

TURKEY MOUNTAIN

Tulsa's Wild Place



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TURKEY MOUNTAIN: TULSA'S WILD PLACE

A professional project submitted to the graduate faculty in partial fulfillment of the requirements for the degree of Master of Science in Architectural Urban Studies

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Tulsa, Oklahoma

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**TURKEY TAIL MUSHROOMS GROWING
ON A TREE ALONG THE YELLOW TRAIL**

PHOTO BY KELLY COOK

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Thanks to Laurie Biby and Ryan Howell, founding members of the Tulsa Urban Wilderness Coalition (TUWC), for providing information on the proposed mall development at Turkey Mountain and all their efforts to protect and care for Tulsa’s green spaces. They and the rest of TUWC are true stewards of our natural areas, and all Tulsans owe them a great deal of gratitude.

I’m grateful to Josh Miller and Jeff Stava of the George Kaiser Family Foundation, who provided me with information about GKFF’s generous support of Turkey Mountain over the years and their vision for the park’s future.

I would like to thank the City of Tulsa, specifically Jeannie Cue, District 2 Tulsa City Councilor, and Jim Twombly, Tulsa City Manager, for taking the time to discuss Turkey Mountain and the Vision Tulsa proposal, which included funding to increase Turkey Mountain’s footprint and improve park amenities.

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Thanks to Matt Meyer, Alan McBeath and Tonja Carrigg of River Parks Authority for generously giving me their time and providing information about the background of Turkey Mountain, its challenges and how it’s currently used. Thanks also to the River Parks Authority Board for inviting me to present my study at their April 2016 board meeting.

Thanks to Kurt Bickle, Manager of Graphics at INCOG, who provided me with valuable Turkey Mountain map data.

I’m grateful to my wonderful parents, Doug and Shirley Propst, for raising me to love and respect the natural world. So many of my most treasured childhood memories include family camping trips and poking around for crawdads in the creek near our home. Thank you so much for your support and encouragement.

Huge thanks to Erin Turner for his ongoing support and unending patience throughout my project.

And finally, my biggest thanks go to my daughter, Sophia, for her amazing love, support and patience while her mom was busy with classes and writing and everything else involved in graduate school. I hope that my work on this project has encouraged her to develop a stronger love and appreciation for our world’s precious green spaces. I love you, sweetheart. This project is dedicated to you.

An aerial satellite photograph showing a dense, dark brown forested area on the left, which is Turkey Mountain. A light-colored, winding road or path runs diagonally from the top center towards the bottom right, separating the forest from the Arkansas River. The river, on the right, is a wide, light brown body of water with visible sandbars and meanders. The overall image has a grainy, high-contrast appearance typical of older satellite imagery.

“Our contention is that within the next few decades, Turkey Mountain will become an urban oasis. It is a unique physical feature and should be preserved for future generations as it is...

I think one of these days, not in my lifetime but in my grandchildren’s or maybe even later, they will appreciate that the public has this property.”

JACKIE BUBENIK
FORMER RIVER PARKS DIRECTOR
1988

SATELLITE IMAGE OF TURKEY MOUNTAIN WITH ARKANSAS RIVER TO THE EAST

MAP PROVIDED BY INCOG

TURKEY MOUNTAIN TRAILS – APRIL 2016



- RED TRAIL - 0.8 mile loop
- BLUE TRAIL - 1.5 mile loop
- YELLOW TRAIL - 4.4 mile loop
- PINK TRAIL - 5.7 mile loop
- RIVER PARKS PAVED TRAILS - >25 miles
- UNMARKED TRAILS - >25 miles

INTRODUCTION

Turkey Mountain Urban Wilderness Area is one of the largest public wild areas in Tulsa. With over 300 acres of mixed crosstimer forest and several ponds, the park features approximately 37 miles of trails, 12 miles of which are marked. The highest point in the park rises 300 feet above the Arkansas River. Utilized by families, hikers, trail runners, cyclists, equestrians and other lovers of nature, it has become one of the most popular outdoor destinations in Tulsa. People are drawn to its wooded trails, rock formations and beautiful vistas of Tulsa. The park is open from dawn to dusk and doesn't charge an entrance fee, making it one of the most popular free attractions in the city.

[\(http://www.riverparks.org/explore-river-parks/river-parks-activities/turkey-mountain-urban-wilderness/\)](http://www.riverparks.org/explore-river-parks/river-parks-activities/turkey-mountain-urban-wilderness/)

The park is operated by the Tulsa River Parks Authority (RPA), established as a public-private partnership in 1974. The RPA receives 49 percent of its funding from private donations administered through the River Parks Foundation, a 501 (c)(3) not-for-profit organization. The remaining 51 percent of the park's funding comes from Tulsa County, the City of Tulsa and the federal government. Overall, the RPA manages approximately 800 acres of park land in Tulsa County.

[\(http://www.riverparks.org/support-river-parks/donate/\)](http://www.riverparks.org/support-river-parks/donate/)

The park recently gained media attention due to a proposed outlet mall development on private land northwest of the park. The development proposal spurred the formation of a grassroots group, the Tulsa Urban Wilderness Coalition, a group of cyclists, hikers and other avid users of Turkey Mountain, which led a petition to stop the mall development on the property. Eventually, the developers decided against the Turkey Mountain location and moved the mall to Jenks.

The City of Tulsa included funding for Turkey Mountain in its 2016 Vision Tulsa tax proposal. The proposal, which passed on April 5, 2016, includes \$5.6 million for acquisition of land to increase the park's footprint and \$2 million for the creation of a Turkey Mountain master plan and additional park amenities, which could include additional parking, restrooms and trail enhancements.

I hope that my findings, analysis and recommendations will raise awareness of Turkey Mountain Urban Wilderness Area, inform a future master plan for the park and help it become an even more valued asset to future generations of Tulsa and the surrounding area.

TURKEY MOUNTAIN
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BASECAMP 2015

PHOTO PROVIDED BY RYAN HOWELL, TULSA URBAN WILDERNESS COALITION
AND BASECAMP FOUNDER

GOALS AND OBJECTIVES

The primary intent of my study is to form a clearer understanding of how people use Turkey Mountain. It is my hope that the results of my observational user study of the park will increase awareness of its importance in the daily life and health of the residents of Tulsa, as well as its value as an attraction to the city. It is also hoped that the results of this study will make a case for increased funding of the park for ongoing maintenance and additional amenities to make visiting Turkey Mountain an even richer experience.

SCHEDULE

September

- Develop methodology for observational study of Turkey Mountain to learn who uses the park and how they use it
- Schedule interviews and meet with key stakeholders
- Begin observational study of Turkey Mountain
- Research urban wilderness areas

October

- Mid-term jury – 10/17
- Continue observational study
- Continue interviews with key stakeholders
- Continue researching urban wilderness areas

November

- Continue researching urban wilderness areas
- Continue meeting with key stakeholders to update them on progress

December

- Begin compiling observational study results
- Create urban wilderness area case studies
- Continue meeting with stakeholders to update them on progress; share in-progress park redesign and ask for feedback
- End-of-term jury – 12/12

January

- Begin work on recommendations
- Meet with stakeholders, share progress and ask for feedback
- Complete urban wilderness case studies

February

- Start work on 3D model
- Meet with stakeholders, share progress and ask for feedback
- Continue work on recommendations

March

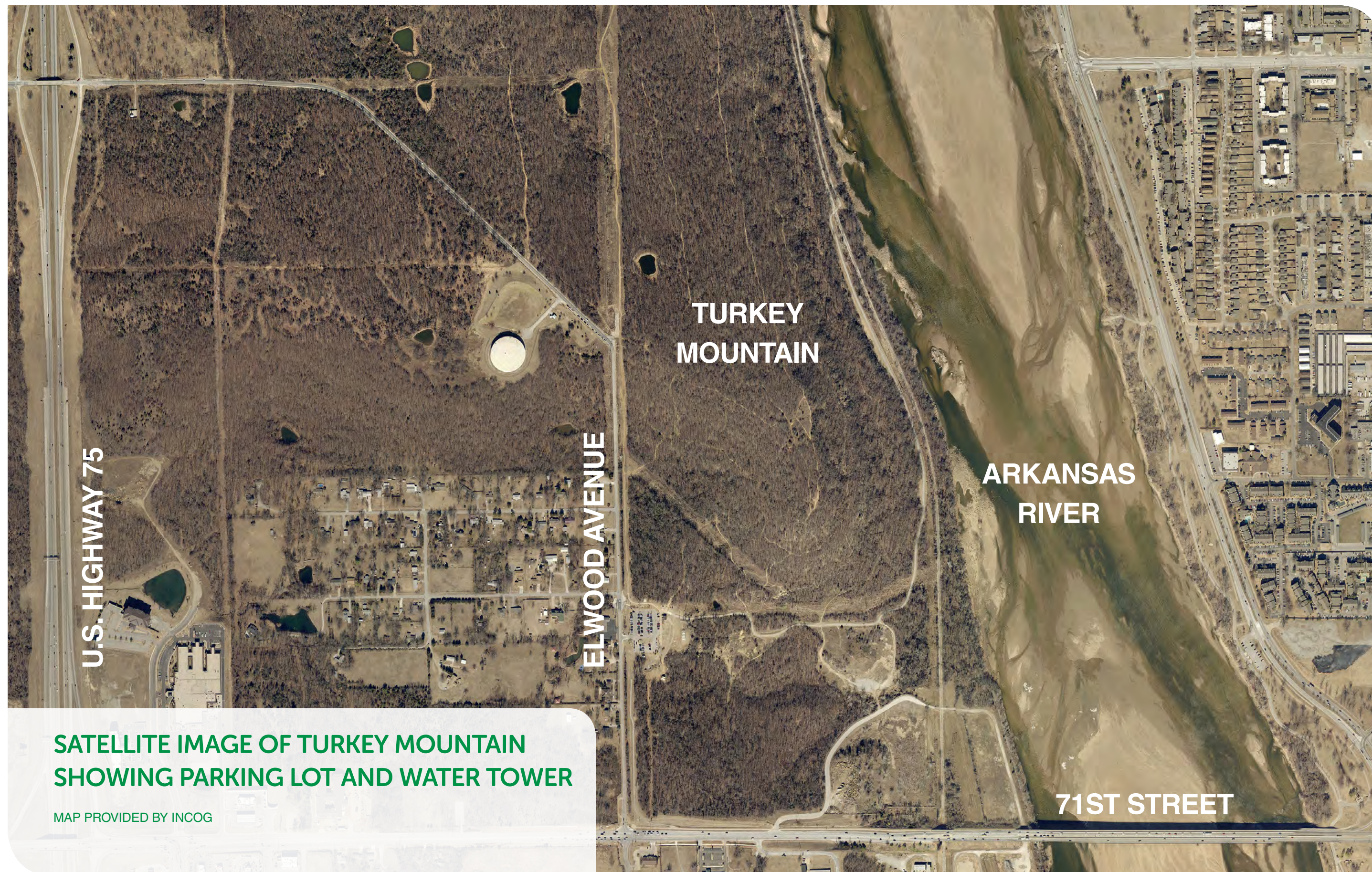
- Mid-term jury – 3/7
- Complete park recommendations
- Complete 3D model

April

- Finalize presentation of findings from observational study, user survey, key stakeholder interviews and urban wilderness case studies
- Compile examples and complete designs to accompany recommendations
- Final professional project defense – 4/30

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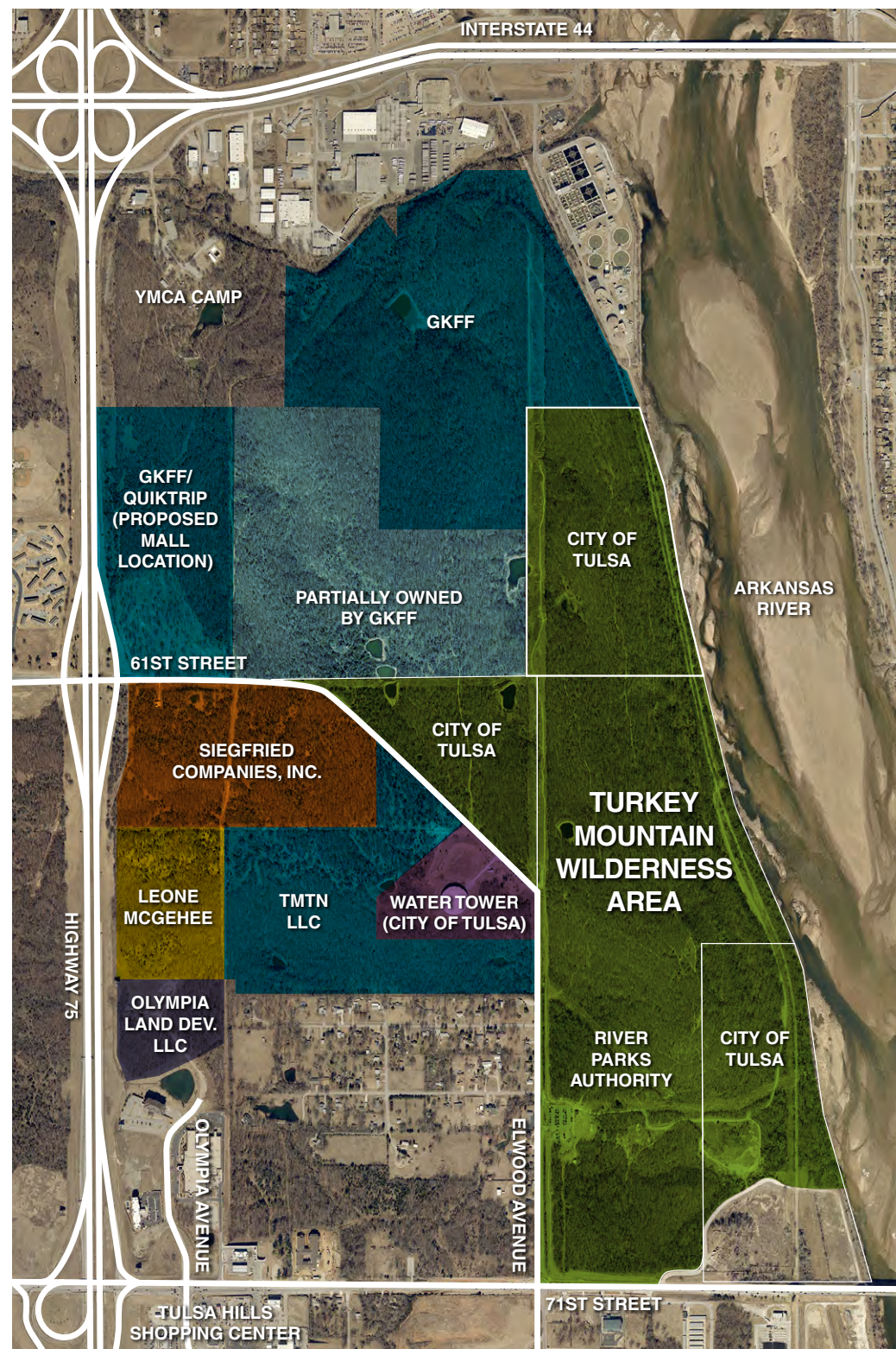




**SATELLITE IMAGE OF TURKEY MOUNTAIN
SHOWING PARKING LOT AND WATER TOWER**

MAP PROVIDED BY INCOG

TURKEY MOUNTAIN LAND OWNERSHIP – APRIL 2016



WHAT IS TURKEY MOUNTAIN?

