - Buckley tridens (*Tridens buckleyanus*): No monitoring.
  - Louisiana broomrape (*Aphyllon ludovicianum*; *Orobanche ludoviciana*). No monitoring.
  - Ladies tresses orchids (*Spiranthes magnicamporum*): 2019 was a not a good year for this species in the usual locations due to a significant deficit in rainfall in the fall of 2019. We did find 3 of the 7 plants that were relocated prior to the paving of the driveway. There were no flower stalks. Nonetheless, there were numerous flowering stems observed in November 2019 in the seeded, restored area on the hill along the entrance drive.
  - Sticky Liatris (*Liatris glandulosa*): No observations.
  - Virginia Snakeroot (*Endodeca serpentaria*): This plant was observed along the creek in fall and early spring, but no flowers were seen.
  - Other species of note observed by C. Todzia include Anemia mexicana, Liatris punctata, Verbesina lindheimeri, Mitreola petiolata, Dodecatheon meadia, and Berchemia scandens.

Invasive species management

- Preserve and Travis County TNR staff, student interns, volunteers, and American Youthworks (contracted by Travis County) continued to map, monitor for and remove invasive, non-native species, such as Japanese honeysuckle (Lonicera japonica), Chinese Tallow (*Triadica sebifera*), Chinaberry (Melia azedarach), firethorn (*Pyracantha coccinea*), Japanese privet (Ligustrum japonicum), Chinese privet (*Ligustrum sinense*), nandina (*Nandina domestica*), Beggars' ticks (*Torilis arvensis*), Johnson grass (*Sorghum halepense*), chaste-tree (*Vitex agnus-castus*), bastard cabbage (*Rapistrum rugosum*), and giant cane (*Arundo donax*), among others.
- Invasive species control measures at Wild Basin involve manual removal of plants by invasive species crews by hand pulling or use of a weed wrench (Appendix C). In addition, in collaboration with Travis County TNR personnel, we use either a "cut and paint" method or "girdle and treat" method utilizing Garlon 3A herbicide. These treatments are used on plants too large to be removed manually (generally plants greater than 2.5" diameter). Chemical treatments are performed under supervision of Julie Murray, Travis County BCP Natural Resource Specialist, a licensed applicator through Texas Department of Agriculture.
- Invasive species are now primarily mapped and monitored using GIS the GIS "Collector" app in cooperation with Travis County TNR. Previous to 2018, this was mostly done using iNaturalist (see Appendix C).
- Between October 2019 and September 2020, Wild Basin and Travis County TNR staff, American Youthworks (contracted by TC), interns, and volunteers removed 5650 stems of invasive plants. Between 2016 and 2020, 9235 invasive plant species were removed from Wild Basin. Wild Basin staff dedicated 60 hours, interns 78 hours, and volunteers 16 hours for a total of 154 hours working on invasive species training, removal, and mapping in the field. Travis County TNR staff put in 15 onsite hours and arranged and managed contractor American Youthworks (AYW) to assist in eradication efforts. AYW contributed 96 hours removing invasive species at Wild Basin (see Appendix C).
- The dominant invasive species by far removed on the preserve is Japanese Ligustrum (Ligustrum japonicum).
- Last year a large population of Beggar's ticks (*Torilis arvensis*) was removed on the north side of the parking lot between the trailhead and security shed. This year another round of removal was completed with

noticeably less stems produced overall but extending from the trailhead to the front gate.
    - Invasive species removal by interns in Spring and Fall 2020 was impacted by the Covid-19 shutdown, with all onsite student activities ceasing March 14, 2020 in Spring, and limited days/hours as well as fewer interns in Fall 2020.

- Protection from browse pressure. Wild Basin staff maintained existing deer exclosures of hog wire cages around stands of young native trees and shrubs to prohibit excessive browse by deer and other animals.
- Fuel reduction.
    - A project was coordinated by Travis County and the City of Westlake to cut fuel breaks along the southern border of Wild Basin in areas adjacent to residential areas. In FY 2017, 0.6 acres were treated Lake Travis Fire and Rescue near the preserve's back gate. An additional 1.6 acres were treated along the southern perimeter bordering residential areas in FY2017 and FY2018. No treatments were needed in these areas during FY2019 or FY2020.
    - Firewise guidelines of clearing debris and trimming back branches and woody brush continue to be followed in the area immediately surrounding the visitors center.

Wildlife Management

Wildlife Management Activities

- Golden-cheeked Warbler. A total of 41 surveys were conducted at Wild Basin and Vireo Preserve between 11 March and 15 June by Darrell Hutchinson, Lisa O'Donnell, and Jim O'Donnell for a total of 139.75 survey hours. The 2020 breeding season was a marked improvement over previous years both in terms of pairing and breeding success. Six males were detected during the breeding season – three at Wild Basin and three at Vireo Preserve. All six males paired and four pairs reproduced successfully – one at Wild Basin and three at Vireo Preserve. Compared to recent years, pairing and reproductive success across the plot was higher. Total plot density was about average, but the increase in occupancy this year occurred on Vireo Preserve. Wild Basin has supported only three male territories during the last four years, although Wild Basin recorded up to seven territories in the past.

Due to Covid-19, the color banding effort was suspended. One color-banded male returned from last year. RD/SI:NB/BL was banded on 17 March 2019 as an after-second-year (ASY) bird. He occupied part of the same territory as last year near the back gate, but also shifted to defend the lower North Hollow drainage and was observed singing regularly along Possum Trail. No nests from this pair were found, but the male was very active through mid-June, suggesting at least two failed nesting attempts. The effects of the lockdown are difficult to determine. However, one pair (UBVPWB1) nested next to the parking lot by the Visitors Center at Wild Basin, where no pairs have nested since 2011. UBVPWB1 was the only pair to breed successfully at Wild Basin. Two nests were found. The first was found predated, but the re-nest fledged a minimum of three.

Notably, two male Black-capped Vireos were detected this year – one at Wild Basin and one at Vireo Preserve. Both were unbanded and failed to pair. Transient males have been detected at Vireo Preserve several times in the last few years. However, this is the first confirmed sighting of Black-capped Vireo at Wild Basin in years. For a full report see Appendix D.

- Feral Hogs (*Sus Scrofa*). Possible feral hog scat and light rooting was discovered along the perimeter between Bee Creek and South Hollow. A day following this discovery a neighbor independently reported a possible hog sighting on Bee Creek. This information was reported to Travis County and camera monitoring has begun
- Wildlife activity continued to be monitored across Wild Basin boundaries and along trails using 15 motion-triggered cameras installed along the preserve's perimeter and 13 cameras installed along trails. Additionally, human hiker activity is monitored and analyzed alongside wildlife activity using images from trail-based cameras. Additionally, human hiker activity is monitored and analyzed alongside wildlife activity using images from trail-based cameras. The cameras continue to be maintained and data are collected and analyzed by Wild Basin staff, interns, volunteers, and research students regularly. No formal analysis was conducted using the images during the past year.

