

A Report for Memorial Park Conservancy

Communicating the Value of a Walk Through the Woods



Antonia Iyer • Yunmin Oh • Zoe Parker • Annum Sadana

About the Team



Zoe Parker is a senior from Stockbridge, Georgia. She is graduating in May with a double major in Environmental Science and Policy Studies and hopes to pursue a Master of Public Health in the future. Zoe is passionate about environmental justice and expanding access to nature for urban residents. Her favorite part of this project was exploring the trail system at Memorial Park.



Yunmin Oh is a senior from Seoul, South Korea. She is graduating in May with a double major in Cognitive Science and Psychology and would like to pursue a career in Human Centered Design/Human-Computer Interaction. She is interested in cognition, mental health, and interaction between humans and technology. She enjoyed applying literature findings to real-world problems through this project.



Annum Sadana is a junior from Houston, Texas. She is studying Social Policy Analysis with a Biochemistry Minor on a pre-med track. She's passionate about issues of social justice and how they impact health outcomes in different communities. Annum also loves to explore new coffee shops, listen to podcasts, and dance. She enjoyed speaking to MPC staff and learning about their experiences in Memorial Park and the trail system specifically.



Antonia Iyer is a senior from Houston, Texas. She is graduating in May with a double major in Political Science and Policy Studies. Her research interests lie in child health and education policy and the intersection between these areas. Additionally, she is passionate about local civic engagement and accessibility to the fine arts. Antonia enjoyed giving back to her Houston community through this project.

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Executive Summary

This report highlights how our Houston Action Research Team (HART) collected and synthesized information on Memorial Park infrastructure and usership, literature on mental health barriers and therapies, and best practices on mental health programming for target populations. We recommend that Memorial Park Conservancy (MPC) improve the existing trail structure and develop programming to increase the mental health benefits Memorial Park provides for the Houston community.

Our deliverable is two-fold:

- **Paths:** user-friendly signage and website content for Memorial Park trails to provide accurate information and communicate the mental health benefits of each trail
- **Programs:** recommendations for potential mental health programming and partnerships for target populations

The paths content, which is specific to each of the forested trails, can be utilized by MPC as it develops new trail signage in the coming years. We created dedicated content for each of the major Memorial Park trails: the purple, blue, yellow, orange, and green trails on the south side as well as the triangle trail on the northwest side. This includes a characterization of the trails, content for trailheads, and suggestions for infrastructure-related improvements.

The programming content consists of recommendations to invest in the mental health of our key populations: veterans and adolescents. We referred to the relevant academic literature and models of similar programs to develop these recommendations. When appropriate, a potential non-profit, local, or corporate partner is recommended to help MPC successfully implement the program.

These recommendations, developed in consideration of the current master planning initiatives, support MPC in its long-term goal of raising public awareness of the mental health benefits of urban forests and offer guidance for MPC to maximize these benefits for its users through targeted programming. Both the paths and programs aim to enhance the experience of regular Memorial Park users and draw in new users who can most benefit from the mental health benefits of coming to Memorial Park.

What is the value of a walk through the woods?

Green urbanism, an attempt to shape more sustainable places, communities, and lifestyles,¹ is an important component of sustainable and livable cities.² Although difficult to precisely define, sustainability refers to the ability of a society and its infrastructure to meet current needs and the needs of future populations.³ These can be human needs (e.g., food, electricity and clean water) as well as ecological or economic. Liveability is even more difficult to define but is often related to “quality of life,” “wellbeing,” and “satisfaction” of people living in the city.³ Parks and gardens in cities have aesthetic, health, and social benefits, which improve the quality of life for an increasingly urbanized society.² Densely populated megacities with inadequate provision of green spaces are associated with poorer mental health.⁴ Thus, it is important for cities such as Houston to provide green space from which a diverse set of communities can benefit.