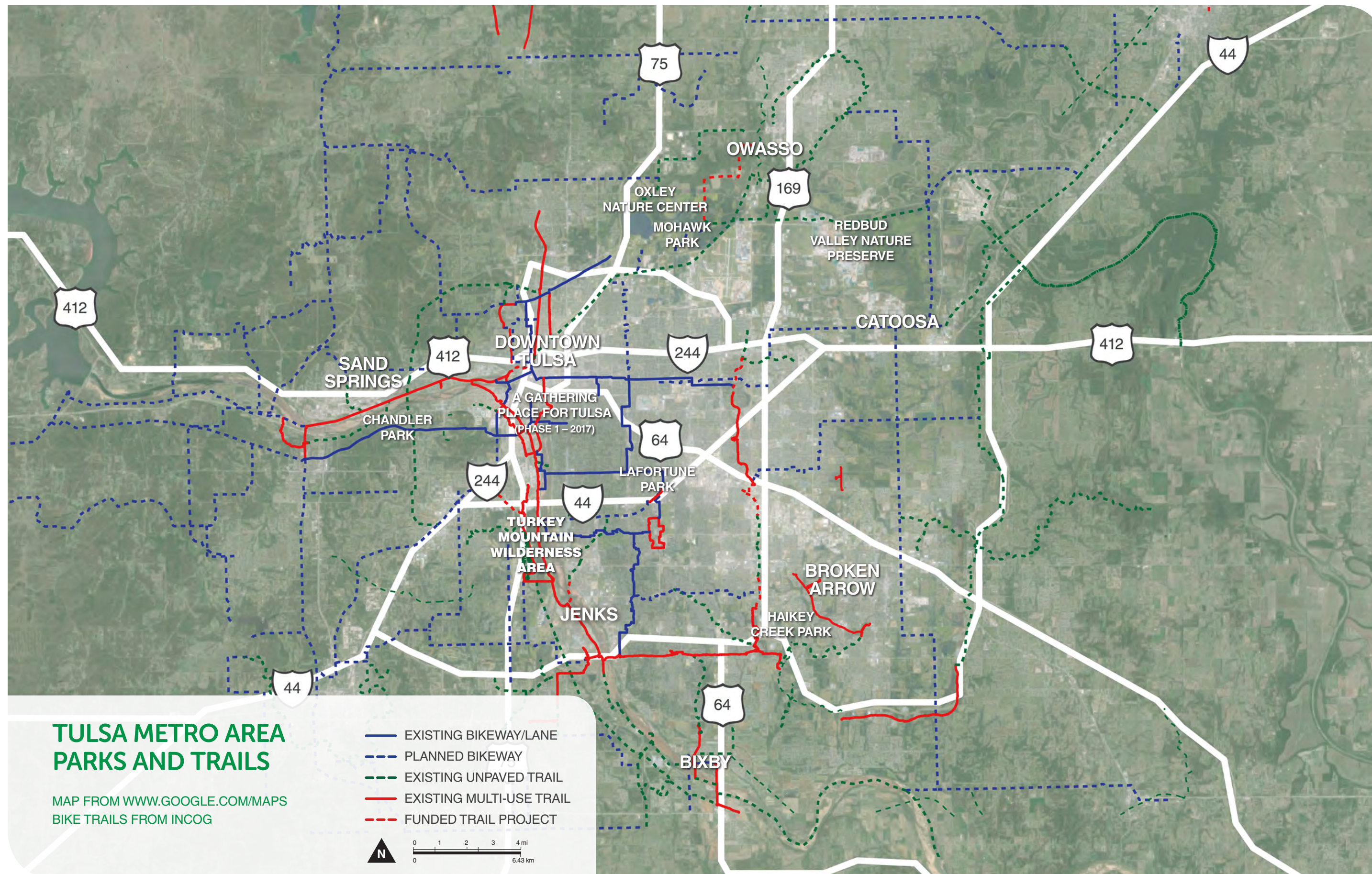
Turkey Mountain is part of the Crosstimbers Region, a transitional area between the Great Plains and the Ozark Plateau. Dominated by Post Oaks and Blackjack Oaks, the Crosstimbers extends from central Texas, across eastern Oklahoma and into southeastern Kansas. Wildlife at Turkey Mountain includes deer, fox, coyote and raccoon, as well as many species of birds, including the Summer Tanager, Rose-breasted Grosbeak, Nashville and Tennessee Warblers, Olive-sided Flycatchers, Great-crested Flycatchers, Screech Owls and more (Audubon Society, <http://www.tulsaaudubon.org/guides/turkeymountain.htm>).

A rail line, constructed in the early 1900s and still operating today, runs along the Arkansas River on the eastern edge of the park. Trains brought oil drilling to Turkey Mountain, which led to many trees being cut down to facilitate the drilling process. The area turned out to be a poor source of oil, so the wells were abandoned after a few years. Many of the trees on Turkey Mountain today have grown since the oil days.

The area to the northwest of Turkey Mountain Wilderness Area has been the subject of debate recently. The proposal of an outlet mall on the northeast corner of Highway 75 and 61st Street led to the formation of the Tulsa Urban Wilderness Coalition, the members of which opposed the proposed location. The developer decided to move the mall to Jenks. In the meantime, the George Kaiser Family Foundation has purchased the 61st Street site, with the intent of protecting it from future development.

Turkey Mountain Urban Wilderness Area is managed and maintained by the River Parks Authority (RPA), a City-County public trust that operates several miles of public park land along the banks of the Arkansas River. Land within the boundaries of the Wilderness Area is owned by or leased to RPA. Leased parcels that are City-owned are among the properties included in a proposed master land lease between RPA and the City, which is under review as of April 2016. The proposed master lease would consolidate all City-owned parcels that are part of River Parks, including those on Turkey Mountain, would provide a longer lease term, and remove an ambiguous 30-day cancellation clause.

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TURKEY MOUNTAIN DISTANCE FROM TULSA METRO CITIES

Turkey Mountain Urban Wilderness Area is located in west Tulsa. It is bounded by the Arkansas River to the east, Elwood Avenue to the west, 71st Street to the south, and 58th Street to the north.

The park is only seven miles from downtown Tulsa, a distance that can be reached by car in about 15 minutes, or by bike in about 47 minutes via the River Parks trail system.

The following chart shows travel distances to Turkey Mountain from downtown Tulsa and several Tulsa suburbs, along with the population of each:

City	Distance	Drive time	Cycling time	Population (2013)
Jenks	5 miles	10 minutes	35 minutes	18,670
Tulsa (Downtown)	7 miles	15 minutes	47 minutes	398,121
Sand Springs	12 miles	15 minutes	1 hour, 23 minutes	19,339
Bixby	14 miles	19 minutes	1 hour, 13 minutes	23,228
Broken Arrow	15 miles	16 minutes	1 hour, 35 minutes	103,500
Catoosa	20 miles	20 minutes	2 hours, 11 minutes	7,159

Data from Google maps website, www.google.com/maps



Turkey Mountain's name is believed to have come from the large numbers of wild turkeys that once lived there. (Plate 6 of Birds of America by John James Audubon, commons.wikimedia.org)



Arkansas River toll bridge with Turkey Mountain in the background (Beryl Ford Collection)



Tulsa 1893. Looking from Stand Pipe Hill to Turkey Mt. (Beryl Ford Collection)

User: rhowell
 Date: 6/3/2013
 Path: V:\personal_dir\rhowell\OFO Multi-Purpose Map - 10.0 Version.mxd

Turkey Mountain

Historic Oil Wells

1:12,000

0 0.1 0.2 0.4 Miles

Bureau of Land Management
 Oklahoma Field Office
 7906 E 33 St, Suite 101
 Tulsa, OK 74145

HISTORY OF TURKEY MOUNTAIN

The origin of the name “Turkey Mountain” is unknown. It has been speculated that the area was once home to a large number of wild turkeys, and was a popular spot for hunting.

The Oil Days

As in much of Tulsa County, Turkey Mountain was a popular area for drilling in the early 20th century. The map on the opposite page shows wells that existed on and near the property. Evidence of these early wells can still be seen in the park today in the form of pipes running along some of the trails. These pipes were used to carry water for use in operating the wells. All of the wells on Turkey Mountain have been capped, according to the River Parks Authority.

1978: First Turkey Mountain Land Acquired

The original plan for Turkey Mountain, set forth by the River Parks system in the 1960s, was to acquire as much land as possible on Turkey Mountain for use as a park, as much as 1,700 acres. However, a 1969 River Parks bond issue was defeated, and the plan to acquire the land became a lower priority.

In 1978, River Parks Authority acquired 147 acres of Turkey Mountain land with money from a combination of federal and Tulsa County funds. Forty-nine acres of the acquired land were donated by the landowner, J.L. Reynolds. The River Parks Authority borrowed \$532,272 to purchase the land. The total value in 1978 of the entire acquired acreage was approximately \$798,000. (Lucas, 1978) The contract for the land was signed on Dec. 26, 1978. (Unknown, 1978)

When River Parks Authority first acquired the land, their main priorities were to clean it up and keep people from littering and cutting down trees. *“Yesterday people were still dumping trash in the area. But it is a public park as of now,”* said Jackie Bubenik, then-director of River Parks Authority. *“We are posting signs and police will begin patrolling. The park is not safe in its present condition and we are discouraging visitors.”* (Randle, 1978)

Tulsa Citizens Step Up

River Parks Authority had no funds for the maintenance and cleanup of the new park, so they asked for volunteers to help clean up the trash that had been dumped there for years. Two hundred

people volunteered, starting what would become a tradition of Tulsa citizens volunteering to help the park. About ten semi-trailer truck loads of trash were removed on two consecutive Sundays in April 1980. The Tulsa Foundation, a group of park supporters, donated \$16,000 for fencing and a parking lot at the entrance to the park. (Pearce, 1980)

Development Attempts and Rezoning

The issue of protecting the land around Turkey Mountain Wilderness Area came into the spotlight in 1983, when the Biffle Company asked to build a 700-acre multi-use housing, golf and retail development on the west side of the Arkansas River between 51st and 71st streets. Because of the poor economy, the plan never happened, but it prompted INCOG and the Tulsa Metropolitan Area Planning Commission to take action to protect the area from “random development.” Turkey Mountain Area, described as the area roughly from 51st Street south to 71st Street, and from the Arkansas River to U.S. 75, was designated as a special district, which would require any zoning requests in the area to include a path/park concept. City planners at the time also recommended acquiring as much land as possible, especially near the river. (Walker, 1988)

“Our contention is that within the next few decades, Turkey Mountain will become an urban oasis,” said River Parks director, Jackie Bubenik. *“It is a unique physical feature and should be preserved for future generations as it is...I think one of these days, not in my lifetime but in my grandchildren’s or maybe even later, they will appreciate that the public has this property.”* (Walker, 1988)

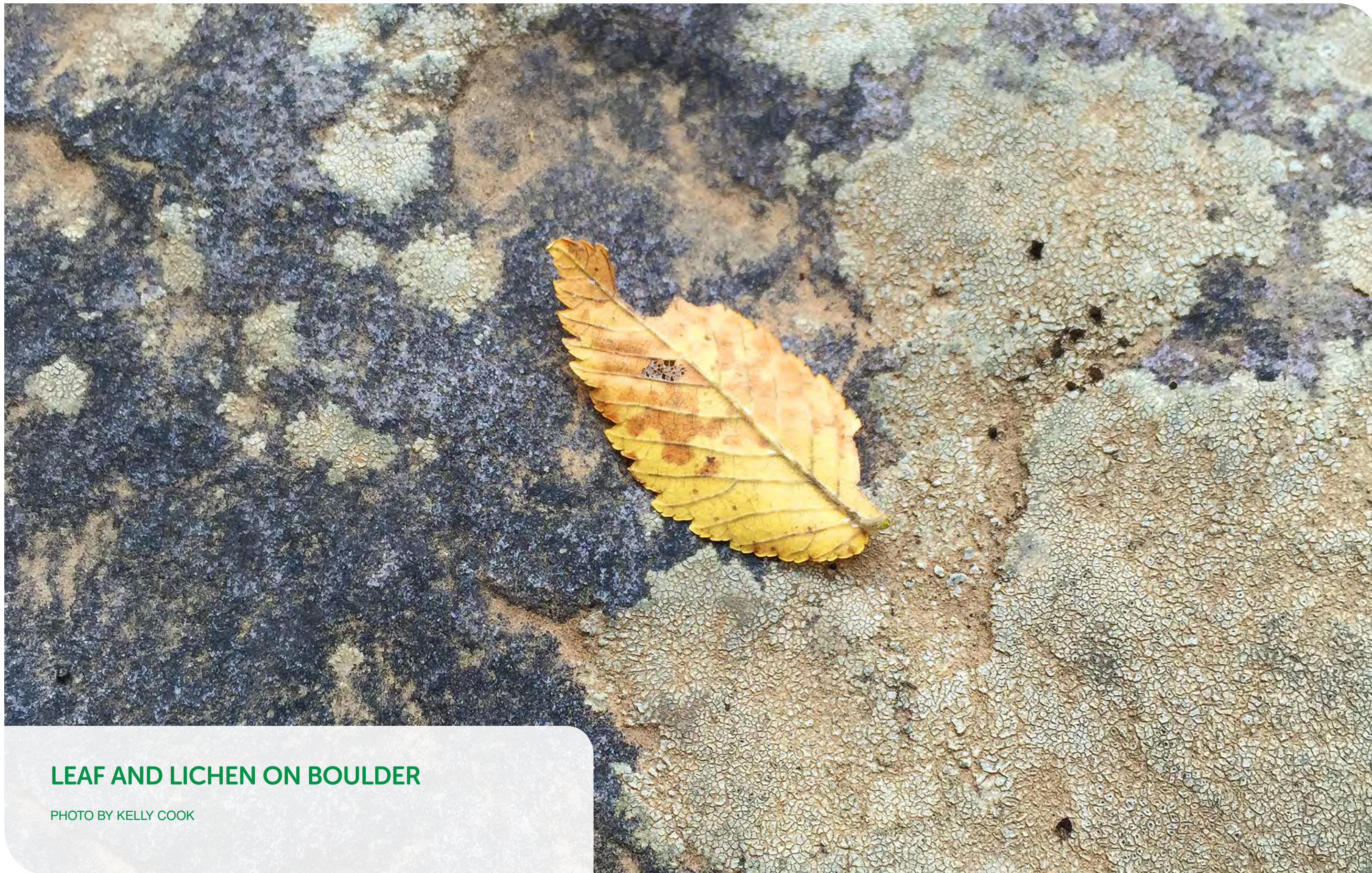
Illicit Activity

In the early 1990s, Turkey Mountain became known as a place where illicit activity took place. Many people stopped using the park during this time. Police patrols were increased and a dusk-to-dawn curfew was implemented at the park to curtail the activity. (Aydelott & Kimbrell, 1991)

In 1992, a group of Tulsa citizens began patrolling Turkey Mountain in an effort to curtail criminal activity at the park. Rick Payne and Mike Pate, two cyclists who were also Tulsa firefighters, organized groups of cyclists to regularly ride the trails at Turkey Mountain, and call police if they spotted criminal activity. (Holland, 1992)

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LEAF AND LICHEN ON BOULDER

PHOTO BY KELLY COOK

HISTORY OF TURKEY MOUNTAIN, CONTINUED

75-acre Addition

In 1991, River Parks Authority purchased a 75-acre parcel of land adjacent to Turkey Mountain. The land was purchased with \$180,000 in cash, donated by Stephen Jatras, a Tulsa philanthropist and developer. The property was in foreclosure, and was valued at \$455,000. Jatras was appointed to the River Parks Authority after his donation. (Unknown, Mayor says civic commitment motivated donation, 1991). The land officially became part of Turkey Mountain in 1994. (Colberg, 1994)

Water Tank Controversy

In 1995, the Tulsa planning commission began the process of amending the District 8 comprehensive plan to remove language added in 1987 to specify that water tanks, needed for development in southwest Tulsa, would be built on the east side of Elwood Avenue, on the Turkey Mountain park property. The 1995 amendment would stipulate that the tanks be built on private property, on the west side of Elwood Avenue. (Branstetter, 1995) After a great deal of arguments between city councilors, landowners and the River Parks Authority about the best place for the tanks, the Tulsa City Council voted to condemn 18.8 acres of private land on the west side of Elwood Avenue, owned by the estate of Samuel K. Viersen, for the construction of a single water tank. (Killman, Tanks area condemned, 1995) Construction of the water tank was completed in 1998, opening the door for expanded growth and development in southwest Tulsa. The land surrounding the tank is fenced and off limits to the public.

1996 Turkey Mountain Study

In 1996, graduate students at the University Center at Tulsa urban design program and the University of Oklahoma landscape architecture program, led by James Patterson, former Director of OU's urban design program, conducted a workshop and user study of Turkey Mountain. (Branstetter, Workshop to study use of Turkey Mountain, 1996). Although I have been unable to locate the complete study, newspaper articles from the period stated that several suggestions were proposed, including:

- A trolley system to help with limited parking
- Designate some trails as equestrian use only
- Improve running surfaces on trails to prevent injury

- Build courses for cross-country races
- Limit the park's operating hours and the number of users
- Build restrooms and picnic facilities
- Build a 60-car parking lot off 71st Street
- Build four scenic overlooks
- Add stone trail markers indicating mileage and trail names

(Killman, Ideas offered for Turkey Mountain, 1996)

Scout Blazes Trails

In 2004, Rob Phillips marked three trails on Turkey Mountain for his Eagle Scout award. He also installed fiberglass poles showing the direction of each trail, and added a new trailhead sign with a topographical map of the entire park. (Dudley, 2004) The trails Phillips marked are still in use today, and are known as the Red, Blue and Yellow trails.

George Kaiser Family Foundation (GKFF) Funds Parking Lot Improvement, Shelters and Climbing Boulders

Costing \$1.4 million, the two-phase project expanded the parking lot to 80 spaces and added horse trailer parking, two man-made boulders for climbing, restrooms, water fountains, and picnic shelters near the main entrance. The improvements also included a gate to the parking lot which allowed it to be closed after hours. The project was completed in 2008. (Lassek, 2008)

Great Tulsa Campout / Basecamp

In 2013, Turkey Mountain visitors were invited to camp overnight at the park for the first time. Open to individuals and families, the event offered live music, guided hikes, yoga and other activities. Since then, there have been two more campouts, and each year the event has grown in popularity. At the 2015 campout, an estimated 450 people camped at the event. (Middleton, 2013) According to Ryan Howell, one of the coordinators of Basecamp and a board member of the Tulsa Urban Wilderness Coalition, approximately 20 percent of the 2015 Basecamp attendees had never camped overnight before.