Water Quality

Water Quality and Quantity Monitoring Activities

- Water quality testing was conducted monthly during the reporting period by Wild Basin staff (with assistance from student interns) using the Colorado River Watch Network water quality monitoring protocols. Several different parameters were tested, including pH, nitrates, turbidity, dissolved oxygen,

specific conductance and E. coli. All data from water quality testing at Wild Basin can be found online at the CRWN website (https://crwn.lcra.org/events.aspx?qrySite=72).

- Water quality was of great concern this year due to sedimentation and algal blooms, and several new developments popping up around Wild Basin's perimeter. Of note is a 46-townhome development (The Addie at Westlake) directly across Loop 360 from the Wild Basin Entrance. This subdivision will utilize an onsite water treatment plant and leaching field system that could pose major threats to water quality in Wild Basin in the event of heavy rains. Bee Creek experienced sediment movement and deposition and algal blooms throughout its length in Wild Basin this FY- most likely due to continued migration of sediment from the past Hotel Granduca septic failure - but the Addie drains both to Bee Creek directly and Bee Creek via North Hollow and may have contributed. A new development on Wild Basin Ledge poses ongoing sediment issues as well. All of these properties were reported to TCEQ in September and photos and videos provided. Travis County and City of Austin were reported to as well when appropriate. The Wild Basin Ledge development's controls have been improved several times but so far continue to fail, and there are still concerns that remain unaddressed. Wild Basin staff will continue to work with TCEQ, neighbors and the County to get these issues addressed. No actions have been taken to alleviate concerns with the continuing problem from Hotel Granduca, despite several reports about concerns. It is reported by Travis County that there were settlement funds to mitigate impacts, but no funds have been used or actions taken to prevent or mitigate the degradation that continues to impact Wild Basin and downstream neighbors. Wild Basin is investigating tools and setting up protocols to permanently monitor for these impacts and provide triggers for reporting violations and documenting further degradation, as well as continuing to push for prevention measures from all of these developments.

Outreach, Education, and Volunteer Coordination

Wild Basin actively provides environmental educational opportunities and volunteer stewardship opportunities for the community. A total of 1342 education, stewardship and volunteer hours were logged at Wild Basin on a number of outreach-related activities, including trail maintenance and stewardship (described above), environmental education, and research. The major programs held at Wild Basin from October 1, 2019 to September 30, 2020 are summarized below.

Environmental Education and Interpretive Programs

- School Programs – Wild Basin provided guided environmental education hikes to various public and private school groups as well as scout groups during the early weeks of the spring 2020 school semester. Between October 1, 2019 and mid-March, 247 children and 57 adults participated in guided hikes led by trained volunteer trail guides in the preserve. In FY2020, approximately 11 trained volunteer guides donated an estimated 30 hours to assist with these education programs. From April through the end of the fiscal year all in-person programs for schools and public were cancelled due to the presence of Covid-19 in the Austin community. In August-September 2020 St. Edward's University student intern Kaitlyn Dawson photographed and filmed short educational videos at the preserve for K-12 schools, including an early elementary science and literacy series in partnership with Austin ISD called *Reading in the Wild*. These videos allowed Wild Basin to pivot to meet the needs of K-12 schools during the pandemic, and begin to produce new on-demand virtual programming for schools.
- Public Programs – Through February 2020 local children and adults (approximately 95 total) attended several public programs hosted by Wild Basin staff and volunteers, including monthly Second Saturday Guided Hikes, quarterly e-Bird surveys, and one Artist in Residence event. In mid-March due to the presence of Covid-19 in the Austin community, all in-person public programs and events were cancelled, including typically one of our largest events, *Wild by Wild Basin*. In April 2020 one public virtual program called *Find Your Wild,* affiliated with the Citywide Nature Challenge invited the public to explore nature during lockdown. In August 2020 student interns Edere Ohwobete, Sofia Ramirez, and Eve Dean presented virtual poster presentations at St. Edward's University about research projects on the preserve. In September Wild Basin held one public program, a small star party night tour with REI for seven adults.
- Artist in Residence – Wild Basin welcomed the fourth Artist in Residence for Fall 2019 awardee was rising artist and St. Edward's University student Precious Parker. As a visual artist, storyteller and photographer, Parker explores "the relational connection between subjects and space with subtle elements of emotion". During her residency at Wild Basin, Parker examined how humans and nature live in tandem and hopes her artwork will encourage people to reflect on their connection to nature and the spaces they occupy. In November, Parker guided 14 children and adults in the technique of cyanotype nature printing. The Spring 2020 Artist in Residence was professional artist Danika Ostrowski. Ostrowski is based in Austin and is a dedicated advocate for the preservation of

public lands. She paints both en-plein-air and creates in-studio work based on photographs, sketches and memories. Ostrowski began painting on the porch at Wild Basin every Friday morning until Wild Basin closed due to Covid-19 in mid-March.

- Educator Training – In October 2019 Wild Basin hosted a training for the national environmental education curriculum, Project Learning Tree, in conjunction with the Texas Project Learning Tree, Texas Forest Service and Sam Houston State University School of Teaching and Learning. The Saturday and Sunday workshops for educators at Wild Basin trained 17 educators from across Central Texas with environmental education activities focusing on trees and forests appropriate for PK-8th grade classrooms.
- Volunteer Training – In January 2020 Wild Basin conducted a Trail Guide Training workshop. Seven new volunteer trail guides were trained in natural science interpretation, techniques for working with school groups, as well as learning the basics of the Bee Creek watershed, and the plants, animals, geology of the preserve. At an additional workshop in January three new volunteer guides were trained for the Tiny Footprints preschool program. Wild Basin also recruited a new group of volunteers to patrol and protect the preserve and to help maintain the trail system. In January, 15 new Trail Patrol volunteers on trail monitoring and trail work techniques/terminology, tool maintenance, basic procedures/protocol, iNaturalist, and the Authority of the Resource technique. And two online stewardship volunteer trainings were held in June 2020. Ten land steward and ecological monitoring volunteers were trained in techniques for safe access to the preserve during Covid-19, Wild Basin updates, volunteer protocol, scheduling online shifts, and liability form compliance.

Environmental Education Resources for the Public

- Interpretive Visitor Center – During most years visiting groups and the general public have access to the Wild Basin Visitor Center on Monday-Friday, 9am-4pm, year-round excluding major holidays. Visitors can explore the educational exhibits, including projector microscopes to view natural science specimens, interactive bird calls and binoculars, as well as look up trail sightings using iNaturalist data on two touch screen monitors. Exhibits also include information on the Balcones Canyonlands Preserve and the protection of endangered species, and an interpretive slideshow of wildlife photos from a trail camera research project. During the last fiscal year, the Visitor Center was open through mid-March, 2020.

At that time the Visitor Center was closed for safety to prevent the spread of Covid-19 in the community. It remained closed through the end of the fiscal year 2020.

- Public Visitation – Due to malfunctioning trail counters that were taken out of service in July 2019, head counts provided by our Wild Basin Security Guard were utilized to determine visitation between Sep 2019 and Jan 2020. New trail counters were installed in January 2020 and counts for Jan-Mar are an average of trail counts and head counts. On March 24, Wild Basin closed due to the pandemic and remained closed until September 17th, 2020. Reopening was initiated on a reservation only basis and again head counts were utilized as in this case they are the most accurate. Wild Basin welcomed approximately 19,839 visitors during the 2019-2020 fiscal year. 19,523 of these were between January 1 and March 24th. Visitation was highest in January with 3,781 visitors, and lowest in months April-August with no visitation due to closure. Visitation numbers prior to the pandemic were on track to reach or exceed last year's highest count of 37,727.