Cities around the world are starting to incorporate green environments as important components of urban planning, given their potential for positive effects on mental health and cognitive function.² Natural outdoor environments are associated with significant reductions in mood disturbance and cortisol levels (a measure of stress) as well as heart rate variability compared with urban environments.^{5,6} Natural environments have restorative characteristics that can mitigate stress and aid in recovery from fatigue.² Research has shown that exposure to green spaces can be psychologically and physiologically restorative by improving mental health, reducing blood pressure and stress levels, as well as encouraging physical activity.^{2,7} Exposure to nature is also correlated with better sleep, reduced depression and anxiety, greater happiness, increased well-being and life satisfaction, reduced aggression, reduced ADHD symptoms, and increased social connectedness.⁴ Individuals, however, are not explicitly aware of these benefits and visit parks for a variety of reasons, especially “to witness nature,” “to meet others,” “for sport,” “to relax,” or “to be with children.” Surveys suggest that the experience of nature in an urban environment is a source of positive feelings and beneficial services, which fulfill important immaterial and non-consumptive human needs.

The positive effects of green space are significant for a broad range of groups. The sense of adventure that children experience in nature contributes to their development⁸ and can even result in improved performance on standardized tests.⁹ In a study of 4,338 twins, researchers found that access to green space was strongly correlated to decreased depression.¹⁰ Greater greenness was also found to be associated with reduced incidence of depression in older women (age 54–91) regardless of their level of physical activity.¹¹ These articles as well as other data also suggest that those who can access neighboring public parks from childhood through adulthood may experience slower rates of cognitive decline later in life.¹²

Additionally, not all green space is equivalent. “Aggregated green space” and “forest” correlate differently with general health.¹³ A study spanning twelve urban parks found that biodiversity (e.g., connection to nature, tree cover, and habitat diversity) account for 43% of the positive

psychological effect.¹⁴ Although a majority of the literature focuses on residential green space, visiting green spaces is correlated with higher mental health and vitality scores, independent of cultural and climatic contexts.¹⁵ Thus MPC's conservation efforts to preserve the diverse environment near the Southern Arc trails is especially crucial to the mental health benefit of those visiting the park from all across Houston.

Scope and Methods Overview

Green spaces have been found to have numerous mental, as well as physical, health benefits.^{11,16} As the largest urban forest in the Houston area with a wide variety of recreational opportunities,¹⁷ MPC is uniquely positioned to foster awareness of these benefits for both the general population and key groups that may particularly benefit through targeted programming at Memorial Park.

We initially compiled academic literature on the general mental health benefits of urban forests to accurately articulate the value of urban green space for mental health. Additionally, the team visited Memorial Park multiple times across the four-month project period and conferred with various MPC staff members to better understand how it could best support the park. These sources of information allowed the team to create trail signage and discern targeted populations that could particularly benefit from mental health programming at Memorial Park.

After determining these key populations, we synthesized literature that described these groups' experiences with urban forests. Summaries of twenty-three articles can be found in *Appendix A* and general findings are at the beginning of each programming section. Finally, the team developed group-specific program ideas and identified local organizations (including non-profits, corporations, and small businesses) with which MPC could partner to jumpstart these programs. These recommendations offer guidance to MPC on how to advance its goal of supporting the mental health of its users.

Paths

We began our project with a tour of Memorial Park to conduct initial observational research. During the tour we visited the Triangle Trail and gained information about trail navigation, user demographics, and trail management. After the tour, we identified some features that are barriers to trail usage. For example, there are overpass tunnels at both entrances of the Triangle Trail that pose safety and accessibility issues, especially for those Houston residents who lack experience with the Memorial Park trail system (Figure 1). In addition, the middle of the trail was blocked with wire without proper signage and failed to communicate safety to park users (Figure 2).

A literature review that examined correlates of urban trail use supports the significance of such issues by pointing out how the presence of drainage canals and tunnels is associated with 18% to 49% decrease in trail usage.¹⁸ Furthermore, through visits of Memorial Park, we found that there was little signage or information on what users might expect from walking or biking the trails. A review that investigated characteristics of urban parks also found that poor maintenance and the absence of user-friendly signage not only discourages park use, but also negatively affects perceptions of safety, functionality and park quality.¹⁹



Figure 1 (left). Presence of drainage canals and tunnels decreases trail usage and accessibility.

Figure 2 (right). Blocked trail without signage is disorienting and may invite exploration.