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BOULDER NEAR BLUE TRAIL ENTRANCE

PHOTO BY KELLY COOK

HISTORY OF TURKEY MOUNTAIN, CONTINUED

Proposed Mall Development and Tulsa Urban Wilderness Coalition

In August 2013, Simon Property Group announced plans to build an outlet mall on private land near the Turkey Mountain Wilderness Area. The announcement caused concern among users of Turkey Mountain, and led to the formation of the Tulsa Urban Wilderness Coalition, a group of hikers, mountain bikers and other Turkey Mountain advocates. (Canfield, 2013)

In February 2015, TUWC announced that it was against the proposed mall development, because the mall developers could not fully address the concerns expressed by TUWC regarding the negative impact the development would have on the area.

On May 21, 2015, Simon Property Group announced that they were abandoning the site on Turkey Mountain and moving the outlet mall to Jenks. (Wade, 2015)

The TUWC has now shifted its focus to raising funds with the intent of purchasing land on Turkey Mountain so it can be added to the Turkey Mountain Wilderness Area, as well as advocating the protection of other wild public places in Tulsa.

GKFF Land Purchases

In the meantime, the George Kaiser Family Foundation began purchasing tracts of private land adjacent to River Parks- and City of Tulsa-owned land, with the intent of protecting it from future development. The 139 acres currently owned by GKFF are to the east and north of the proposed mall location.

GKFF/QuikTrip Loan

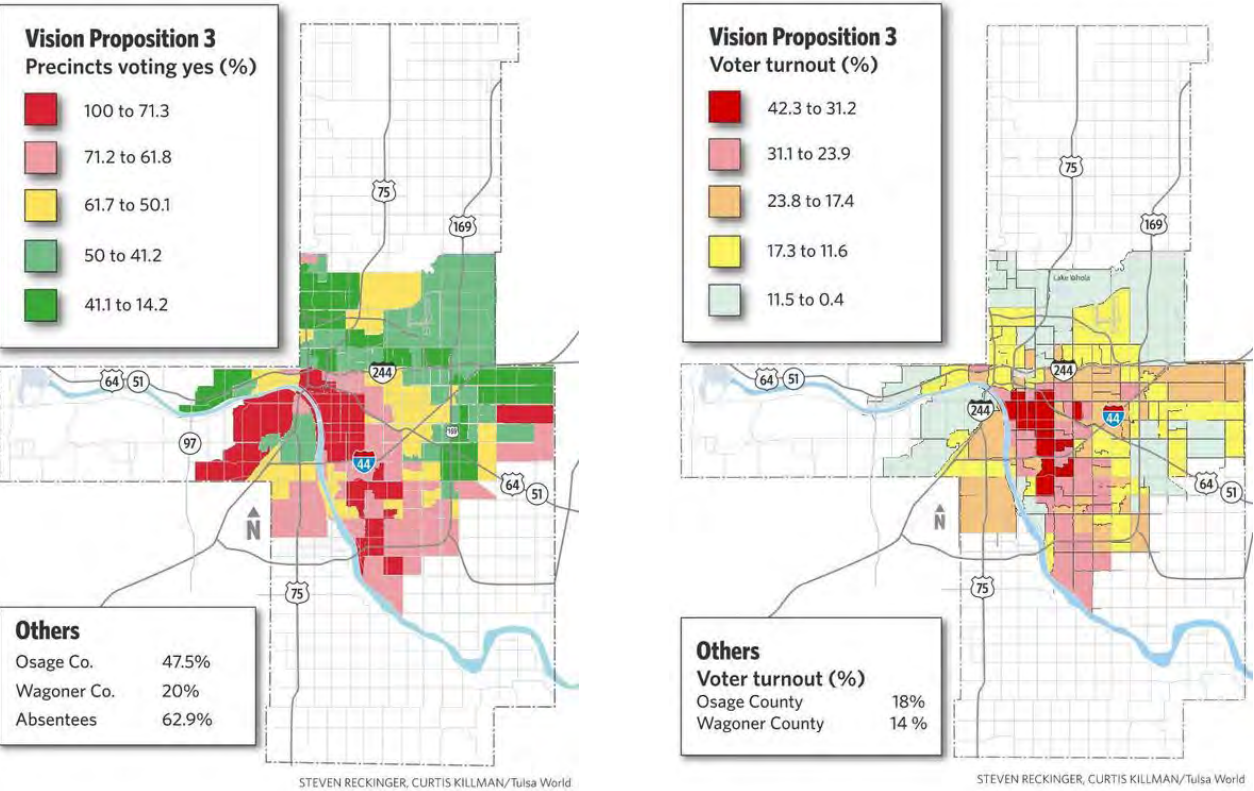
Plans to acquire more land around Turkey Mountain gained steam on December 9, 2015, when the River Parks Authority voted to accept a \$5.6 million loan from QuikTrip Corporation and the George Kaiser Family Foundation to fund the purchase of land “in the vicinity of Turkey Mountain.” Tied to voters approving Proposition 3 of the Vision Tulsa sales tax initiative, the loan would allow the purchase of up to 150 additional acres that would become part of Turkey Mountain park. The tracts being considered for purchase would not include the 200 acres of nearby land already owned or partially-owned by GKFF. Funds from the Vision Tulsa tax proposal would repay QuikTrip and GKFF for the loan. (Tulsa World, 12/10/15)

Vision Tulsa

In 2015, the City of Tulsa proposed an extension of the Vision 2025 sales tax initiative, passed in 2003. The new extension, Vision Tulsa, consisted of three separate propositions: Proposition 1 designated funds for public safety, Proposition 2 designated funds for street maintenance and transit, and Proposition 3 designated funds for economic development.

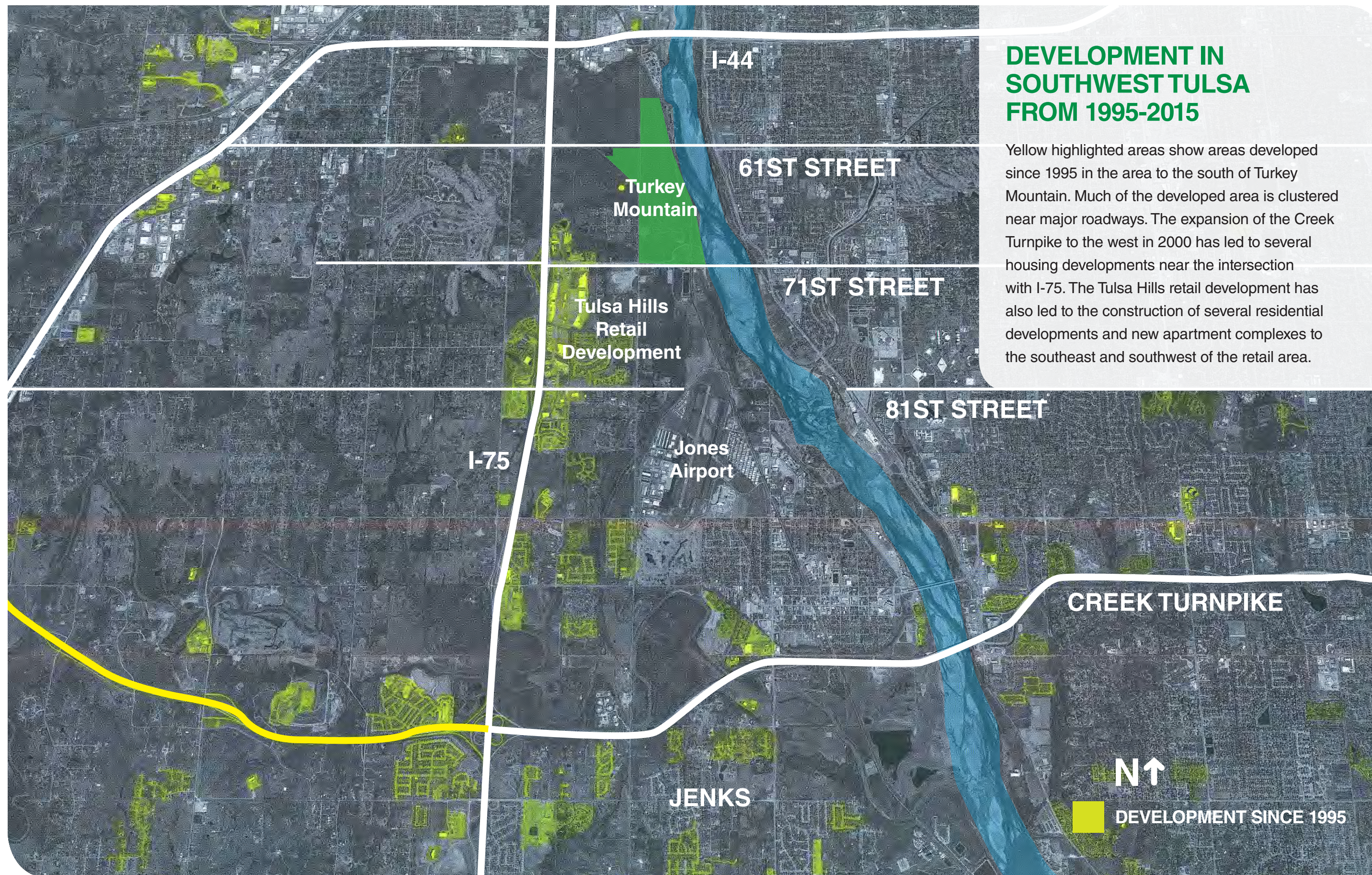
Proposition 3 included \$7.6 million for Turkey Mountain Wilderness Area, which included \$5.6 million for land acquisition and \$2 million for other park needs, such as trail maintenance, amenities and a master plan for the park. In part, the \$5 million land acquisition part of Proposition 3 would repay the money spent by the George Kaiser Family Foundation and QuikTrip Corporation to purchase the land north of 61st Street and east of Highway 75 that was intended for the outlet mall development.

On April 6, 2016, 63.3 percent of Tulsa voters approved Proposition 3 of Vision Tulsa.



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DEVELOPMENT IN SOUTHWEST TULSA FROM 1995-2015

Yellow highlighted areas show areas developed since 1995 in the area to the south of Turkey Mountain. Much of the developed area is clustered near major roadways. The expansion of the Creek Turnpike to the west in 2000 has led to several housing developments near the intersection with I-75. The Tulsa Hills retail development has also led to the construction of several residential developments and new apartment complexes to the southeast and southwest of the retail area.

MAPPING ANALYSIS

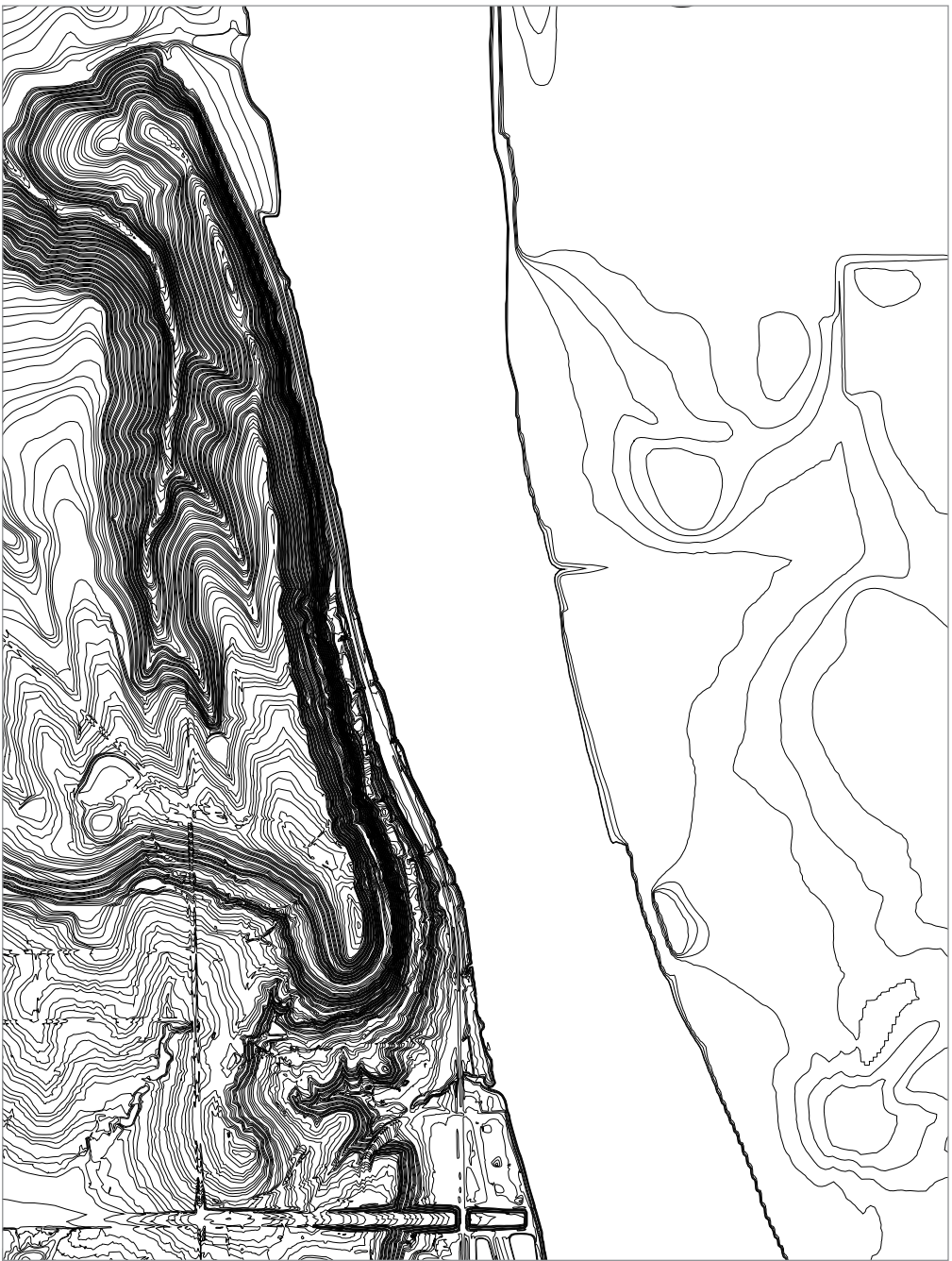
To understand the development pattern around the Turkey Mountain area, I conducted a study comparing satellite maps from 1995 and 2015. With the maps side by side, I highlighted the areas where development has taken place over this 20-year span. The highlighted map is shown to the left.

The map shows that areas along major highways tend to be developed first, likely due to improved access. The large Tulsa Hills retail development, just south of the Turkey Mountain area, shows how an area that was once wooded land can become commercial, and how the addition of the retail development led to the development of housing nearby. Based on the current development patterns, I predict similar development will occur along the east side of I-75, north to the southern edge of the YMCA camp, located at the junction of I-44 and I-75.

TURKEY MOUNTAIN EASEMENTS AND RAIL LINE



TURKEY MOUNTAIN TOPOGRAPHICAL MAP



Topographical map used to create three-dimensional model of Turkey Mountain.

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Vantage point:
Upper lot, blue trail entrance

TURKEY MOUNTAIN OBSERVATIONAL RESEARCH

Weather

Temp:

68

Wind:

N 17

Conditions:

Sunny

Gender: m=male; f=female

Age: c=child; t=teen; a

Ethnicity: w=white; b=

Activity: w=walking; r=

Exertion: s-sedentary:

Parking Lot Count:

Lower lot (arrival): 106

Lower lot (departure): 99

Upper lot (arrival): 28

Upper lot (arrival): *departure* 35

OBSERVATIONAL STUDY SURVEY INSTRUMENT

PHOTO BY KELLY COOK

OBSERVATIONAL STUDY SURVEY INSTRUMENT

PHOTO BY KELLY COOK

USER OBSERVATION STUDY

To learn who uses Turkey Mountain Wilderness Area and how they use it, I conducted a study of the park via observational research.

My observational study methodology was inspired by SOPARC (System for Observing Play and Recreation in Communities), developed in 2006 by Thomas L. McKenzie, Ph.D., Department of Exercise and Nutritional Sciences, San Diego State University, San Diego, California.

From September to December 2015, I conducted a series of observations of park users and collected information on the following aspects of each user:

- Gender (male or female)
- Age range (child, adult, teen or senior)
- Type of activity (hiking, cycling or other)
- Whether the user had a dog

My survey instrument initially contained fields to collect users' ethnic data, but after discussions with the River Parks Authority (RPA) and representatives from the Tulsa Urban Wilderness Coalition (TUWC), I decided not to collect that data, due to the difficulty involved in determining a user's ethnic background from observation alone.

I also collected information about vehicles in the parking lots at Turkey Mountain, my vantage point for observing, and weather conditions at the time of my observations:

- Upper lot vehicle count (arrival and departure)
- Lower lot vehicle count (arrival and departure)
- Weather conditions, including temperature and wind

I conducted six observations for my study, each one hour in length. I determined four distinct time periods for my observations:

- Weekday morning
- Weekday afternoon
- Weekend morning
- Weekend afternoon

In total I recorded observations of 476 subjects.

Study Constraints

Time of year: I only observed during a certain time of year (September through December). It can be expected that user numbers would fluctuate depending on the time of year, so ideally this study would be repeated at different times of the year to collect a more comprehensive sample.

Hours of study: Due to the hours I was required to be at work, the times I observed were mostly limited to before work (7-9 a.m.), around the lunch hour (11 to 1 p.m.) and weekends. Therefore, the timing of my observations was not conducive to a random sampling.