Community Science

- eBird quarterly walks – Ebird walks for the 2020 reporting period were cancelled due to Covid-19 restrictions and personnel changes (i.e., Allen Seils stopped conducting surveys, new Research Director hired). Quarterly walks were resumed in November 2020, and results will be provided in next year's annual report.

- iNaturalist – Students, volunteer natural resource stewards, and the public are encouraged to participate in the Wild Basin Biodiversity Project, a community science project on the iNaturalist platform (http://www.inaturalist.org/projects/wild-basin-biodiversity-project). This project allows users to submit observations of flora and fauna, supported by photos or sound recordings, using either their mobile device or desktop computer. The community of members on iNaturalist then helps to determine or confirm the identity of the animal or plant, and it becomes a valuable data point for our natural resource management efforts as well as broader scientific research. iNaturalist also allows users to view observations uploaded by other visitors to the preserve. A total of 1,170 observations documenting 431 unique species have been reported by 64 observers (volunteers, students, and visitors) in the Wild Basin Biodiversity Project on iNaturalist. In April 2020 Wild Basin's INaturalist Biodiversity Project participated in a worldwide iNaturalist event: *Find Your Wild,* affiliated with the Citywide Nature Challenge program.

Volunteer stewardship

- Volunteer Stewardship Workdays- Wild Basin provides opportunities for the public to volunteer and assist with land management activities, as well as learn about the BCP and conservation issues. Collectively, land management volunteers contributed approximately 460 hours from Oct 2019 to Sept 2020. This includes contributions from approximately 108 volunteers participating in Saturday workdays, group stewardship events, and a dedicated small group of volunteers participating in weekly workdays. Specific stewardship events include the following:
    - Second Saturday Public Workdays – Held from Dec. 2019 to Feb. 2020, suspended in March to present due to Covid-19 19 concerns.
    - Saturday Invasive Species Workdays - Started Sept. 2020 for limited volunteers when available. Limited to 4 total participants with social distancing and masks required.
    - Third Saturday SEU Workdays – Held as interest allowed until Feb. 2020. Suspended due to Covid-19 concerns and remote learning at SEU.
    - Trail Roots Group Saturday Workday – Local trail running group of 20 participants worked to improve trail drainage, improve native gardens, and brush off social trails.
    - Thursday Volunteer Workdays - A small group of dedicated Wild Basin volunteers participated in weekly land stewardship activities including trail pruning and protection, invasive plant removal, and pond repair. Collectively, Thursday volunteers contributed 184 of land stewardship hours.
    - Eagle Scout Project – A local eagle scout managed and completed a project building a walking stick holder and fashioned walking sticks reclaimed from a slash pile of old juniper posts. It was hoped visitors would reuse these sticks rather than gathering them in the preserve. Unfortunately, the original walking sticks mostly disappeared, and due to Covid-19 concerns this is not currently in use.

Public events, meetings, workshops, and conferences

- Wild Basin Advisory Committee meeting - In January 2020 Wild Basin hosted an annual meeting of the Advisory Committee, consisting of SEU faculty and staff, governmental and community partners, and dedicated volunteers. Director Dr. Barbara Dugelby gave an update on the preserve's annual activities as well as progress toward strategic planning goals.
- Recreational Equipment Incorporated – REI conducted Star Walks from October 2019 to February 2020.

- Mindfulness programming - Certified Pilates and Yoga instructor Erin Ray held seven "Mindful Walking Meditations" and nine "Mindful Movement" hikes at Wild Basin from October 2019 - February 2020.
- Community partner workshops – Community partner groups TreeFolks and REI held staff trainings and workshops at Wild Basin November 2019 and February 2020, with more than 40 people attending.
- Meetings of businesses and government entities – Wild Basin hosted the City of Austin Watershed Protection Department for a staff meeting in February 2020.
- The Wild Basin Director, Dr. Barbara Dugelby, gave two invited presentations about Wild Basin to St. Edward's University classes, both entitled "Wild Basin: A History of Important Research and the Preserve's Relevance to Austin and the Hill Country".
- Wild Basin staff and interns held a "Find Your Wild" INaturalist project and social media event to promote participation in the 2020 City Nature Challenge.
- Wild Basin Preserve Manager Niki Lake held a training for 15 volunteers to participate in a new group called Wild Basin Trail Patrol.
- Wild Basin Preserve Manager Niki Lake held a volunteer training for the safe return of minimal volunteers after Covid-19 shutdown but amid continued restrictions. These volunteers focused on trail patrol and stewardship activities.
- Wild Basin staff held a basic First Aid response training for Wild Basin volunteers.

St. Edward's University Events

- Staff Retreats and Meetings - SEU departments held their planning and staff retreats at Wild Basin, including Financial Services and the School of Behavioral and Social Sciences.
- St. Edward's University events – Wild Basin staff continued outreach to the SEU community with a public awareness "Pop Up" in October 2019, internship and involvement fairs in November 2019 and January 2020, and monthly university Sustainability Committee meetings from October to February and a final meeting in August.
- Dr. Darren Proppe, Wild Basin Research Director, gave a guided hike to the Animal Behavior class from St. Edward's University. Participants included the faculty instructor (Katy Goldey), two of her family members, and three students.
- Biology 1107 - Cells, Genetics, and Organ Systems and Biology 1108 – Populations and Organisms - The introductory biology labs incorporated a course-based undergraduate research experience (CURE) that allowed students to participate in hands-on research. Approximately 116 students participated in a

project to collect water samples and evaluate water quality parameters in Bee Creek.

- Student research presentations – student researchers presented their work on Wild Basin-related research projects at the following symposiums and conferences:
  - "Comparing bird species richness and diversity between more and less developed sites" by Eve Dean and Sofia Ramirez. Lucian Symposium, St. Edward's University, September 25, 2020.
  - "Quantitative Analysis of the Effect of Traffic Noise Levels on the Endangered Golden-Cheeked Warbler in Wild Basin Wilderness Preserve", by Eder´ewoma Ohwobete. Lucian Symposium, St. Edward's University, September 25, 2020.
- Wild Basin Internship Program – Wild Basin provided internships for 14 undergraduate and 5 high school students. This includes internships in Land Management, Biological Research, Invasive Species, Environmental Education, Media Arts, and Outreach/Public Relations. Projects included water quality testing, invasive species removal, trail maintenance, sediment monitoring, monitoring animal behavior with camera systems, acoustic monitoring, butterfly garden maintenance, tabling events, trail patrol, photography, and virtual programming.
- Courses – A list of undergraduate and graduate courses that incorporated Wild Basin into their curricula in Fall 2019 and Spring 2020 is included in Table 1. Approximately 174 university students visited Wild Basin as part of their course work in 2019-2020.