Because trail signage is positively correlated with both urban trail usage and perceptions of park safety, we believe that user-friendly sign content at trail heads will lead to increase usage of trails.^{18,19} In addition, as we explained in the earlier section, many researchers have established that exposure to green spaces is highly associated with mental health benefits. Yet, park users may not be aware of these benefits unless they have done extensive research themselves. Therefore, we recommend communicating the potential mental health benefits that trail users can gain from each trail in addition to providing accurate information about trails in sign content.

In order to create user-friendly sign content, we first wanted to better understand the user perspective of engaging with the trails. Our goals were to identify unique characteristics of each trail and provide accurate geographic information and sufficient descriptions of each trail so that new users would feel comfortable venturing into these urban forest spaces. To do this we both considered ourselves as new trail users as well as the experiences of others, including MPC staff. Considering the possible changes that the Master Plan might bring, we visited the six major trails (Purple, Blue, Yellow, Orange, Green, and Triangle) that will be maintained after its completion to record the unique characteristics of each trail and interview users along the trails. The details of how information was captured about each trail, who we talked to, and what we asked will be described in the next section.



Figure 3. Map of Memorial Park

Trail visits

To better analyze the issues of the current trail system (mainly signage and accessibility) and identify unique characteristics (i.e., topography, trail use, scenic views) of each trail, we visited the six major trails over the course of four months, from January to April 2019. Details of when we visited each trail can be found in *Appendix B*. During the visits, we recorded features of the trails including geographical components, scenery, noise level, physical accessibility, and our general observations and sensory experiences by taking pictures and notes. Pictures of each trail can be found in the Sign Content section. In addition, when we encountered trail users during the visits, we conducted a short interview with them by asking questions such as how frequently they visit the trail, what was their overall experience, and what, if anything, they would recommend to MPC to improve their experience. Details of user interviews can be found in *Appendix B*.

After each trail visit, we answered a series of reflection questions that we created to gain further insights and incorporate our personal experience. Reflection questions included (1) whether our actual experience aligned with our first impression of the trail, (2) what factors shaped our perception of the trail, (3) who would be the target audience for the trail, (4) what type of programming can happen with the trail specifically, (5) how was the experience navigating the trail (e.g., whether or not we needed technology support to navigate), (6) what could have improved our overall experience with the trail, and (7) how would we describe the trail in five words. These reflections can be found in *Appendix B*.

Interviews with MPC staff

We also conducted phone interviews with three members of the MPC staff who were regular trail users to get more information about the trails and insights as to what it is like to use the trail. We spoke with Hailey Darby, a Visitor Services Assistant, Anne Vance, an Annual Giving Manager, and Suzanne Formanek, an Operations Supervisor. During these interviews we asked about basic information for each trail including trail difficulty, trail mileage, how long it takes to hike the trail, audience, frequency of use of each trail, how they describe each trail, whether they see any major differences in usage between each trail, why do they think some of the trails are underutilized, their experience with each trail, and any recommendations or ideas on how to generate sign content that will best appeal to MPC. Notes from each phone interview with these members of the MPC staff can be found in *Appendix C*.

Based on the information and insights that we gained from the trail visits and phone interviews with MPC staff, we created user-friendly sign content that includes general descriptions of each trail and associated potential mental health benefits.

Sign Content

In this section, we provide general descriptions (topography, difficulty level, scenic view, and access points) of each trail as well as the associated potential mental health benefits. We constructed general descriptions of each trail based on our trail visits and interviews with MPC staff and identified potential mental health benefits for each trail based upon our literature review. For each trail, we list the signs we recommend along with text for each of those signs. Endnotes are provided to help with understanding where the information comes from, but should *not* be put on the actual signage. We also include suggestions to improve the individual trails to help maximize the potential mental health benefits.

Website Placement

The general descriptions we have provided for each trail may be incorporated onto the website for use of potential Memorial Park visitors. We have included both a written description and a visual representation of a proposed website map below.

Option 1: Visit Memorial Park → Memorial Park Map

- Trail descriptions would be provided below the Memorial Park map. This option would not require the creation of a new webpage; any hyperlinks could lead to this existing page.