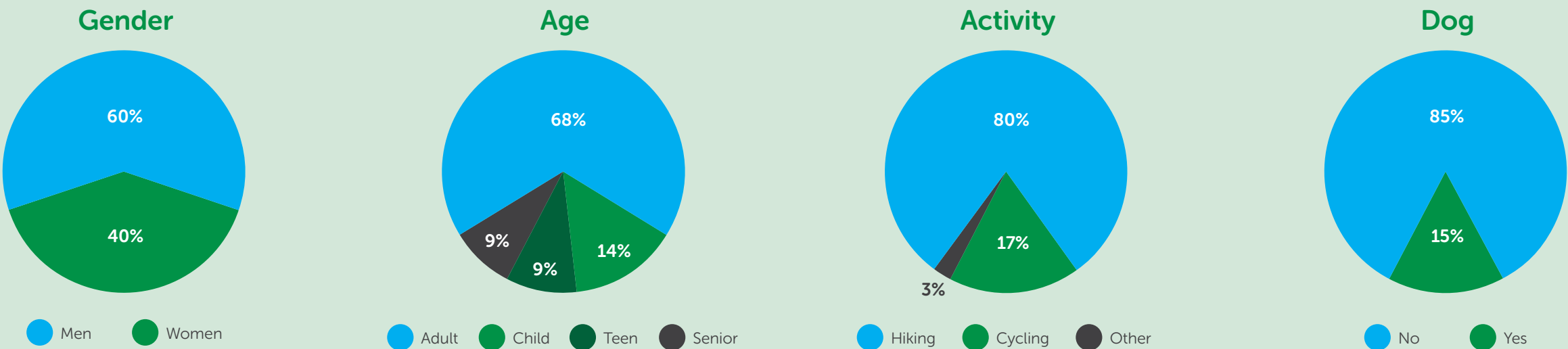
Vantage point: Since I could only observe from one point at a time, it was impossible to get a complete number of how many people were using the park at any given time during my observations. Also, my vantage point was not random. I most often conducted my observations near the lower parking lot at the entrance to the Blue Trail. That location seemed to be the most popular point of entry for park users, and I wanted to record as many users as possible during my observations.

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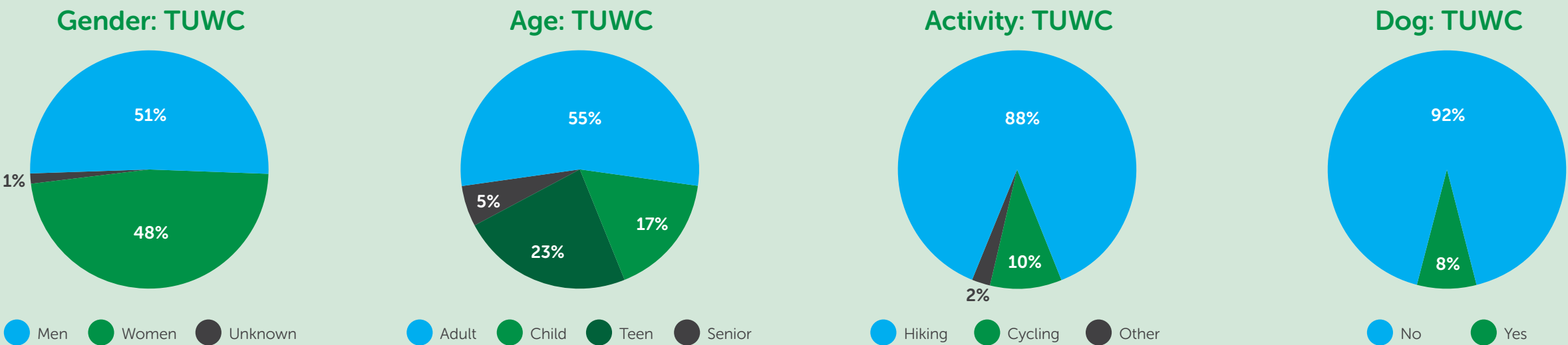


RESULTS OF MY OBSERVATIONAL STUDY COMPARED
WITH TULSA URBAN WILDERNESS COALITION STUDY

Statistics from my study (n=476):



Statistics from Tulsa Urban Wilderness Coalition study (n=3,371):



USER OBSERVATION STUDY, CONTINUED

Findings

Through my study, I hoped to learn more about who visits Turkey Mountain and the activities they participate in at the park. The charts to the left show the results of my observations compared with the results of a similar study conducted by the Tulsa Urban Wilderness Coalition in March 2015.

Tulsa Urban Wilderness Coalition (TUWC) Study

In October 2015, after I had started my observational research of visitors to Turkey Mountain, I met with Laurie Biby of TUWC. She told me that TUWC had conducted a similar observational study in March 2015. Ryan Howell, Robert Burke and Marci Hawkins, all members of TUWC, were in the process of compiling the study findings. Ryan later shared their findings with me so that I could compare them with my results.

The TUWC study was similar to mine in several ways. It was primarily observational in nature, and the observational instrument they used was nearly identical to mine. They observed visitor gender, age, activity and whether the user had a dog.

There were also some differences. TUWC's study sample included more than 3,300 individuals, while my sample size was 476. Also, the TUWC study was conducted over the course of three days (March 14 and 15, 2015 from 7 a.m. to 6 p.m. and March 24, 2015 from 2 to 6 p.m.), totaling 26 hours of observation. My study was conducted over six days, with six hours of observation. My observations were conducted on Tuesday, September 22 from 12:30 to 1:30 p.m., Thursday, October 22 from 12 to 1 p.m., Sunday, November 1 from 2:30 to 3:30 p.m., Friday, November 6 from 8:50 to 9:50 a.m., Saturday, November 14 from 2:30 to 3:30 p.m. and Friday, December 4 from 8:45 to 9:45 a.m.

The TUWC study also allowed park visitors to voluntarily provide information to the surveyors, including their home ZIP code and whether they visited a restaurant or stayed in a hotel as part of their trip to Turkey Mountain. The ZIP code data was

used to determine how far people traveled to get to Turkey Mountain, and the hotel/restaurant question was used to form an estimate of the overall impact Turkey Mountain visitors have on the Tulsa economy.

For future studies of this nature, I would recommend collecting information about where visitors traveled from to visit the park and how they spent money while they were in Tulsa, to help determine Turkey Mountain's impact on Tulsa as a recreational destination and generator of sales tax revenues.

Gender

Hypothesis: Most Turkey Mountain visitors are men.

Before conducting my study, I assumed that most Turkey Mountain users were mountain bikers, and therefore predominantly male. My study results show more males than females, by a ratio of 60 percent male and 40 percent female. However, the TUWC study shows a more equal distribution of males to females, which could be explained by their larger sample size.

Age

Hypothesis: Most Turkey Mountain visitors are adults.

As my study shows, sixty-eight percent of the visitors I observed were adults. I was surprised by the number of families with children at the park. Fourteen percent of the total park visitors I observed were children. Teens and seniors each made up nine percent of total visitors.

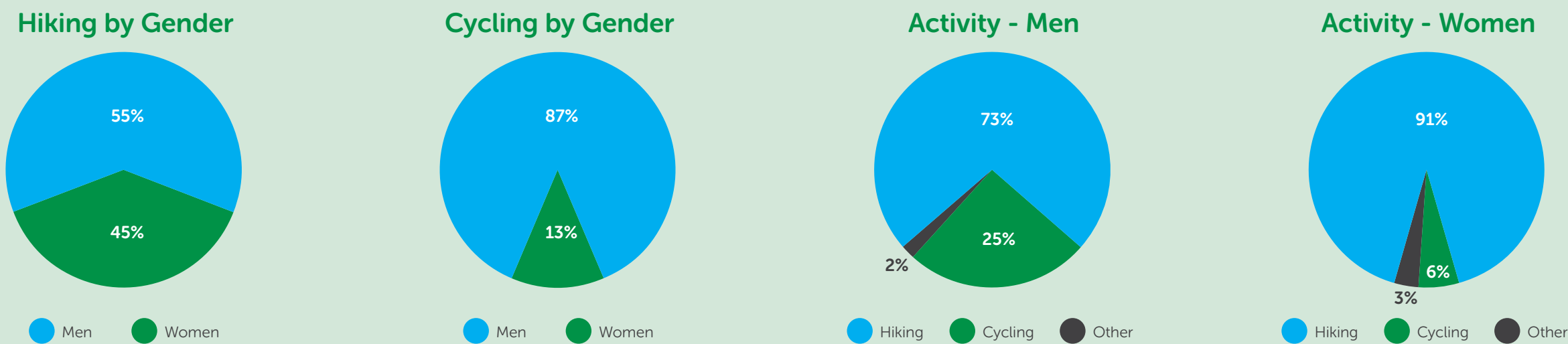
The TUWC study showed a larger percentage of teen visitors to the park, 23 percent versus nine percent in my study. Part of the difference shown in visitor age could be attributed to the subjectivity of the person making the observations, as the ages recorded were solely based on observation.

TURKEY MOUNTAIN
Tulsa's Wild Place

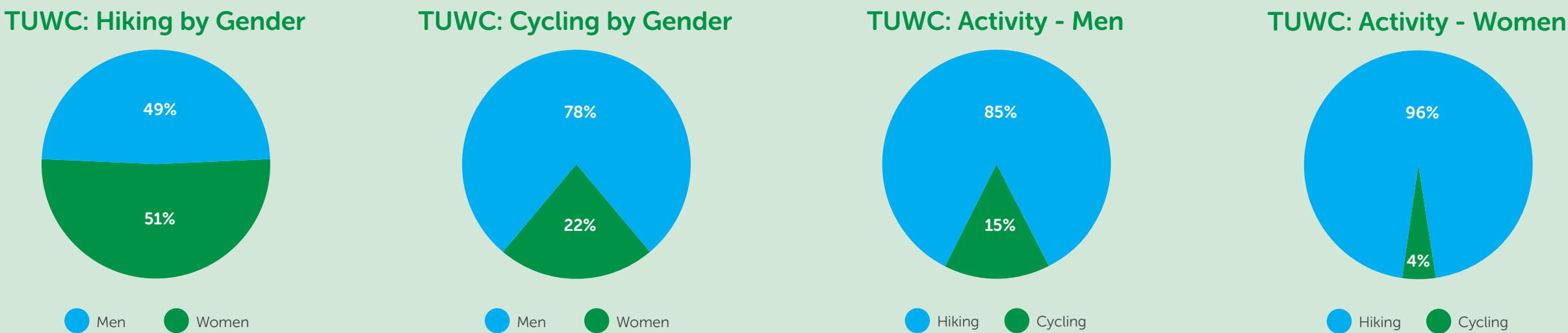


**RESULTS OF MY OBSERVATIONAL STUDY COMPARED
WITH TULSA URBAN WILDERNESS STUDY**

Statistics from my study (n=476):



Statistics from Tulsa Urban Wilderness Coalition study (n=3,371):



USER OBSERVATION STUDY, CONTINUED

Activity

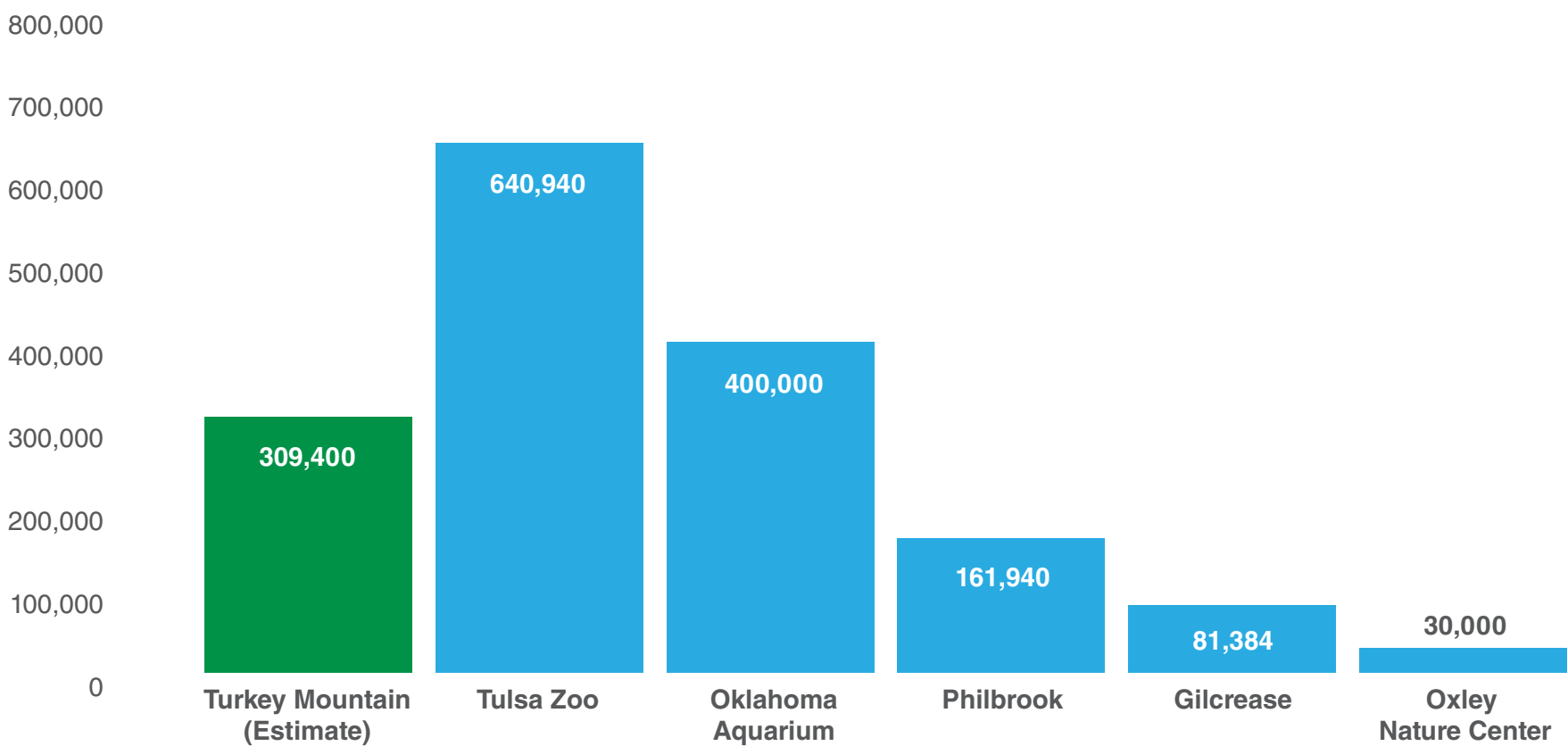
Hypothesis: Most Turkey Mountain visitors are mountain bikers.

Based on my preconceptions before spending much time at Turkey Mountain, I assumed that most of its users were mountain bikers. However, my observations, as well as the observations of TUWC, show that hiking is by far the most popular activity at the park. My study showed that 80 percent were hikers (runners were also placed into this category), with 17 percent cyclists and two percent participating in other activities. The other activities I observed included horseback riding, photography, or simply relaxing.

Turkey Mountain Annual Visitor Estimate

During my observations, I counted an average of 39 people per hour on weekdays, and 195 people per hour on weekends. Assuming the park is used 10 hours per day, that equals 1,950 visitors per week and 3,900 visitors per weekend, which puts the total weekly estimated average at 5,850 visitors, or 835 per day. This gives an annual estimate of around 309,400 visitors to Turkey Mountain Wilderness Area. For comparison, in 2015, the Tulsa Zoo, the region's largest attraction, had 640,940 visitors, and the Oklahoma Aquarium in Jenks had around 400,000.

TURKEY MOUNTAIN ESTIMATED VISITORS COMPARED TO OTHER TULSA ATTRACTIONS (2015)



TURKEY MOUNTAIN
Tulsa's Wild Place





STAKEHOLDER INTERVIEWS

River Parks Authority (RPA)

September 3, 2015 - Matt Meyer, Executive Director and Alan McBeath, current contractor and former Maintenance Manager of RPA

My initial meeting with RPA, the entity that operates Turkey Mountain and the rest of River Parks, was primarily to introduce myself and my project to RPA. Matt Meyer and Alan McBeath gave me an overview of how River Parks operates and how Turkey Mountain is managed.

The primary concerns that RPA expressed during our first meeting were the ongoing maintenance of Turkey Mountain, and RPA's desire to acquire land adjacent to the park in order to protect it from development. Limited budgets mean that there are very few people available to monitor the park, making enforcement of park rules difficult.

March 3, 2016 - Matt Meyer, Alan McBeath and Tonja Carrigg, Manager of Community Relations of RPA

At this meeting with RPA, I updated Matt, Alan and Tonja on the progress of my project and discussed Turkey Mountain's inclusion in the Vision Tulsa tax proposal. Matt Meyer invited me to present a summary of my project to the RPA Board of Directors' April 2016 meeting.

April 14, 2016 - River Parks Authority Board of Directors

In April, I presented a summary of my project to the RPA board. My presentation was well-received by the board.

Tulsa Tough

September 12, 2015 - Chris Zenthoefer and Shawn Brett, founders of Tulsa Tough cycling race

Chris and Shawn shared their vision for a cycling park, located on the south side of Turkey Mountain.