Table 1. Undergraduate and graduate classes taught at Wild Basin in 2019-2020

Course #	Title	# of Students	Semester
BIOL 1107	Cells, Genetics, and Organ Systems Lab	59	Fall 2019
BIOL 1108	Populations and Organisms	48	Spring 2020
PSYC 4349	Animal Behavior	3	Fall 2020
	TOTAL	**110 students**	**3 classes**

Publications

- Wild Basin staff and interns reported on Wild Basin news, events, and volunteers in three email newsletters, as well as updates in regular blog posts and social media outlets.
- An article titled, “Flora and fauna flourishing at Wild Basin amid closure to coronavirus”, was published in the Austin American Statesman. https://www.statesman.com/news/20200430/flora-and-fauna-flourishing-at-wild-basin-amid-closure-to-coronavirus.
- Dr. Darren Proppe was primary or co-author on the following peer reviewed publications in 2019 - 2020:

  Scholten B., Olen A., Choi J., Baker D., Caulfied M. & **Proppe D.S.** 2020. Interaction with unmanned aerial vehicles does not alter stress responses in breeding tree swallows. *Conservation Physiology*. https://doi.org/10.1093/conphys/coaa080

  Proppe D.S., Pandit M.M., Bridge E.S., Jasperse P, Holwerda C. 2020. Semi-portable solar power to facilitate continuous operation of technology in the field. *Methods in Ecology and Evolution*. https://doi.org/10.1111/2041-210X.13456.

  Ng A., Pontius M., DeRuiter S.L., & **Proppe D.S.** 2020. Noise alters avian abundance and productivity at banding stations across the Continental USA. *Avian Conservation and Ecology*. 15: 4. https://doi.org/10.5751/ACE-01633-150204.

Scientific Research

Due to Covid-19 precautions and staff transitions (i.e., hiring of new Research Director), research activity during the 2020 reporting year was relatively low. Four projects received Scientific Research Permits and three activities received education permits from Travis County and completed work at Wild Basin in 2019-2020. Short summaries of all permitted projects are included below.

(1) Dugelby, B. Bivens, G., and Finch, P. Documenting spatial and temporal patterns in wildlife distribution across Wild Basin.

This permitted research continued in 2019-20 and has two components: (a) Documenting wildlife distribution and movement patterns along and through Wild Basin boundaries and (b) Study of the impact of human foot traffic on native mammal use of trails in an urban preserve.

(a) Documenting wildlife distribution and movement patterns along and through Wild Basin boundaries

Project Description This study employs 15 motion-triggered wildlife cameras to document wildlife species and their activity patterns across the Wild Basin landscape. Cameras have been installed at a distance of at least 250m from each other or along Wild Basin boundaries.

Progress Report: Although no formal analysis was performed on the data from this study in 2019-20, data continue to be collected and managed for future analysis.

(b) Study of the impact of human foot traffic on native mammal use of trails in an urban preserve.

Project Description: This study examines the effect of human activity on wildlife use of preserve trails using 13 motion-triggered wildlife cameras. We aim to evaluate the impact of human relative activity (HRA) on wildlife relative activity (WRA) at different locations along the trail network at Wild Basin.

Progress Report: Although no formal analysis was performed on the data from this study in 2019-20, data continue to be collected and managed for future analysis.

(2) Proppe, D., and Quinn, W. Quantifying the daily, seasonal, and Covid-19 shut-down variation in the soundscapes of the Wild Basin Wilderness Preserve

Project Description: The goal of this project is to assess how noise pollution from Texas State Highway Loop 360, neighboring commercial developments, and surrounding suburban homes affect the ecological community within the Wild Basin Wilderness Preserve during the Covid-19 shut-down and during the procession to more typical human activity. Our immediate objectives are:

1. To map the soundscapes of the Wild Basin Wilderness Preserve
2. To model the effects of physical parameters (e.g., temperature, humidity, wind velocity, topography, etc.) on soundscape features
3. To create a spatially and temporally explicit GIS raster layer depicting anthropogenic and natural sound levels across the Wild Basin landscape

To accomplish our objectives, we will extensively record ambient noise conditions over the next two and half years at up to 20 locations spread across the Wild Basin Wilderness Preserve, and intensively survey 138 locations across a 100-meter grid spanning the entire landscape of the Wild Basin Wilderness Preserve. Extensive recording will be done through the placement of passive acoustic recorders (Wildlife Acoustics Song Meter Mini) across the preserve for extended periods of time.

Intensive recording will be done by hand - recording 10 minutes of noise at 138 locations (69 per year) once each week (8 weeks) for two consecutive summers.

Summary of Results: 18 recorders were placed across a virtual grid system overlaid on the Wild Basin landscape to initiate our extensive recording protocol. Three of these recorders were placed in areas used by golden-cheeked warblers in spring of 2020 to assess whether these habitats were quieter than the general preserve. As predicted, noise levels during the summer of 2020 (June 13 - July 17) decreased with distance from Highway 360 (Figure 1). Noise level was also lower in areas that had been utilized by golden-cheeked warblers than the preserve mean noise level (F_1 = 7.29, p = 0.007). The fifteen preserve grid recorders continue to collect data daily. Intensive recording will be initiated in summer of 2021. Data on how weather impacts noise, and initial GIS maps will be prepared at that time, and detailed results will be given in future reports.

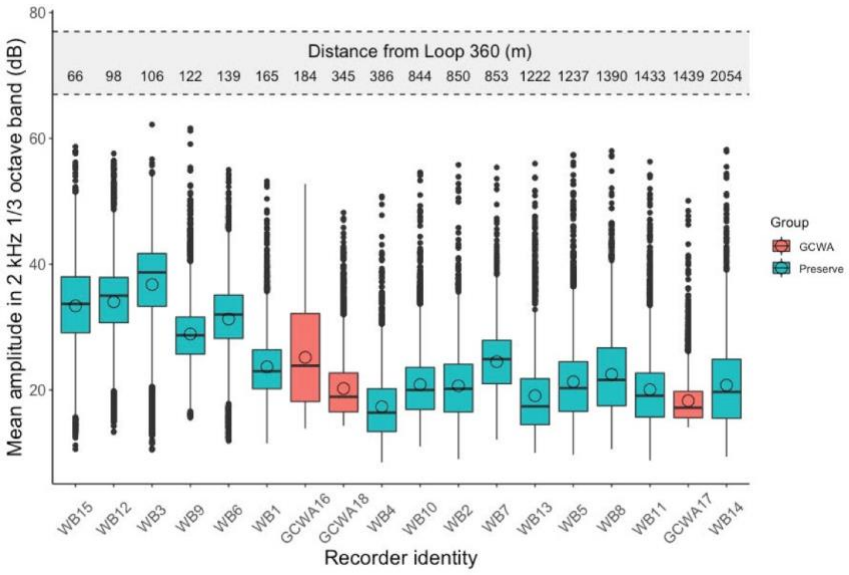

Figure 1. Change in noise level with distance from Highway 360.

(3) Lake, N. Monarch Watch

Project Description:

The Monarch Watch tagging program is a large-scale citizen science project initiated in 1992 to provide insight into the dynamics of monarch migration through mark and recapture. Monarchs are tagged using a sticker placed on their distal cell and are handled according to protocol.

Summary of Results:
Four monarchs were tagged at Wild Basin in Fall 2019 – two males and one female. Conditions were challenging in that there was an early freeze this year right at peak migration for Central Texas. Two high school and one college intern assisted with capture and tagging. One intern was from the wintering grounds of monarchs in Michoacan, Mexico. Interns reported being deeply impacted by this experience.