Option 2: Visit Memorial Park → Park Offerings → Trails and Hiking → *New* Trails Page

- This option offers an opportunity to hyperlink to a new webpage that lists the general trail descriptions. The new webpage would be nested under the “Visit Memorial Park” link.

A SHARED PASSION FOR THE PARK

Whether for recreation or simply enjoying the outdoors, over four million people combination of amenities and nature, recreation and respite. Centrally located, commerce, as they head to work. Thirty miles of hiking trails provide a respite I amenities and facilities. Through sustained leadership, meaningful investment : organization, protects, restores and preserves Memorial Park for the enjoyment Houston Parks and Recreation Department. We believe the quality of life in Ho

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Trail Descriptions

Purple Trail Signage

General description (can be used on website or shared by visitors service staff)

The Purple Trail has a wide walking surface and is mostly flat. This makes it the most “beginner-friendly” of MPC’s natural surface trails. The trail is well-shaded by trees and features a variety of plant and tree species. The Purple Trail provides access points to the Red, Yellow, Blue, and Orange Trails.

Trailhead

The Purple Trail is the gateway to Memorial Park’s natural surface trails. Follow the trail markers for a leisurely, beginner-friendly 1.64-mile loop or choose your own adventure along the way.

Mid-Trail

A walk through nature can reduce fatigue and improve your mood.²⁰

Scenic view (bayou overlook/ravine at intersection with the Blue Trail)

Viewing natural landscapes can reduce feelings of stress. Take a moment to appreciate the beauty of Buffalo Bayou.²¹

Note for MPC Internal Use: In order to allow visitors an opportunity to reflect at this scenic point, a bench or some type of seating may be beneficial. Since the Purple Trail is highly trafficked relative to other trails at Memorial Park, a large bench that provides seating for multiple people would be ideal. As the Purple Trail intersects with many of the other trails in the Southern Arc trail system, first-time users will benefit from strategically placed way-finding signposts and maps that inform them where they are on the trail system.



Blue Trail Signage

General description (can be used on website or shared by visitors service staff)

The Blue Trail is a versatile trail. This secluded path offers the opportunity for several activities, from a relaxing walk to an adventurous bike ride. With a variety of narrow walking surfaces from steep to muddy to rocky, this trail is a moderate challenge for beginner hikers and experienced bikers.

Trailhead

The Blue Trail is a multi-use path. For novice hikers following the loop, expect around a 45-minute walk. Follow the trail markers for a moderately challenging one-mile loop or choose your own adventure along the way.

Mid-Trail

Living in an urban environment can put a strain on the mind and body.²² Simply being present in nature can boost positive emotions.²¹

Scenic view (bayou overlook/ravine where it intersects with the Purple Trail)

Viewing natural landscapes can reduce feelings of stress. Take a moment to appreciate the beauty of Buffalo Bayou.²¹

Note for MPC Internal Use: Clearer signage/markers at the loop-back point to stay on-path would be useful.



Yellow Trail Signage

General description (can be used on website or shared by visitors service staff)

The Yellow Trail has a narrow walking surface and has a lot of steep hills and drops. The trail might be muddy after rain. It is one of the most challenging among MPC's trails and attracts a lot of bikers. Keep your ears open for bikers sharing the narrow trail. The trail is well-shaded by the tree canopy which leads to a quieter environment as you go deeper and offers the chance to see wildlife. The Yellow Trail provides access points to the Purple and Orange Trails.

Trailhead

The Yellow Trail is heavily trafficked by bikers, walkers, and runners with dogs. Follow the trail markers for a challenging 0.91 mile (1.45 km) loop or choose your own adventure along the way.

Mid-Trail

Tackling challenging trails can improve your problem-solving skills. Hiking with your friends or family can build teamwork, cooperation, and social engagement.²³

Note for MPC Internal Use: To provide a clearer transition to different trails, signage that informs what trail (e.g., Purple or Orange) will be expected may be helpful.



Orange Trail Signage

General description (can be used on website or shared by visitors service staff)

The Orange Trail has a narrow walking surface with some steep hills but is generally flat. It also provides better access by having some wooden bridges along the trail. It is popular with bikers. This trail provides an opportunity for novice trail hikers to try something new and is open to anyone who likes adventure and a little bit of challenge. The Orange Trail provides access points to the Purple and Yellow trails.