INCOG

September 15, 2015 - Kurt Bickle, Manager of Graphics, INCOG

I met with Kurt Bickle about mapping that INCOG has done of Turkey Mountain. Kurt shared high-resolution aerial maps of Turkey Mountain that I stitched together to create a very large aerial map of the entire park.

Turkey Urban Wilderness Coalition (TUWC)

October 16, 2015 - Laurie Biby, founding member and Marketing and PR Director of TUWC

In my meeting with Laurie Biby, she shared information about TUWC's formation in response to the proposed outlet mall near Turkey Mountain and the Tulsa community's response to the development.

November 18, 2015 - Ryan Howell, founding member and Educational and Outreach Director of TUWC

Ryan Howell shared information about the educational efforts of TUWC, as well as the success of Basecamp, an annual public camping event held at Turkey Mountain.

January 12, 2016 - TUWC Trails Sub-committee Meeting.

In this meeting, I helped TUWC plan a clean-up day for Turkey Mountain and discuss an initiative to educate trail users on proper trail use.

TURKEY MOUNTAIN
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CITY OF
Tulsa
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STAKEHOLDER INTERVIEWS, CONTINUED

City of Tulsa

February 2, 2016 - Jeannie Cue, Tulsa City Councilor for District 2

Jeannie Cue shared her love for Turkey Mountain and expressed how valuable she believes Turkey Mountain is for Tulsa and for District 2 specifically. She also shared the recently completed Vision Tulsa plan and the importance of Turkey Mountain's inclusion in the economic development portion of the plan. She also said that lack of parking at Turkey Mountain and the safety of pedestrians along Elwood Avenue are major concerns of the people who live near the park.

March 26, 2016 - Jim Twombly, Tulsa City Manager

Jim Twombly shared information about the City of Tulsa's ideas around the potential acquisition of land around Turkey Mountain to add to the park's footprint. He said that the City of Tulsa believes that Turkey Mountain is important to Tulsa, both for attracting tourism and for enticing businesses to locate in Tulsa. He shared that the City has explored the idea of extending Olympia Avenue to 61st Street and potentially closing Elwood Avenue to through traffic. He also said that the tract of land south of 61st Street and east of Highway 75 has been considered to be developed as a tax increment financing (TIF) district, with a portion of the tax revenue generated by the district designated for the improvement and maintenance of the Turkey Mountain Urban Wilderness Area.

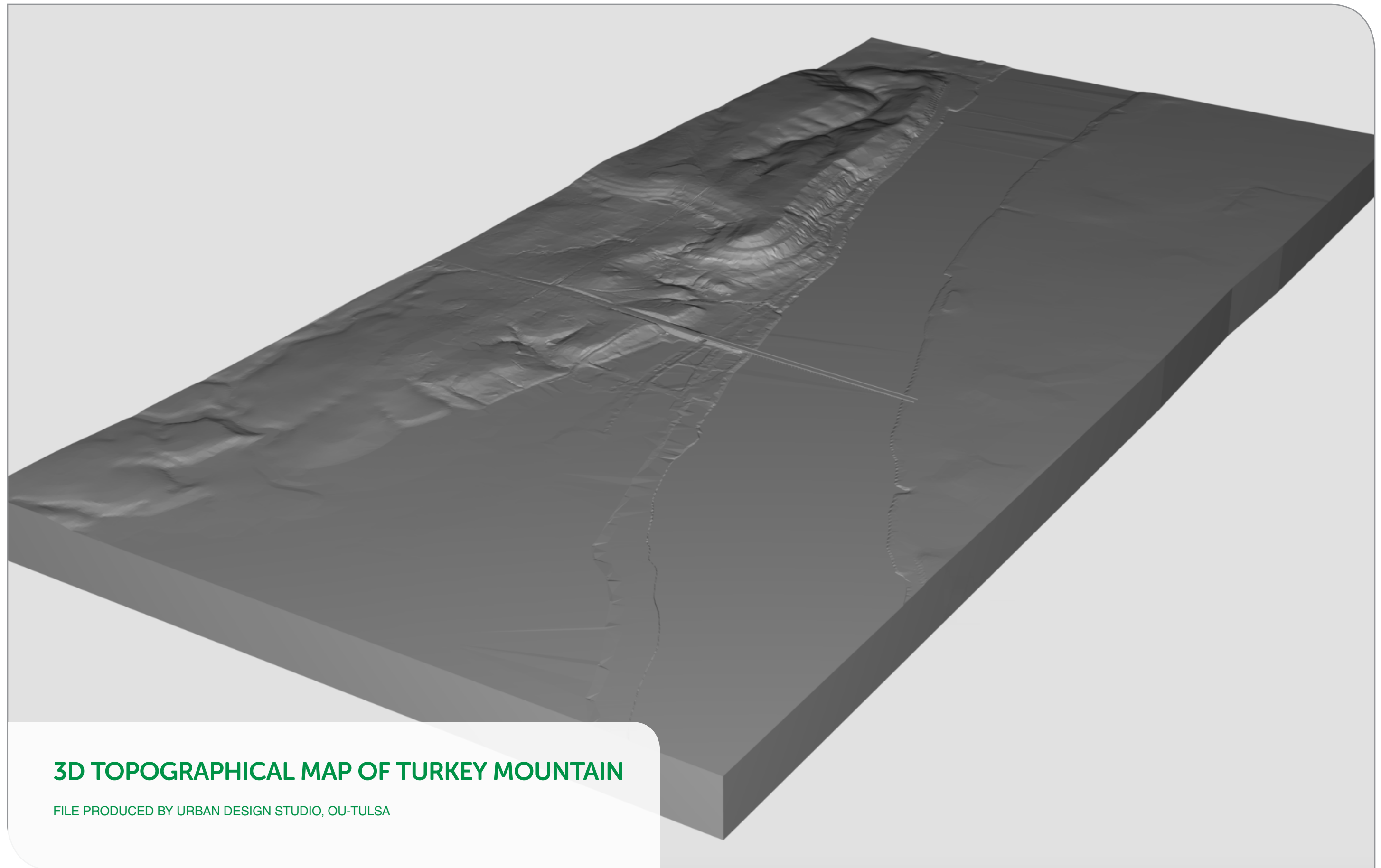
George Kaiser Family Foundation (GKFF)

February 18, 2016 - Josh Miller, Program Director at GKFF

I met with Josh Miller on the day that GKFF announced their purchase of the 60 acre tract that had been considered by Simon Properties for an outlet mall development. Josh shared information about GKFF's involvement in Turkey Mountain over the years, including the donation that provided the funding for the south parking lot, restrooms and pavilions. GKFF's recent involvement with Turkey Mountain has included the purchase of several tracts of land adjacent to Turkey Mountain, with the intent of protecting those lands from development and eventually making the land a permanent part of Turkey Mountain Wilderness Area. GKFF, along with QuikTrip Corporation, provided a \$5.6 million loan to River Parks Authority to purchase the land considered for the outlet mall along with other yet-to-be determined tracts of adjacent undeveloped land. This loan will be repaid with funds from the Vision Tulsa tax proposal, an extension of the Vision 2025 tax plan that Tulsa voters passed on April 6, 2016.

TURKEY MOUNTAIN
Tulsa's Wild Place





3D TOPOGRAPHICAL MAP OF TURKEY MOUNTAIN

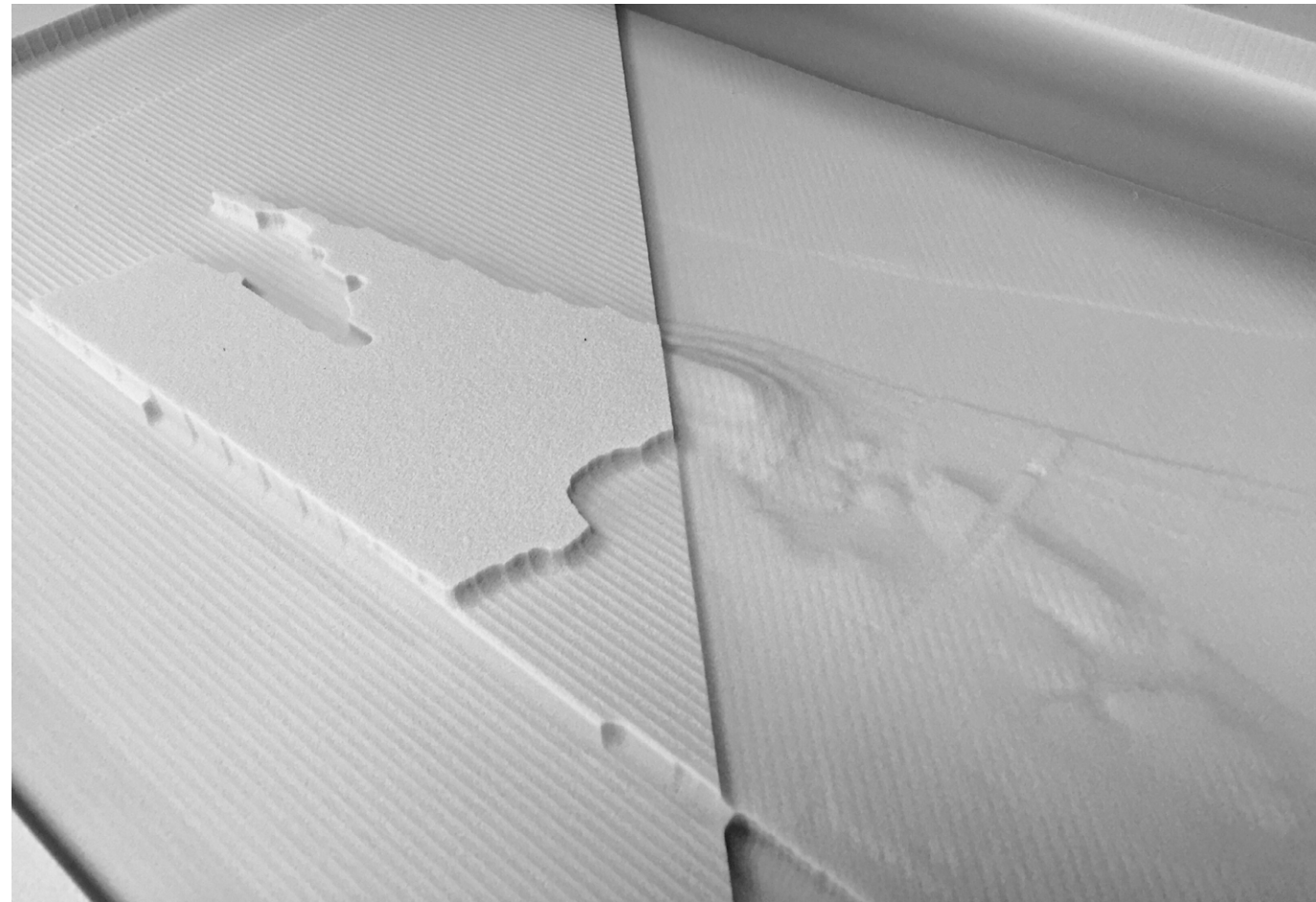
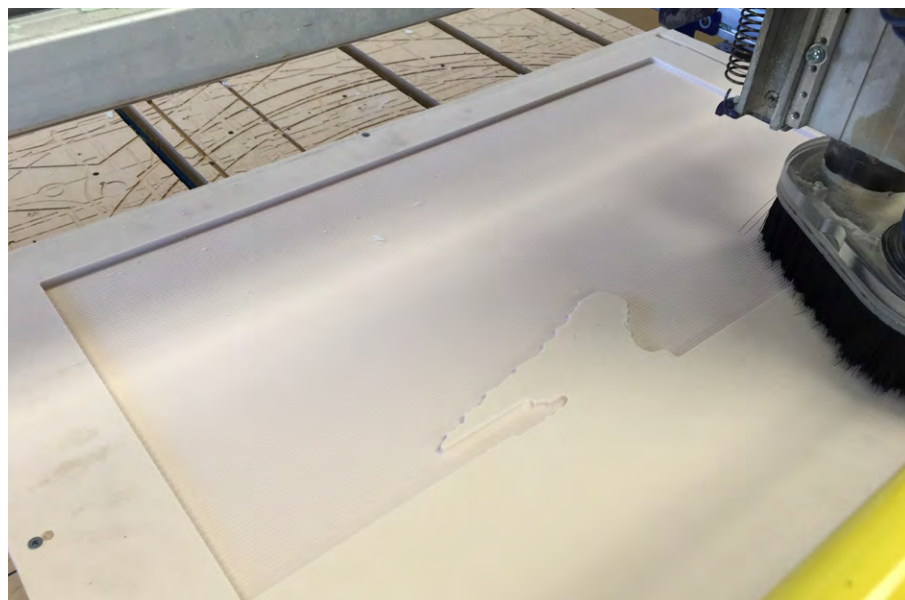
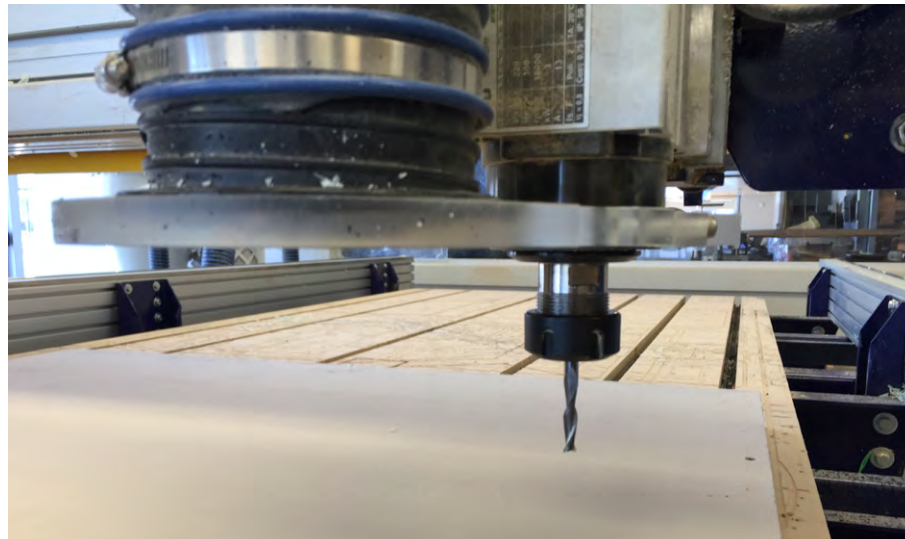
FILE PRODUCED BY URBAN DESIGN STUDIO, OU-TULSA

3-D MODEL

As part of my project, I decided to create a three-dimensional topographical map of Turkey Mountain. With the help of Shawn Schaefer at the Urban Design Studio at OU, a three-dimensional digital model of Turkey Mountain was created from vector topographical data.

To fabricate the 3-D map, I worked with FabLab, an open-source maker space in Tulsa. In March 2016, I took a class at FabLab to learn how to operate the ShopBot, a CNC routing machine that can mill three dimensional objects out of high-density foam or other materials. I also sourced the material for my model: 1.5 inch thick high-density polyurethane foam board. My finished model is 29 by 19 inches.

A map like this could be used for way finding on the trails, so that visitors could see the trails they plan to hike or bike on a three-dimensional surface. If a map like this were placed at Turkey Mountain, it should be made from an extremely durable material, such as bronze or heavy molded plastic, to resist theft and vandalism.