(4) Todzia, C. Updated Checklist of the Vascular Plants of Wild Basin Preserve
Project description: The most recent accounting of the vascular plants of Wild Basin is by Bill Carr (1996). This list of 455 species is a compilation of the plant lists previously undertaken at Wild Basin (Muzos, 1986; Walther, 1985; Williams, 1977). No actual field work at Wild Basin was conducted specifically for this checklist. Anecdotal observations indicate that the list is not complete (Bill Carr, pers comm). The goal of this study is to update this checklist compiled 23 years ago, and put information in database format which will be Web accessible.

Summary of Results: Wild Basin Preserve was visited on approximately 10 days between end of June and November. Plants were identified using Flora of North Central Texas by Diggs, Lipscomb and O'Kennon, Flora North America, and the USDA Plants database. This year has been very challenging for plant research at Wild Basin. First, Wild Basin was closed from mid-March through June, the peak of flowering in central Texas. Then high temperatures and drought hit in August limiting flowering. Notable species that were observed this year include: Anemia Mexicana, Spiranthes magnicarpum, Liatris punctata, Verbesina lindheimeri, Mitreola petiolata, Dodecatheon meadia, and Berchemia scandens.

(5) DeWhatley, M. Course-based undergraduate research experience within an introductory biology course (Biol 1107) at St. Edwards's University
Project Description: Permittee will incorporate a course-based undergraduate research experience (CURE) into the traditional introductory biology lab to deepen understanding of biological concepts and scientific processes through participation in real research. Students will collect water samples from Bee Creek in Wild Basin and then conduct analyses in the St. Edward's labs to evaluate water quality parameters (nitrates, phosphorus, chlorophyll a). Water samples will be collected at 3 locations in Wild Basin where Bee Creek intersects a trail (2 locations on Creek Trail and 1 location on Yaupon trail). At most, 72 students made up of 18 groups will collect 500

mL samples during a three-week span (10/21-11/8). Each group is required to collect water at least 3 times.

Summary of Results: Between October 21, 2019, and November 7, 2019, a total of 59 students from three sections of the BIOL 1107 lab at St. Edward's University visited Wild Basin to collect water samples from Bee Creek. Each student visited one of three sites: 1) "Upstream" - upstream of the waterfall, at the crossing on the Yaupon Trail that is nearest to the Creek Trail, 2) "Midstream" - at the crossing on the Creek Trail that is about halfway between the Woodland Trail and the east entrance to the Yaupon Trail, 3) "Downstream" - at the crossing nearest to the eastern intersection of the Creek Trial and the Yaupon Trail. For each site, stream characteristics were recorded, including pH, dissolved oxygen, water temperature, and water velocity (Table 2). Hydrion pH strips were used to measure pH (range: 6.5-13.0). YSI-550A dissolved oxygen probes were used to measure both dissolved oxygen and water temperature. Water velocity was assessed using an empty bottle and a meter stick; the rate of flow in meters per second was recorded.

Table 2. Average physical characteristics for three sites at Wild Basin Preserve across three weeks of sampling. Standard deviation values are shown in parentheses following each average value.

Stream Characteristic	Upstream	Midstream	Downstream
Dissolved Oxygen (mg/L)	10.26 (0.96)	5.86 (1.50)	7.6 (3.13)
pH	6.70 (0.33)	6.67 (0.26)	6.50 (0.00)
Water Velocity (m/sec)	0.07 (0.09)	0.13 (0.13)	0.10 (0.08)
Water Temperature (°C)	19.65 (1.29)	18.91 (1.65)	17.42 (2.01)

Across the three sections of BIOL 1107 that visited Wild Basin, students collected approximately 16 L of stream water per week, for each of the three weeks. The water samples were taken to the lab at St. Edward's University and tested for nitrates, phosphates, or chlorophyll *a* (Table 3). Two tests were performed for each parameter at each sample site on each of the three weeks, for a total of 18 tests of each parameter in Bee Creek. Nitrates and phosphates were tested using the Hach

cadmium reduction method 8039 and the USEPA PhosVer 3 method 8048, respectively. Chlorophyll *a* was extracted from filtered phytoplankton using 90% acetone, then concentrations were assessed using spectrophotometry.

Table 3. Average water quality parameters for three sites at Wild Basin Preserve across three weeks of sampling. Standard deviation values shown in parentheses following average value.

Parameter	Upstream	Midstream	Downstream
Nitrate (NO_3^- in mg/L)	0.812 (0.437)	0.702 (0.206)	0.365 (0.255)
Phosphate (PO_4^{3-} in mg/L)	0.032 (0.033)	0.097 (0.130)	0.023 (0.006)
Chlorophyll *a* (mg/L)	0.00089 (0.00102)	0.00112 (0.00216)	0.00426 (0.00369)

(6) Green, M. Biology 1108 Introductory Biology Labs

Project Description:

Sampling structure: During the Spring 2019 semester, the course BIOL 1108 at St. Edward's University had approximately 48 students conducting research at Wild Basin. Two different sections of BIOL 1108, each with approximately 24 students, completed sampling at 2 different sites of Bee Creek: 1) Upstream of the waterfall, the closest point at Bee Creek to the Highway 360 Bridge while staying on trail, and 2) Downstream where Creek Trail intersects the creek at the furthest distance south and east (Figure 2). Students quantified periphyton biomass, macroinvertebrate diversity, and coliform concentration. This data was made available to all of the students enrolled in BIOL 1108, so that they could compare sites across Austin to obtain a better understanding of how land use and other factors may affect stream quality. Note that we intended to sample for three weeks, (March 9th, 16th, and 30th), but because of the SARS-CoV-2 outbreak, the course was switched to online (with no in person sampling) after one week.

Coliform sampling: Students collected 500ml of water from the streams using the three rinse method. In the lab, they diluted and plated samples on both R2A media (general bacterial growth), and Endo media (selects for coliform bacteria). Plates were

incubated for 24 hours and the number of colony forming units (CFU) per ml were calculated. At the Downstream site, there was an average of 340 CFU/ml on the R2A media and 195 CFU/ml on the Endo media. At the Upstream site, there was an average of 590 CFU/ml on the R2A media and 140 CFU/ml on the Endo media.

Macroinvertebrate sampling: Students collected macroinvertebrates using the kick and sweep method which utilizes a kick screen to collect individuals. Macroinvertebrates were collected, identified to order at the site, and then released back into the stream to minimize disturbance. Any macroinvertebrate unable to be identified to order were preserved in ethanol and brought back to the lab for identification. Students were required to identify the organisms to order and then calculate % EPT, which for this class was calculated as the number of individuals that belong to the orders Ephemeroptera, Plecoptera, and Trichoptera, divided by the total number of individuals counted. Organisms in the EPT orders are more sensitive to pollution, thus serve as bio-indicators. For the sampling that took place on March 11 at the Downstream site, 30 macroinvertebrates were collected, none of them belonging to the orders Ephemeroptera, Plecoptera, or Trichoptera. For the sampling that took place on March 12 at the Upstream site, 26 individuals were collected, 15 of them from the orders EPT, resulting in 57% EPT.