Trailhead

The Orange Trail is heavily trafficked by cyclists, walkers, and runners with dogs. Follow the trail markers for 0.86 mile (1.38 km) loop or choose your own adventure along the way.

Mid-Trail

Escaping in nature allows you to leave the world behind. Walking in the woods may decrease your “stress hormones.”²⁴ Viewing nature can help you recover from stress, fatigue, and sickness.²⁵ Listening to nature can also restore your good mood.²⁶

Note for MPC Internal Use: To provide a better transition to different trails, signage that informs which way to exit (e.g., three different routes to Purple) may be helpful.



Triangle Signage

General description (can be used on website or shared by visitors service staff)

The Triangle is for those looking to go off the beaten path. With continuous elevation changes and challenging terrain, this trail is an energizing workout for both hikers and bikers. It is located in the Northwest corner of the park (separate from the main trail system) and can be accessed via either entrance off Memorial Drive and Woodway Drive. For easiest access, park at the Running Trails Center.

Trailhead (needed at both entrances)

Walk through the underpass tunnel to begin your journey on the Triangle. For beginner hikers, expect up to a 40-minute walk from start to finish.

Mid-Trail

Outdoor exercise in green space can strengthen you both physically and mentally.²⁰

Note for MPC Internal Use: Clearer signage should be provided at the start of the trailhead (including a map) as well as *on the way to the Triangle entrances* (e.g., from the Running Trails Center). At the mid-trail point, there should also be clearer signage to distinguish the Triangle path from the Hogg Woods path.



Green Trail Signage

General description (can be used on website or shared by visitors service staff)

The Green Trail is for those looking to experience a forested retreat from the hustle and bustle of Houston. This trail makes a great short workout for bikers and hikers both. Looking to go on this trail? Park near the Running Trails Center and walk along the sidewalk until you see the trailhead located near the Memorial Park gates.

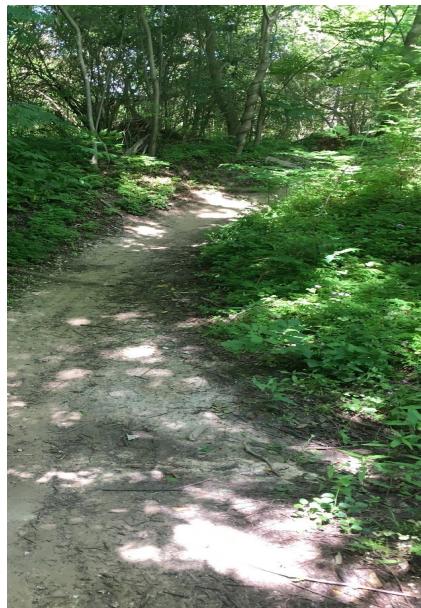
Trailhead (needed at both entrances)

Unlike the other trails in the Southern trail system, the Green trail does not loop back on itself. Expect a 45-minute hike one way from trailhead to trailhead.

Mid-Trail (at bench overlook)

Take a moment here to pause - studies show that even twenty minutes in green space can be good for your mental health.²⁷

NOTE for MPC Internal Use: Clearer signage should be provided at the start of the trailhead (including a map) as well as on the way to the Green Trail entrances (e.g., from the Running Trails Center).



Programs

The following section outlines programmatic recommendations that promote mental health benefits for visitors of Memorial Park. Research on the park's existing programming and conversations with MPC staff aided us in identifying two special populations to target with programming that could support mental wellbeing: veterans and teenagers. While these two populations are not exhaustive of all groups that may benefit from targeted mental health programs, we consulted with MPC staff to determine that these groups encompass populations that MPC would like to attract to the park and that have unique ties to Memorial Park's mission or can provide a unique resource to Memorial Park, respectively.