Creating a three-dimensional map of Turkey Mountain was a multi-step process:

1. *A three-dimensional digital model of Turkey Mountain was created using two-dimensional digital topographical data.*
2. *I sourced my material: high-density polyurethane foam from Reece Supply Company, a Tulsa signage business.*
3. *Third, I took a class at FabLab, an open-source fabrication shop, to learn how to use the ShopBot, a CNC routing tool.*
4. *At FabLab, I imported the 3-D digital model file into a software program called VectorWorks, in which I set up toolpaths and other machine instructions. A 1/4-inch square-edged bit was selected for the carving.*
5. *When it was time to fabricate my model, I attached the foam to the bed of the CNC router with wood screws and loaded my toolpaths and model instructions. The 19- by 29-inch model took approximately 2.5 hours to carve.*

TURKEY MOUNTAIN
Tulsa's Wild Place



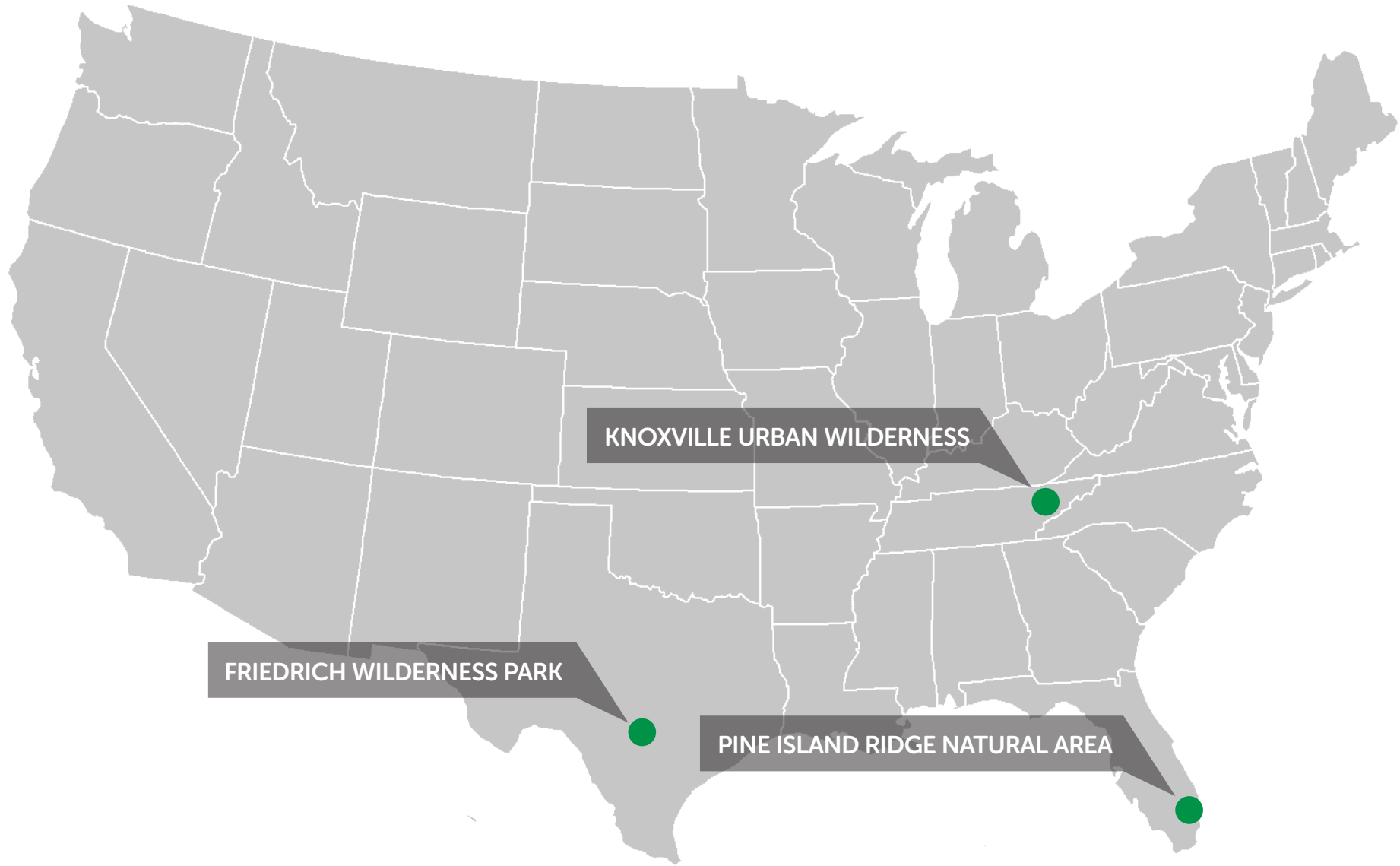


KAYAKING AT MEAD'S QUARRY, KNOXVILLE, TENNESSEE

PHOTO SOURCE [Knoxville News Sentinel](#)

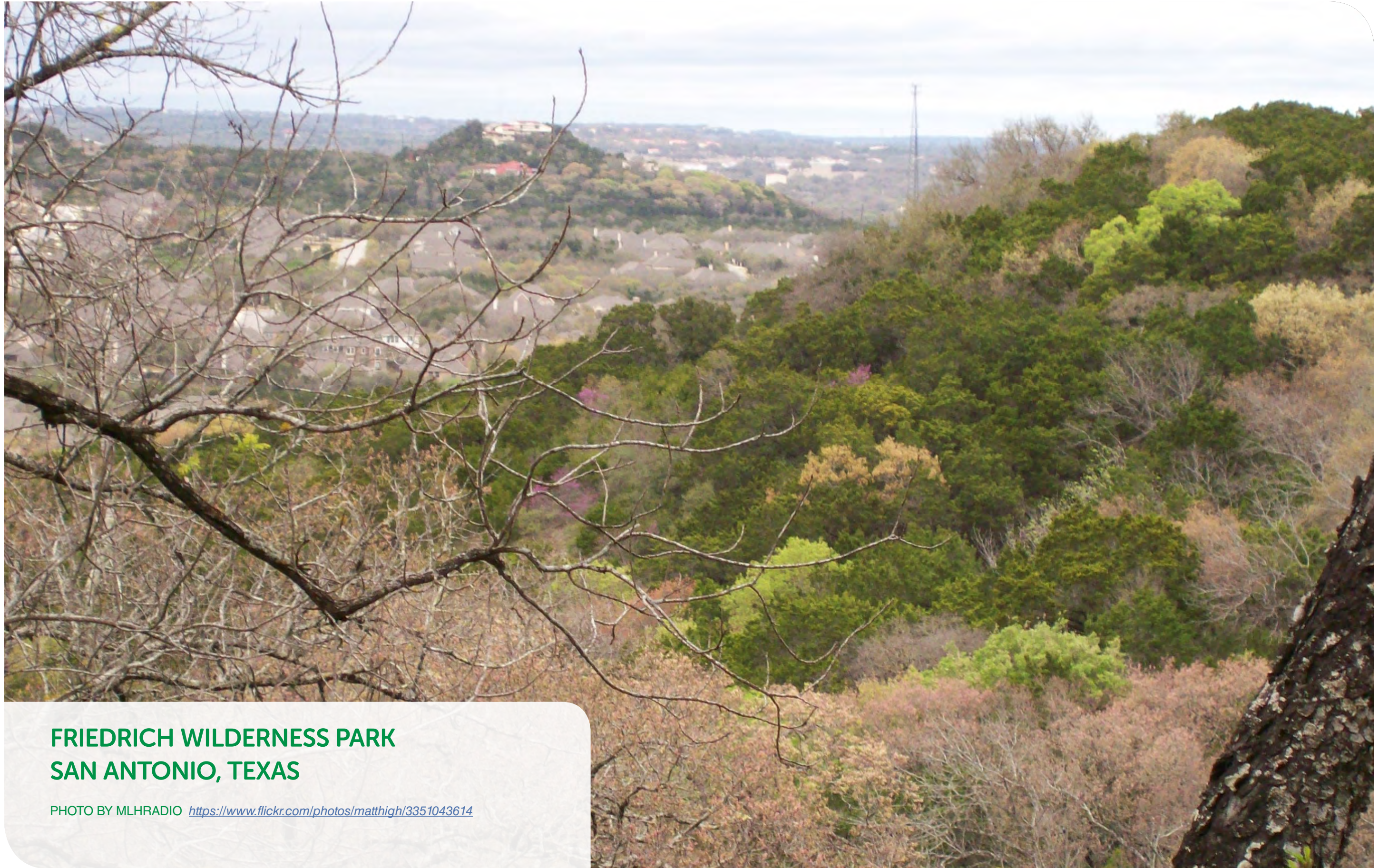
URBAN WILDERNESS CASE STUDIES

To understand how other urban wilderness areas compare to Turkey Mountain, I conducted case studies of similar parks across the U.S. In working to identify comparable parks for my case study, it quickly became apparent that urban wilderness areas are fairly rare places. I did, however, identify three parks that are similar in size and usage to Turkey Mountain: Friedrich Wilderness Park in San Antonio, Texas; Knoxville Urban Wilderness in Knoxville, Tennessee; and Pine Island Ridge Natural Area in Davie, Florida.



TURKEY MOUNTAIN
Tulsa's Wild Place





FRIEDRICH WILDERNESS PARK SAN ANTONIO, TEXAS

PHOTO BY MLHRADIO <https://www.flickr.com/photos/matthigh/3351043614>

URBAN WILDERNESS CASE STUDIES, CONTINUED

Friedrich Wilderness Park

San Antonio, Texas

Area: 500 acres

Vegetation: Juniper, oak, persimmon and terrestrial orchids.

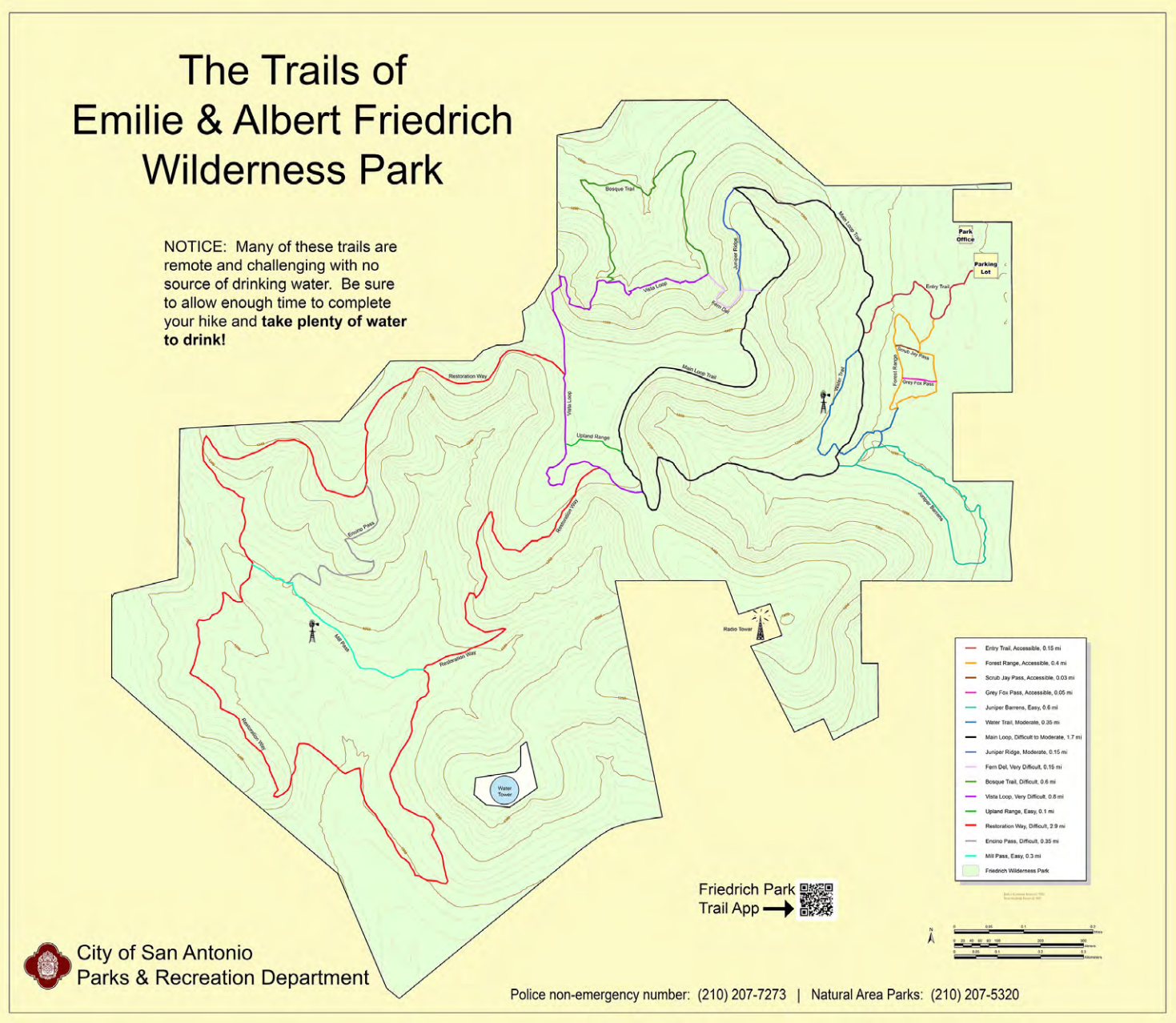
Wildlife: Two endangered birds, the Golden-Cheeked Warbler and the Black-Capped Vireo, spend summers in the park.

Amenities: 5.5 miles of paved and unpaved trails with varying degrees of difficulty, including a handicapped accessible trail. Signage and programs educate visitors about the park's vegetation and wildlife. The Friends of Friedrich Park provides volunteer support for the park, and the Master Naturalist Program utilizes the park to study soil and water resources, ecology, native Texas Plants, and archaeology.

Relevance to Turkey Mountain Wilderness Area: Friedrich Wilderness Park is the most similar park to Turkey Mountain in terms of size and usage. The primary difference is that Friedrich Park is pedestrian-only, due to endangered birds that nest in the park.

Friedrich differs in terms of park policy as well; when trails are too wet, they are closed to hikers to prevent damage to the trails. Also, dogs are not allowed in the park.

The Friends of San Antonio Natural Areas is a nonprofit group that promotes the stewardship of San Antonio's parks and the understanding and appreciation of nature through science education programs (<http://fosana.org/about/>).



Example of an unpaved trail at Friedrich Wilderness Park. <http://botany.csd.tamu.edu/FLORA/pic03/DSCN2563.JPG>



Signage along a trail at Friedrich Wilderness Park. <https://a.travel-assets.com/findyours-php/viewfinder/images/res60/24000/24288-Friedrich-Wilderness-Park.jpg>

Friedrich Wilderness Park map, <http://hikesa.org/wp-content/uploads/2015/11/FWPtopo.jpg>

TURKEY MOUNTAIN
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KNOXVILLE URBAN WILDERNESS KNOXVILLE, TENNESSEE

PHOTO BY DOGWOOD ARTS <http://www.dogwoodarts.com/south-knoxville/>

URBAN WILDERNESS CASE STUDIES, CONTINUED

Knoxville Urban Wilderness

Knoxville, Tennessee

<http://www.outdoorknoxville.com/urban-wilderness>

Area: 1,000 acres

Vegetation: In the Knoxville area, the northern deciduous forest meets the southern temperate forest. Much of the Knoxville Urban Wilderness consists of a native hardwood over-story with a highly invaded mid-story. Many of the under-story consists of non-native plants like honeysuckle, multi-flora rose, and privet.

Wildlife: Black bear, coyote, red fox, gray fox, cougar, bobcat, elk (reintroduced), white-tailed deer, opossum, armadillo, eastern cottontail, Appalachian cottontail, swamp rabbit, woodchuck, raccoon, Northern American river otter and American mink.

Amenities: 150 miles of paved and natural trails and water activities. The Outdoor Knoxville Adventure Center is the home of the Legacy Parks Foundation, which raises money to support Knoxville's outdoor spaces. The Center provides maps, fliers and other outdoor resources to encourage enjoyment of the outdoors. A rental shop provides paddleboards, kayaks and bicycles. The shop offers classes on paddleboarding and other outdoor skills and serves as an information hub for activities held at the park.

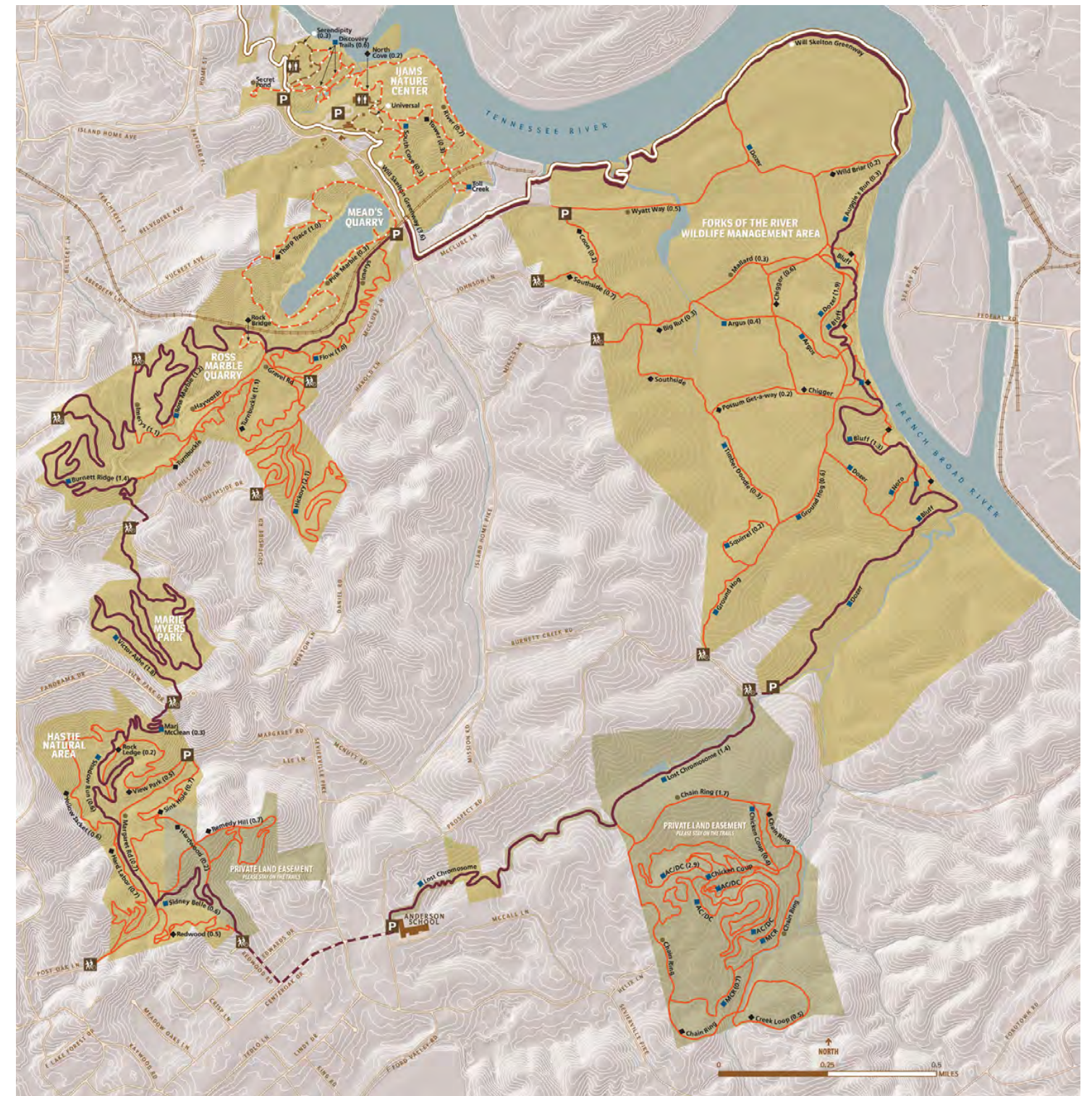
Relevance to Turkey Mountain Wilderness Area: The Knoxville Urban Wilderness Area provides an example of where Turkey Mountain could be in 10 to 20 years. The Outdoor Knoxville Adventure Center is a great model for a mixed-use hub for the park.