Periphyton sampling: One student per group waded into the stream and collected one periphyton-covered rock from a riffle area. The periphyton was scrubbed off of the rock in a 3cm x 3cm square area using a toothbrush. The sample was brought back to the lab, filtered, dried in an oven, and dry biomass (g/cm2) was calculated. The Downstream site had an average dry biomass of 0.02 g/cm2 from two rock samples. The Upstream site had a dry biomass of 0.008 g/cm2 from one rock sample.

Summary of Results: Only one week of sampling was conducted due to the Covid-19 pandemic, so no statistical analysis was able to be completed.

Figure 2. Map of two sampling sites for the BIOL 1108 students in Spring 2019.

(7) Ackermann, C. REI Star Walks

Project Description: This event involves an introduction to the night sky through a mellow hike. Hikers stop for a guided exploration of the constellations.

Summary of Results:

Star Walk: On the evening of September 25th, the REI led Star Walk had 8 members of the public attend along with 2 REI Instructors. The walk began at 7:30pm and concluded at 9:30pm. We followed the loop trail (Triknee to Possum to Creek Trail and back), providing interpretive content during the low light time of the tour and pausing for Star Viewing once the skies were sufficiently dark.

Facilities and Signs

Facilities

- Wild Basin's parking lot was paved in March of 2019 courtesy of Travis County TNR. In addition, a fire lane was designated and striped (yellow) for parking and turnaround of emergency vehicles. In February 2020, Travis County Road and Bridge striped the parallel parking areas and added red striping in no parking areas along the driveway.
- The building's security system is currently monitored by ADT.
- Compost toilets are located in the Visitor Center and is maintained routinely by adding water and wood shavings and turning at least weekly.
- After several failures of our electric gate and numerous repair calls, it was decided to replace the gate system with a more industrial, remote-capable model. The gate was secured by manually opening, and closing and locking until the new system was purchased and installed early in FY21.
- Dark sky compliant lighting was installed in around the parking lot, completing our goal of dark sky lighting around parking lot and Visitor Center
- Additional surveillance cameras were installed in parking lot - Currently there are 5 cameras around the parking lot/trailhead, two at the Visitor Center, and two surveillance video cameras on the Security shed. One security camera was installed at the back gate.
- The two evaporative toilet units purchased through two grants awarded by REI during FYs 19 and 20 remain a work in progress pending septic and development permits. Building plans have been finalized and an ADA compliant parking space adjacent to this facility was planned and will be installed by Travis County Road and Bridge upon building completion. It is hoped the ELOO units will be installed prior to GCWA nesting season in FY 21. These toilets will eventually replace the previous portalet unit located in the parking lot once a final location is determined and a building to house the units is constructed.

Signs and maps

- Currently, we have two versions of digital maps available on the website homepage (www.wildbasin.org) for visitors to access on their smartphones, including a Google Earth file for the trail system and a PDF copy of the trail map. We also have other resources available on the website, including interpretive information and resources for specific age groups. Paper maps are still available inside the Visitors Center, and a weather-resistant map of the trail system is mounted at each trailhead.

- Numerous signs around the parking lot and trailheads were manufactured last year courtesy of funding provided by Travis County. Installation of signs is 99% compete, apart from the entrance sign. This sign was not made according to specifications, and upon further discussion it was determined Wild Basin needed an updated, more aesthetically pleasing entrance sign. This sign is slated to be designed, approved and installed in FY21.
- "No Parking" signs were installed along Loop 360 by TXDOT to discourage vendors along the western boundary as well as visitors wishing to park along 360 to access the preserve.

Security, Access, and Safety

Emergency Preparedness

Wild Basin staff continued to improve the Wild Basin Wilderness Preserve (Wild Basin) Emergency Response Plan (ERP) developed with St. Edward's University Campus Safety personnel. This plan describes how staff, student interns, and volunteers respond to emergencies, addresses various types of hazards and establishes policies, responsibilities and operations designed to effectively and efficiently address an incident. Wild Basin personnel developed this ERP in collaboration with the Director of Campus Resilience and is a dynamic document. This plan outlines the roles and responsibilities of identified parties and as well as the training and exercises that will be conducted on a regular basis. All staff and volunteers who work at Wild Basin have access to a copy of the ERP. It is located in the "Wild Basin Share" directory of the SEU online file hosting service "Box", filed under "***Safety Resources and Emergency Response Plan.***" Additionally, a hard copy of this ERP is stored in a labeled binder located under the hutch on the front desk of the Wild Basin Creative Research Center. This year it was updated to include Covid-19-related concerns.

Security

- Wild Basin has a security officer onsite 5 days per week. This officer is provided by Travis County in response to security and integrity issues such as vandalism, car break-ins, and visitors bringing dogs into the Preserve.
- This security guard has been extremely helpful, but Wild Basin continues to face many of the same issues when the guard is off duty. Surveillance cameras and incidental observations show dogs on trails when staff or security are offsite or off work.
- Five game cameras and 2 surveillance video cameras are located between the entrance of the preserve and at the trailheads.

- There is an automated gate at the preserve entrance timed to open at first light and close at sunset. The gate is equipped with a sensor that will open the gate arms when people leave the preserve after hours. Gate and trail cameras have captured a number of images of visitors on trails and in the parking area after hours. To minimize unauthorized activities after hours Wild Basin is planning to install a mechanisms and signage that will allow the gate to stay locked after dark, with visitors being advised to call the Travis County Sheriff's Office to be let out of the preserve.

Training

- Reviews of sections of the ERP and medical response scenarios during staff meetings.
- Testing of emergency equipment such as radios, weather station, etc.

Fire Safety and Preparedness

In August, 2018, Wild Basin and St. Edward's University Campus Safety personnel met with personnel from the Westlake Fire Department and Travis County to discuss wildfire preparedness and response strategies. WFD personnel gave an overview of the potential for wildfire and explained their potential response time and approaches to different wildfire scenarios. At the meeting, Travis County and Wild Basin personnel agreed to share GPS coordinates of key trails and points of interest at Wild Basin for rescue personnel to use in the future in responding to 911 calls. In 2019-2020, Wild Basin staff continued to improve upon the fire management section of the ERP.

- Koetter Fire Protection in coordination with St. Edward's university staff completed their annual inspection of the Visitor Center.
- Wild Basin trimmed brush back from building as per fire-wise recommendations. Wild Basin continued to work to implement Westlake FD fire management recommendations.
- Wild Basin held one fire extinguisher review session during this reporting year.