To maximize the capacity of MPC to expand its program offerings for veterans without overburdening staff with additional workload, we identified local nonprofits and corporations that could serve as collaborators. To select the organizations, we consulted with Dr. Winifred Hamilton from Baylor College of Medicine. Dr. Hamilton's extensive knowledge of local health-related organizations allowed her to suggest well-respected organizations that offer mental health-related programming. We also conducted an extensive internet search to identify local organizations with a mental health mission or that offered existing programs we thought could be implemented at Memorial Park. We aimed to select organizations that encompass a diverse array of programming and expertise, yet share a common theme of mental health promotion and education.

Our recommendations for teen-focused programming involve the development of an additional volunteer program at Memorial Park. We conducted a literature review to support our selection of teens as a target population and to clarify the connection to this project's mental health-related goals. Because this project would involve a significant commitment from MPC, we provided suggestions for the potential structure and implementation of the program.

Our programmatic recommendations are presented as a resource for MPC staff moving forward with implementation. We envision the collaborations and programs suggested to be implemented primarily by the Visitors Services department, although particular programs may benefit from involvement by the Conservation, Marketing, and Development departments. We provide a literature review on each group's mental health needs, specific program ideas, and suggested organizations for collaboration for the two selected populations. In the case of new programming ideas that have not yet been established by a collaborator, we have provided more detailed implementation suggestions for MPC.

Veterans Programming

This section provides the context for why Memorial Park is in a unique position to offer programs for veterans. Next, it illustrates how veterans will benefit from visits and activities at Memorial Park. Finally, it provides three viable options to involve veterans in the park and includes partners that can help Memorial Park achieve this programming.

Memorial Park's Veteran Connection

Memorial Park attributes not only its name but also its existence in large part to those who served to protect our nation in times of war. In 1917, when the United States entered the First World War, the War Department leased 7,600 acres of forested land on Buffalo Bayou to establish a training base named Camp Logan. This history was described in the HART report: Preserving the History and Legacy of Camp Logan.²⁹ Nearly 1,000 Camp Logan soldiers lost their lives during the war and over 6,200 were wounded. Afterward, with Camp Logan deserted, Catherine Mary Emmott advocated for the use of some of the land to memorialize the men who had served there.²⁸ Continuing in this effort to be a park that serves members of the military, and with the Master Plan's component to create a Camp Logan Memorial, it is important to make Memorial Park welcoming and beneficial to that population's needs. Programming specific for veterans provides a unique opportunity for MPC to support this community and their mental health.

Veterans' Mental Health

PTSD

Veterans' experiences in combat often leave them with trauma, and rates of post-traumatic stress disorder (PTSD) reach as high as 30% in the United States (U.S.) veteran population.²⁹ Furthermore, 50% of those with PTSD do not seek treatment.³⁰ For many veterans, memories of wartime experiences can still be upsetting long after they served. Many older veterans find they have PTSD symptoms even 50 or more years after their wartime experiences.³¹ Symptoms of PTSD include intrusively recollecting images or thoughts, having nightmares or trouble falling asleep, trying to avoid all reminders or media about their incidents, shying away from social situations, or being easily startled and irritated.³²

Depression

In 2008, VA estimated that about 1 in 3 veterans visiting primary care clinics has some symptoms of depression; 1 in 5 has serious symptoms that suggest the need for further evaluation for major depression; and 1 in 8 to 10 has major depression, requiring treatment with psychotherapy or antidepressants.³³

Substance Abuse

By one estimate, 25 percent of returning Iraq and Afghanistan veterans showed signs of substance abuse disorder.³⁴ Another study by the National Institute of Drug Abuse showed that in 2008 active duty and veteran military personnel abused prescription drugs at a rate that was more than twice the rate for the civilian population.³⁴

Other

There is also a high co-prevalence of other psychiatric (e.g., depression, substance misuse, and anxiety disorders) and behavioral disorders (e.g., chronic pain and sleep disorders) among recent veterans of the wars in Iraq and Afghanistan.³⁵ In one study, over 90% of the cohort was diagnosed with a current psychiatric or behavioral condition, and 50% had three or more psychiatric and behavioral comorbidities.³⁵ Additionally veterans in this group struggle with difficulties in postdeployment functioning, particularly in social and occupational roles.³⁵