Outdoor Knoxville Adventure Center exterior.
<http://media.cleveland.com/plain-dealer/photo/2012/10/11711300-standard.jpg>



Nighttime paddle boarding on the Tennessee River.
http://insideofknoxville.com/wp-content/uploads/2015/07/IMG_9982.jpg



Knoxville Urban Wilderness, South Loop map, <http://www.outdoorknoxville.com/images-outdoors/South-Loop.jpg>

TURKEY MOUNTAIN
Tulsa's Wild Place





**PINE ISLAND RIDGE NATURAL AREA
DAVIE, FLORIDA**

PHOTO BY FRANK PADRON <https://www.thedesoto.com>

URBAN WILDERNESS CASE STUDIES, CONTINUED

Pine Island Ridge Natural Area

Davie, Florida

Area: 101 acres

Vegetation: Live Oak, Sabal Palm, Slash Pine, Hackberry, Marlberry, Wild Coffee, Beautyberry, Swamp Fern, and Giant Sword Fern.

Wildlife: Gopher Tortoises, Great Horned Owls, migratory Warblers, Red-Bellied and Pileated Woodpeckers, Cooper's Hawks, and Atala butterflies.

Amenities: Interpretive signage throughout. Paved trail originating in Tree Tops Park leads to an interpretive shelter in Pine Island Ridge. Equestrian trails on the site link Tree Tops Park with Westridge, a Town of Davie park. The Forest Ridge community is connected at its main entrance to Tree Tops Park by a paved walking path that meanders across Pine Island Ridge. Restrooms are available at Tree Tops Park.

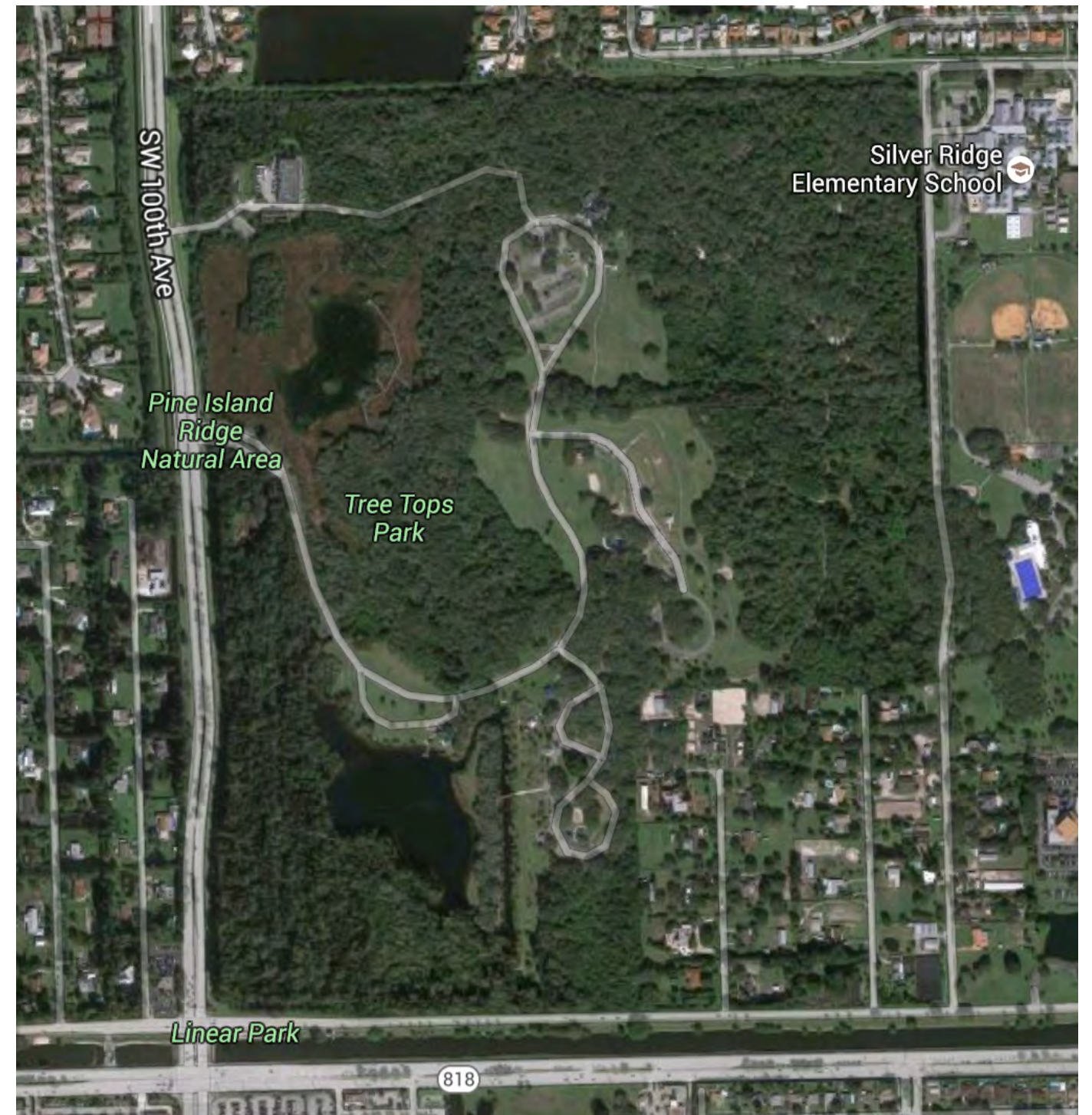
<http://www.broward.org/Parks/PineIslandRidge/Pages/Default.aspx>

Relevance to Turkey Mountain Wilderness Area: Pine Island Ridge was selected as an example of a wilderness area that is completely “hemmed-in” by residential development. This park was originally meant to be developed as a golf course, but the project fell through, so it was allowed to remain in its natural state. It is now a small but well-utilized park that serves as a reminder of what the area was like before development.



Paved trail at Pine Island Ridge Natural Area.

<http://1.bp.blogspot.com/tHMwQOsFVPw/Sag9xI8-Kkl/AAAAAAAAAB5M/KJdH55FnUfA/w1200-h630-p-nu/walk-ing+up+trail+-+pine+island.jpg>



Pine Island Ridge Natural Area map

<https://www.google.com/maps/place/Pine+Island+Ridge+Natural+Area/@26.0699439,-80.2796853,16z/data=!4m2!3m1!1s0x-88d9a80a6d09d59d:0x36ec0d534afeb074>

TURKEY MOUNTAIN
Tulsa's Wild Place





SOPHIA COOK AND SYDNEY BROCK-KIRKLAND, ENJOYING TURKEY MOUNTAIN

PHOTO BY KELLY COOK

SIGNIFICANCE OF STUDY

Turkey Mountain has become important topic in Tulsa

The proposal of an outlet mall development at 61st and Highway 75 and the resulting negative public response from Tulsans received a great deal of local media attention and resulted in the developer, Simon Properties, abandoning the Turkey Mountain location for Jenks.

Over the past year, Turkey Mountain land acquisition by the George Kaiser Family Foundation has intensified. GKFF has stated that they are acquiring the land to preserve it from development.

On December 9, 2015, the River Parks Authority voted to accept a \$5.6 million loan offered by GKFF and QuikTrip Corporation to purchase land in the vicinity of Turkey Mountain. The land would allow the purchase of up to 150 acres. Funds from Vision Tulsa, a renewal of the Vision 2025 tax program, would be used to repay the loan.

In February 2016, GKFF announced the purchase of the 60 acre parcel intended for the outlet mall development.

Turkey Mountain is listed in the economic development portion of the Vision Tulsa tax extension proposal, with \$7.6 million included for land acquisition and amenities, and has been used by City Hall as a “carrot” when promoting the economic development section of the proposal.

Health benefits of natural areas

Health studies show that contact with nature — plants, animals, landscapes, and wilderness — offers many medical benefits. These include lower blood pressure and cholesterol levels, more likely survival after a heart attack, faster recovery from surgery, fewer minor medical complaints, and lower self-reported stress. In children with attention disorders and teens with behavioral disorders, contact with nature results in significant improvement (Frumkin, 2001).

In fact, recent research suggests that exercise is more beneficial — leading to enhanced tranquility, and more relief of anxiety and depression — when it occurs in natural settings, like parks, rather than along urban streets (Bodin and Hartig, 2003). The opportunity for “green exercise” is an important asset offered by city parks.

A study of park use by older adults in Cleveland in *Parks & Recreation* magazine, published by the National Recreation and Park Association, showed that active park users were less likely to be overweight than users with longer park visits who participated in passive activities or did not use the park at all. Active park use was negatively related to visits to a physician (other than routine checkups); and the level of physical activity was the strongest predictor of lower blood pressure.

A study in the October 2000 issue of *The Physician and Sportsmedicine* found that physically active people had lower annual direct medical costs than inactive people. The cost difference was \$330 per person, based on 1987 dollars. If all inactive American adults became physically active, the potential savings could be \$29.2 billion in 1987 dollars, or \$104 billion in 2016 dollars.

Certain features that predict greater use for physical activity are accessibility, proximity, good lighting, toilets and drinking water, and well-designed and maintained paths, as well as attractive scenery (Frumkin, 2003). Turkey Mountain has the potential to provide all of these features to its visitors.

Nearly one million people live in the Tulsa metro area and therefore potentially have access to the positive health benefits of Turkey Mountain.

Different types of parks may differ in the health benefits they offer. A neighborhood park may function as a venue for social interaction, physical activity, and nature contact. Larger parks may offer these same benefits and more, such as cooling and cleaning of urban air and protection and filtering of source water.

TURKEY MOUNTAIN
Tulsa's Wild Place





FOREST FLOOR AT TURKEY MOUNTAIN

PHOTO BY KELLY COOK

SIGNIFICANCE OF STUDY, CONTINUED

It's important for a city parks system to provide a variety of functions, because different groups of people have different health needs. People from different age, ethnic and socioeconomic groups may have different traditions in physical activity and attitudes towards natural settings. For economically disadvantaged people, parks provide an affordable way to engage in healthy activities.

As children spend more time indoors, often with electronic devices, the disconnect from the natural world grows.

“Children and nature go together — or should. Recent studies document the importance of introducing children to the natural world, beginning in the early years. Their social, emotional, and physical health depends on this exposure to develop. Humans are hardwired to need nature — because we are part of it. In some communities, children lack access to nature and the freedom to explore local flora and fauna. How can children care about nature if they haven't experienced it firsthand? Adults must do what they can to ensure that children have those opportunities.” (Ward, Condie, Connecting Young Children With Nature, <http://www.naeyc.org/tyc/article/connecting-young-children-with-nature>)

Environmental benefits of natural areas

Parks reduce the “heat island” effect found in cities. According to the University of Washington's Center for Urban Horticulture, a mature tree canopy “reduces air temperature by about five to ten degrees.”

Trees in parks help improve air quality by removing pollutants from the atmosphere. Trees are especially important for filtering the air in cities, because urban areas have especially high concentrations of pollutants related to traffic, generators and other sources.

Each of the approximately 250 acres of trees at Turkey Mountain absorbs around the same amount of CO₂ emitted in a year as a car traveling 26,000 miles. (Arbor Environmental Alliance, <http://www.arborencvironmentalalliance.com/carbon-tree-facts.asp>)

TURKEY MOUNTAIN
Tulsa's Wild Place



TURKEY MOUNTAIN TRAIL, EARLY SPRING

PHOTO BY KELLY COOK

CONCLUSIONS

Turkey Mountain Wilderness Area is an important Tulsa resource, and is much-loved by the people who go there to exercise, walk their dogs, or simply get away from the noise and hubbub of the city. Once primarily a destination for mountain bikers, the park is enjoyed by hikers, runners, equestrians and families.

Turkey Mountain was once a secret treasure in the Tulsa area, but no longer: the word is out. The proposed Simon Properties mall development in 2015 gave it a great deal of attention, and visitors to the park in recent years have increased substantially. Its inclusion in the successful economic development portion of the 2016 Vision Tulsa tax plan is an indicator of how important Turkey Mountain has become to Tulsans. The passage of this plan means that a \$5.6 million loan from GKFF and QuikTrip to acquire land adjacent to the Turkey Mountain Wilderness Area will be repaid, and an additional \$2 million will be available for the park to use for a master plan, amenities and much-needed trail maintenance.

To keep Turkey Mountain a healthy and vibrant destination for future generations of Tulsans, and to make it an even bigger draw to people from outside our city who might eventually decide to move to Tulsa, a plan needs to be developed to ensure the park is properly cared for. The increased use of Turkey Mountain has led to more erosion on the trails, and increasing crowds of hikers and cyclists at the park increases the risk of collision accidents.

TURKEY MOUNTAIN
Tulsa's Wild Place





ROOTS, LEAVES AND MOSS

PHOTO BY KELLY COOK

POTENTIAL TURKEY MOUNTAIN FOOTPRINT
AND TAX INCREMENT FINANCED (TIF) DISTRICT



RECOMMENDATIONS

My recommendations for Turkey Mountain fall into the categories of land use, parking and roads, amenities, park rules, sustainability and measurement.

Land Use

- A master plan for Turkey Mountain should be developed, including policies for sustainable management of the wilderness area
- GKFF and City of Tulsa should permanently deed the land parcels they own to River Parks Authority, or renegotiate the existing leases to remove 30-day cancellation clauses
- River Parks Authority should acquire the land around water tower, if it has not already been acquired (~150 acres)
- A TIF district should be created on the land south of 61st Street, east of Highway 75 and west of Turkey Mountain Wilderness Area. Taxes from this TIF district would go toward the maintenance and enhancement of Turkey Mountain. This district, bisected by a northward extension of Olympia Avenue, would include retail, office and residential development. Large areas would be kept natural to retain the area's wilderness characteristics. The district would be designed to appeal to pedestrians and cyclists. Ideal retail candidates would be outdoor shops, bike shops and restaurants: the type of business that would attract and benefit from the many outdoor enthusiasts who visit Turkey Mountain Wilderness Area. Sustainable building practices, such as LEED-certified buildings should be employed to minimize the impact on the surrounding area. Parking garages should be built to service these retail and residential areas, to reduce the amount of surface parking required. The main roadway, Olympia Avenue, would be kept near the western edge of the district, to allow much of the central portion to be devoted to green space and trails. Residential areas would be located in the northeastern and southern portions of the district.