APPENDICES

Appendix A: Map of Wild Basin Wilderness Preserve Trail System

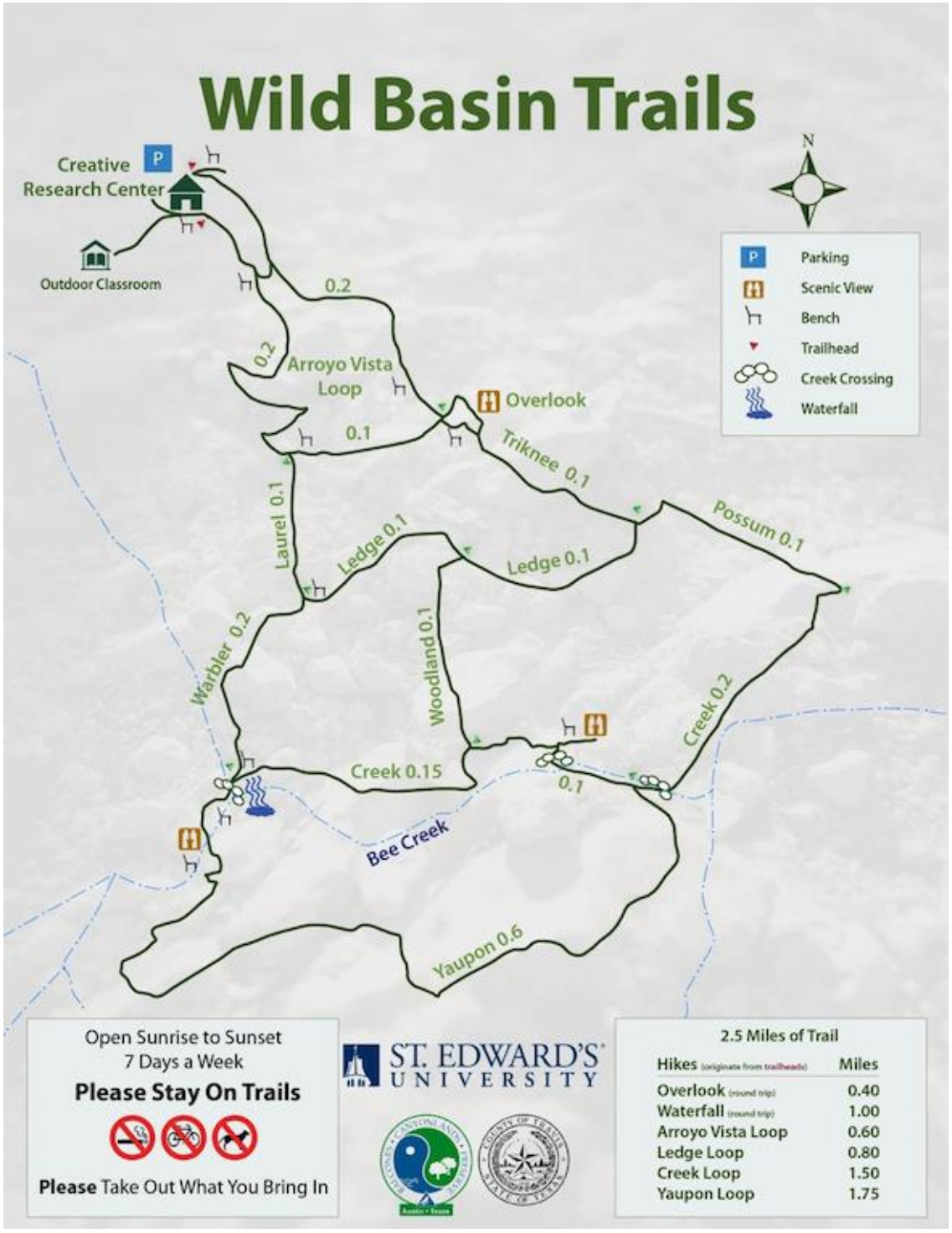

Figure 3. Map of Wild Basin Wilderness Preserve Trail System.

Appendix B: Aerial Map of Wild Basin and Residential Neighbors

Figure 4. Aerial Map of Wild Basin and Residential Neighbors

Appendix C: Invasive species removal work at Wild Basin Oct 2019-Sept 2020 and impacts 2016 - 2020

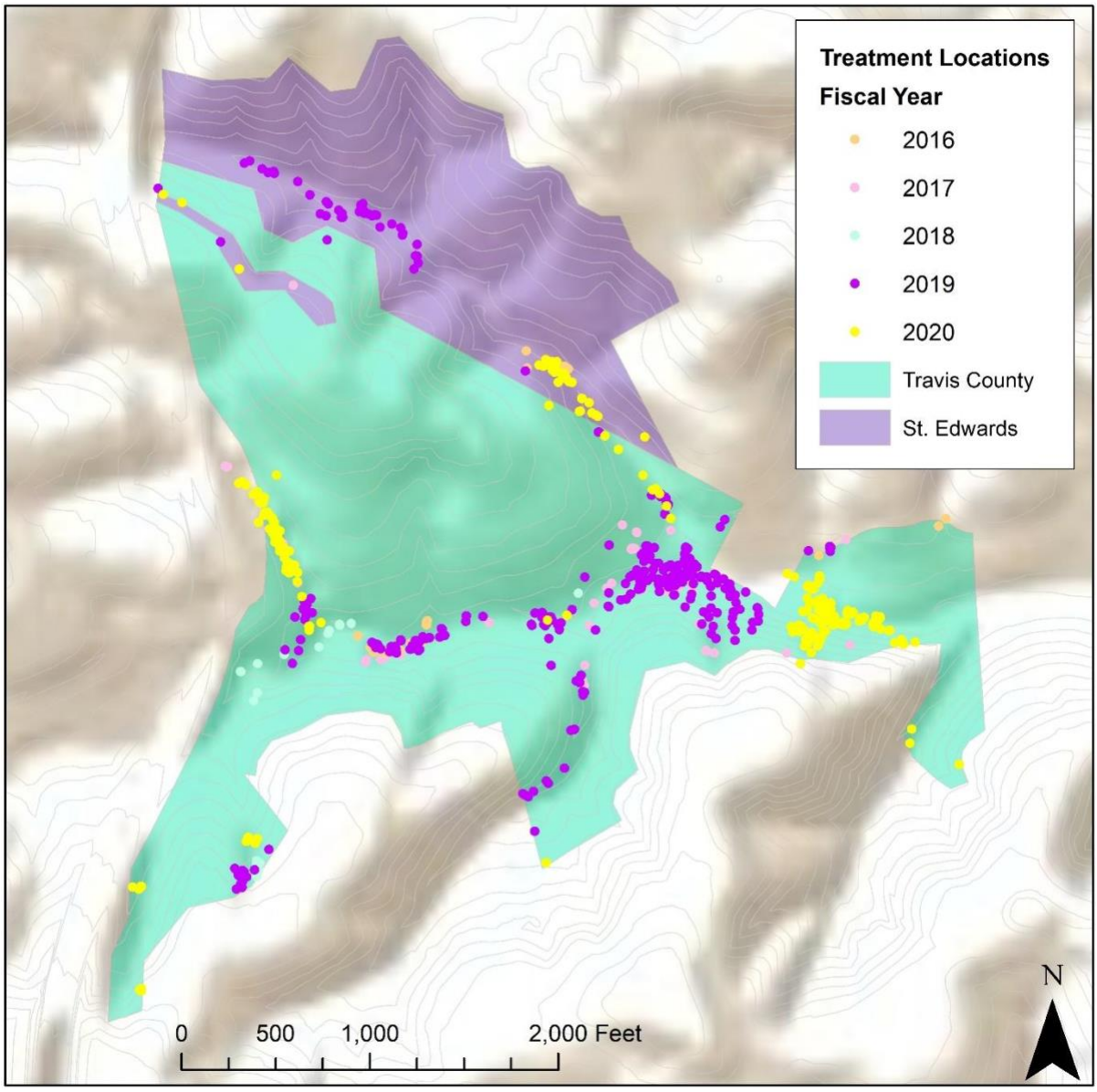

Figure 5. Locations of invasive species removal at Wild Basin Oct 2019-Sept 2020 (*map and data courtesy of Julie Murray, Travis County BCP*)

Appendix D: Summary of 2020 Golden-cheeked Warbler Surveys at Wild Basin Wilderness Preserve

Darrell Hutchinson, City of Austin Field Biologist

A total of 38 surveys were conducted at Wild Basin and Vireo Preserve between 12 March and 10 June by Darrell Hutchinson and Jim O'Donnell for a total of 108.5 survey hours.

Between the two preserves, six separate males were detected during the breeding season. Four males paired, but only one of these nesting pairs reproduced successfully. Two males failed to find a mate and departed the plot. One of these males was detected only three times, and so is not considered territorial. Compared to recent years, plot density was a little higher, but reproductive success remains low.

All six males are color-banded. One color-banded male was a return from previous years (Figure 6). OR/YE:NB/SI was banded at Vireo Preserve in 2014 and has returned for five years in a row. All of the other five males were banded this year. Notably absent (and missed) was NB/WH:MV/SI, also known as 'Candy'. Candy was banded at Vireo Preserve in 2011 and returned every year to approximately the same territory for seven years in a row.

RD/SI:NB/BL was banded on 17 March as an after-second-year (ASY) bird. We suspect that he is a return from last year, because he occupied the same territory as a bird detected late in the 2018 breeding season. The territory is located at the back gate and traverses Wild Basin Preserve, Vireo Preserve, the in-holding property, and Wild Basin Ledge. The female built her nest in Vireo Preserve and the nest fledged on 6 May. The male was observed with up to 3 fledglings several times until 31 May. OR/YE:NB/SI occupied the territory at the bottom of North Hollow, which had previously been held by Candy. The female built her nest just north of Possum Trail. The nest was found predated on May 6. On 10 May, we detected an unconfirmed male close to the nest site. Afterwards, no further detections of the pair were made suggesting the pair shifted or abandoned the plot.

MV/WH:DG/SI was banded on April 15 as a second-year (SY) bird. The female built her nest close to Yaupon Trail. The nest was found predated on 29 April. The male was last detected on 11 May, suggesting the pair shifted or abandoned the plot.

BL/SI:DB/DB was banded on 26 March as a second-year (SY) bird at Vireo Preserve. The male paired successfully. Although the nest was not found, we believe she built near the water tower. The nest failed and the male was last observed on 16 May.
RD/SI:GR/BK was banded on April 4 as a second-year (SY) bird at Vireo Preserve. The male failed to attract a mate and was last detected on 28 April.

GR/SI:OR/YE was banded on 25 March as a second-year (SY) bird at Vireo Preserve. The male failed to attract a mate or establish a territory, and was last detected on 4 April.

Surveys were funded by City of Austin Wildlands Conservation Division and conducted according to City of Austin's Balcones Canyonlands Preserve GCWA Demographic Study protocols. Special thanks to Bob and Luisa Moats who kindly granted access to their private in-holding.

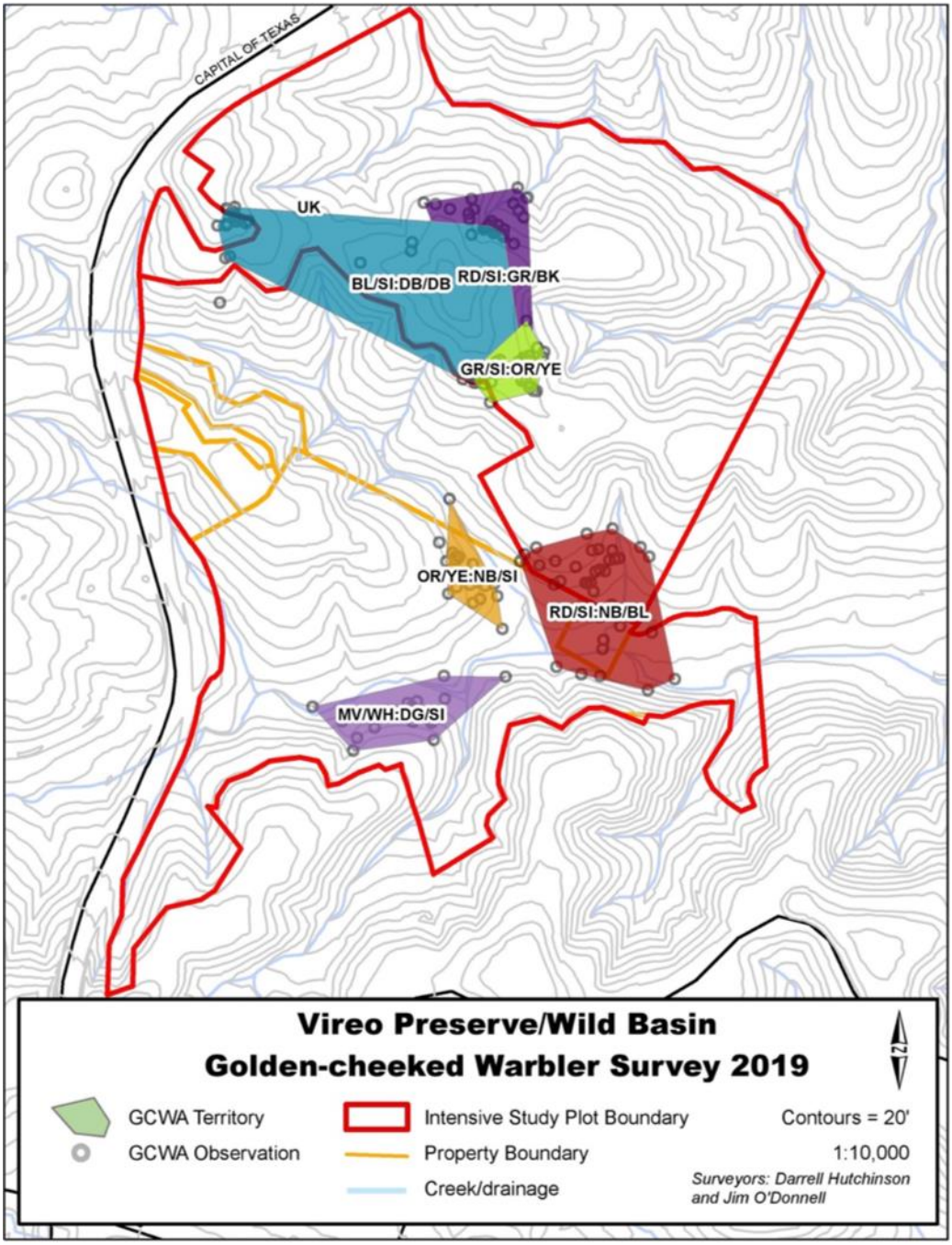

Figure 6. 2020 Golden-cheeked Warbler territories in Vireo Preserve and Wild Basin.