TURKEY MOUNTAIN
Tulsa's Wild Place





EQUESTRIANS NEAR THE BLUE TRAIL ENTRANCE

PHOTO BY KELLY COOK

PARKING AND ROAD RECOMMENDATIONS



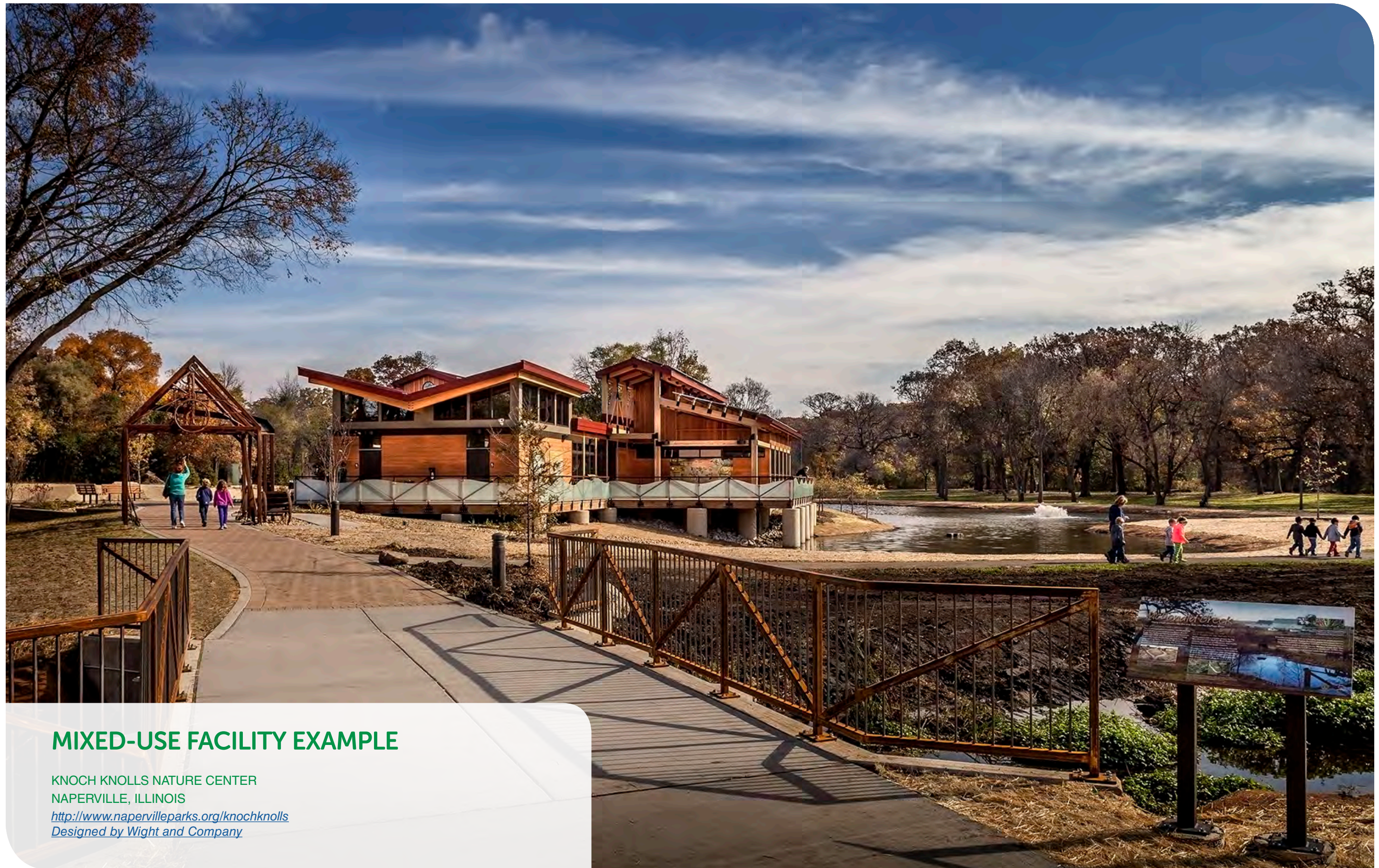
RECOMMENDATIONS, CONTINUED

Parking and Roads

- A parking lot should be added south of 71st Street to connect to Turkey Mountain via the existing Riverparks Trail system. The parking lot would connect to Turkey Mountain via a trail under 71st Street just west of the Arkansas River.
- A parking lot should be added to the recently-acquired parcel of land east of Highway 75 and north of 61st Street. I chose this area for parking and other amenities because many of the trees in this area were cleared in preparation for the mall development, so it would avoid cutting trees in a more forested area.
- Extend Olympia Avenue to the north from 71st Street to 61st Street.
- Close Elwood Avenue to through traffic. Install a gate at both ends of road so that the road can be opened for special events or emergency vehicles. This would allow pedestrians and cyclists to cross Elwood Avenue to reach the new parts of Turkey Mountain west of the existing park that surround the water tower without the dangers of crossing traffic. It would also eliminate the issues with illegal parking along Elwood Avenue by visitors to the park.
- Hold neighborhood meetings to discuss the pros and cons of building a road to connect the neighborhood west of Turkey Mountain to the Olympia Avenue extension to provide a connection to 61st Street.

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MIXED-USE FACILITY EXAMPLE

KNOCH KNOLLS NATURE CENTER
NAPERVILLE, ILLINOIS

<http://www.napervilleparks.org/knochknolls>
Designed by Wight and Company

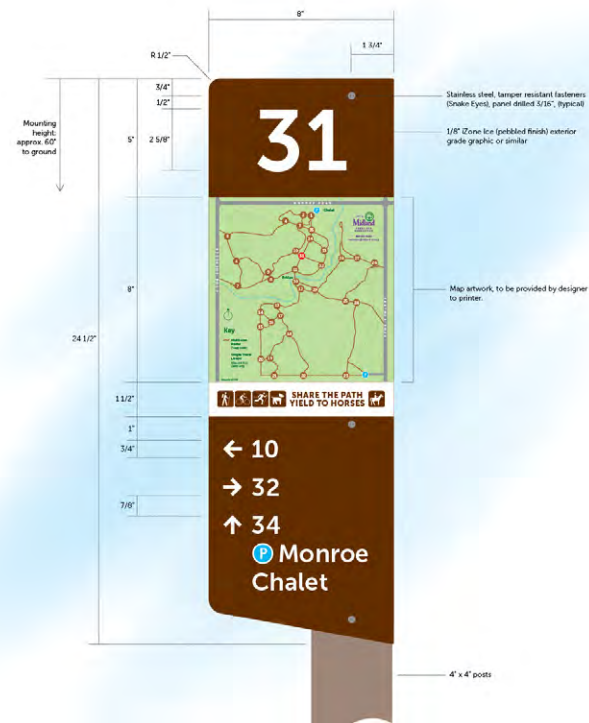
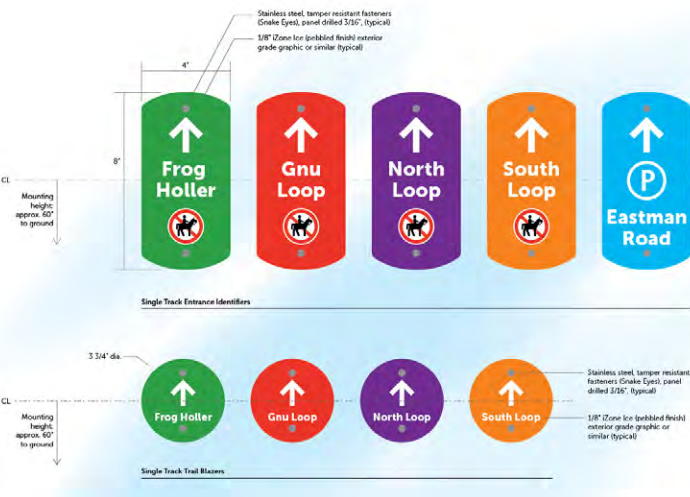
RECOMMENDATIONS, CONTINUED

Amenities

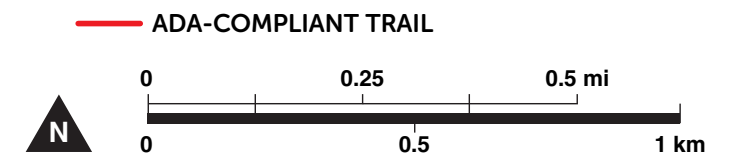
- Add a mixed-use facility to the 60-acre Highway 75/61st Street parcel to serve as a nature center and activity hub for Turkey Mountain. Nature center amenities could include parking, interpretive displays about Turkey Mountain's wildlife and history, mountain bike rentals, a retail bike/outdoor shop, a gift shop, café, classrooms, public restrooms and offices for River Parks and Tulsa Urban Wilderness Coalition staff.

A great example of a similar nature center is the Knoch Knolls Nature Center in Naperville, Illinois (rendering shown on the opposite page). The 6,300 square foot center was built with a budget of \$5.5 million in 2014. It includes exhibit space and classrooms and serves as a hub for the community. The nature-themed playground connects the nature center to park trails.

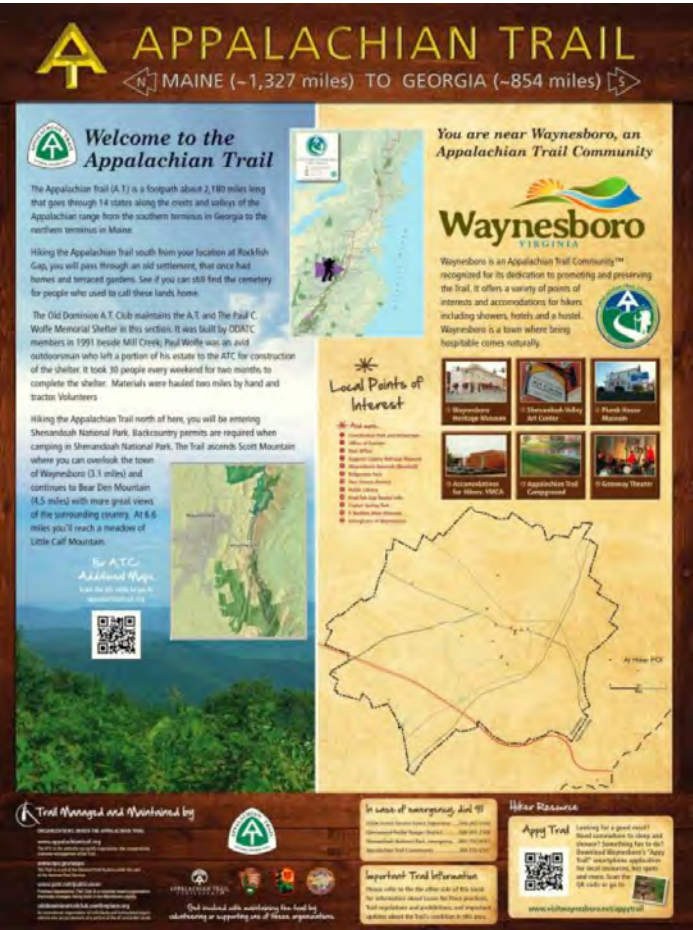
- Add an ADA-compliant trail to make the park accessible to individuals with limited mobility. The proposed location for the trail is just north of the Elwood parking lot. This area has a relatively gentle slope and would be easily accessible from the Elwood parking lot. The segment of the blue trail and the unmarked trails that cross the ADA trail should be removed and/or made off-limits to cyclists and equestrians.
- Enhance signage system for trailheads. Add directional pillars to improve way finding on trails.
- Add interpretive signage along trails to help educate visitors about tree species, geological formations, and wildlife (tracks, scat, etc.).
- Develop a bike park south of Turkey Mountain to provide local cyclists with a world-class venue and attract regional and national visitors



ADA-COMPLIANT TRAIL LOCATION RECOMMENDATION



Clockwise from left: Example of trail pillar signage and markers (<http://www.ullerysmith.com/midland-city-forest-trail-wayfinding-system/>). Top: Recommendation for ADA-compliant trail location at Turkey Mountain Wilderness Area. Upper-right: Example of trail information kiosk (<http://www.hudsongreenway.ny.gov/Libraries/Green/Water Trail kiosk in Croton-on-Hudson.sflb.ashx>). Lower-right: Example of a trail information poster that would be used to provide information and way finding on the trail. Note the QR codes (short for "quick response codes") on the map, which visitors can scan with smart phones to access maps and information about local points of interest (<https://www.appalachiantrail.org/docs/default-document-library/trailhead-kiosks-2012-update-to-the-bulletinboards.pdf?sfvrsn=0>).



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TURKEY MOUNTAIN VISITORS

PHOTO BY KELLY COOK



RECOMMENDATIONS, CONTINUED

Park Rules

- Designate certain trails as bike-only or pedestrian-only. Although so far I have been unable to find reports of accidents involving collisions between pedestrians and cyclists, as the park becomes more popular and crowded, it can be assumed that the risk for such collisions increases. Creating trails that are cyclist- or pedestrian-only would help reduce the risk of accidents on the trails.
- Change the Blue Trail from mixed-use to pedestrian-only.
- Create a new pedestrian-only trail in the newly-opened portion of the park around the water tower. The new Purple Trail would be a loop approximately 1.5 miles long, and would connect from the pedestrian-only blue trail to the east and the pink trail to the north.
- Enforce leash laws at Turkey Mountain. Many dog owners currently allow their dogs to run off-leash at Turkey Mountain, which raises the risk of a) a dog being injured by a passing bike; b) a visitor getting bitten by an off-leash dog; c) a cyclist being injured by colliding with a dog; or d) off-leash dogs getting injured in a fight. This has been a topic of much debate lately on the Turkey Mountain Trail Users Forum on Facebook, with most people coming down on the side of enforcing the existing leash laws.
- Close parking lots when park conditions are wet to avoid trail damage

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GIRL SCOUTS VOLUNTEERING AT CLEAN-UP DAY

PHOTO BY KELLY COOK

RECOMMENDATIONS, CONTINUED

Sustainability

Turkey Mountain Wilderness Area should use sustainable practices throughout the park, to serve as an example of best-in-class park management.

- Use long-lasting, environmentally-sustainable building materials.
- Encourage park visitors to recycle by placing recycling receptacles next to existing waste receptacles.
- Use recycled materials instead of new materials whenever possible.
- Use permeable materials for parking lots.
- Install green roofs on structures whenever possible.
- Minimize or eliminate use of pesticides and chemical fertilizers.
- Start a mulching and composting program for fallen limbs and grass clippings.
- Plant erosion-controlling plants in utility right-of-ways.

DIRECT AND INDIRECT EFFECTS OF RECREATIONAL TRAMPLING ON SOILS AND VEGETATION

Effects	Vegetation	Soil
Direct	Reduced height/vigor	Loss of organic litter
	Loss of ground vegetation, shrubs and trees	Soil exposure and compaction
	Introduction of non-native vegetation	Soil erosion
Indirect	Altered composition – shift to trampling resistant or non-native species	Reduced soil pore space and moisture, increased soil temperature
		Reduced soil fauna

Chart: Formal and Informal Trail Monitoring Protocols and Baseline Conditions:
Great Falls Park and Potomac Gorge, Jeremy Wimpey and Jeffrey Marion, January 2011



BARK, LICHENS AND PEBBLES ALONG TRAIL

PHOTO BY KELLY COOK

RECOMMENDATIONS, CONTINUED

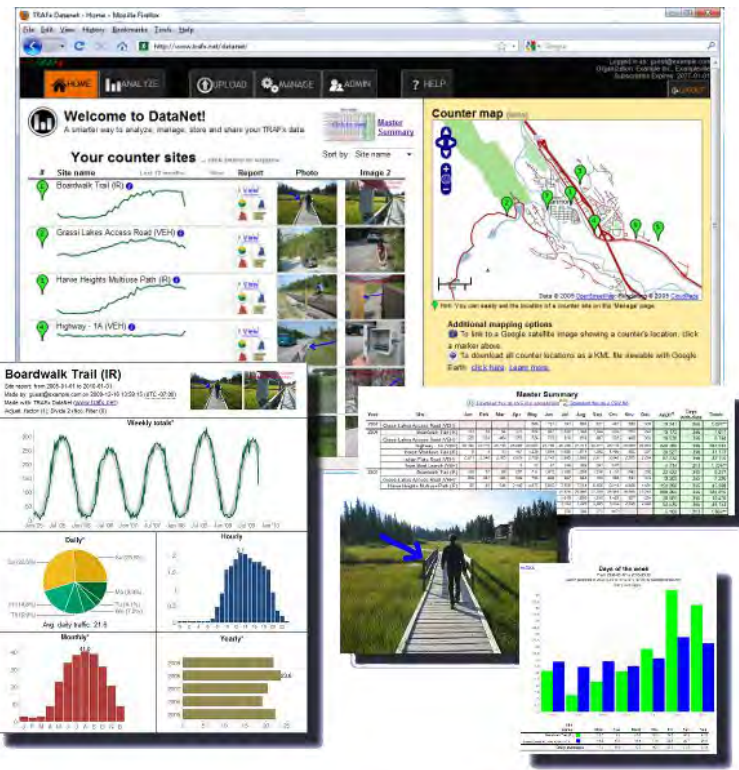
Measurement

- Install trail measurement technology in key entry points around park to measure number of pedestrians, cyclists and equestrians in order to provide ongoing user counts
- To determine Turkey Mountain’s economic impact on the city and how far people travel to visit, regular surveys should be conducted of park visitors. Gather ZIP code data and ask visitors whether they ate at a restaurant or stayed in a hotel to determine the economic activity generated by visits to Turkey Mountain.
- Install camera window posts in the park so visitors can take photos with their smart phones and post to a social media website such as Facebook or Twitter to create an ongoing record of trail conditions.
- Conduct a comprehensive environmental study of the park to serve as a baseline for future studies.
- Conduct regular environmental surveys to study wildlife and plant species in the park, and how they change over time.



Example of crowd-sourcing trail conditions to create an ongoing online record. This method could be used to monitor areas prone to erosion, and used by visitors to see trail conditions before a trip to the park.

Source: Kelly Cook



Infrared trail counters combined with customizable websites to display trail data can provide real-time visualizations of park visitors and trail usage.

Source: TRAFx, <https://www.trafx.net/products.htm>

TRAIL CONDITION CLASSES

Class 0: Trail barely distinguishable; no or minimal disturbance of vegetation and/or organic litter.

Class 1: Trail distinguishable; slight loss of vegetation cover and/or minimal disturbance of organic litter.

Class 2: Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use area.

Class 3: Vegetation cover lost and/or organic litter pulverized within the center of the tread, some bare soil exposed.

Class 4: Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil widespread.

Class 5: Soil erosion obvious, as indicated by exposed roots and rocks and/or gullying

Source: Jeffrey L. Marion

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VIEW OF ARKANSAS RIVER FROM THE YELLOW TRAIL

PHOTO BY KELLY COOK

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