Nature-based interventions for Veterans' mental health

Nature-based therapy is a therapeutic intervention based on experiences in a natural setting that incorporates plants, natural materials, and the outdoor environment. It emerged in the UK and US after WWI and WWII to offer therapy to soldiers suffering from traumatic experiences after active service in these wars.³⁶

Compared with traditional therapies, nature-based therapy provides many advantages.³⁷ Conventional therapies such as psychotherapy and medication have high dropout rates because they often reinforce veterans' combat stress or PTSD symptoms.^{38,39,40} For veterans, seeking help for mental health problems is often related to perceived stigma and can lead to high rates of dropout when they are treated with conventional therapies such as Cognitive Behavioral Therapy, which require them to engage with memories of trauma.^{41,40} If veterans who suffer from PTSD have cognitive impairment, they will not get the full benefit of CBT as it requires intense concentration.^{40,42} Receiving therapy in nature provides veterans a way to seek help and potentially improve their mental functioning without the stress of CBT.³⁷

We decided to focus on the two most well-identified nature-based interventions for veterans' mental health. Although these interventions were originally designed for veterans, a growing number of studies suggest they can have a positive impact on anyone with depression, anxiety, anger, or attention-deficit disorder.⁴³⁻⁴⁶ One form of nature-based intervention is focused on mindfulness, whereas the other is focused on adventure. These two types of nature-based interventions will be further explained in the next section as we generated programming recommendations based on these two models.

Programming Recommendations

As an increasing number of studies find that nature can be used as a restorative and reflective healing place, we propose three distinct nature-based programs for targeting veterans based on already existing nature-based interventions.^{36,37,47–51}

Idea 1: Meditative Walks in Nature for Veterans

Our first programming idea, based on mindfulness, is targeted to veterans who want to experience reflective time in nature and to restore their mind and body. Mindfulness is a mental state achieved by focusing one's awareness on the present moment, while calmly acknowledging and accepting one's feelings, thoughts, and bodily sensations.⁴² Therefore, this programming is less physical but more meditative.

Meditative walks involve mindfulness activities and applied mindfulness techniques such as breathing and dynamic yoga exercises in nature.⁵² In addition, this type of intervention imparts nature-related knowledge including narratives about special plants, birds breeding and seasonal changes in the forest to veterans. Using nature as a setting provides an atmosphere that acts as a catalyst for healing the mind.³⁶

Individual therapeutic sessions can also be incorporated during these walks in nature. Many studies found that veterans not only reported improved physical and mental well-being but such therapy also enhanced their ability to deal with PTSD symptoms in everyday life.^{36,47,48} Greater social outcomes (e.g., better family function), increased capacity for direct attention, a higher level of engagement, and reduced stress levels were also observed.³⁶ We recommend working with mental health organizations as partners to provide these individual therapy sessions.

MPC would be responsible for providing a valuable environment to both mental health organizations and the Houston veteran community. Ideal locations for this intervention would be Purple, Blue, Green, and Orange trails because these trails are easy to intermediate in level of difficulty. In particular, the Green Trail provides a bench and the Orange Trail offers a big tree trunk in the middle of the trail; these could be used as reflective spaces for those in the therapy session to sit, talk, or and engage in meditation.

We reached out to Mental Health America of Greater Houston, US Veterans Initiative, and Combined Arms regarding this style of . T'Liza Kiel, the director of the veterans' programs at Mental Health America of Greater Houston would be interested in meeting to discuss this further. US Veterans Initiative offers counseling programs that provide professional mental health services for eligible veterans. The program not only provides direct clinical intervention services to veterans with PTSD and/or other mental health concerns but also offers diverse types of services including individual psychotherapy and crisis intervention to assist veterans in the healing process, cultivate positive change behaviors, and live enriched and healthier lives.⁴⁹ We suggest following up with Stasea Waller, the communications manager for US Vets Initiative, to

discuss the possibility of integrating their existing programming with meditative walks at Memorial Park in the future. Although Combined Arms does not offer programs itself, it is well known within the veterans community and has an extensive network and resources that would be helpful for veterans. Bryan Escobedo, operations manager for Combined Arms, asked us to include their contact information as a potential partner with MPC.

Idea 2: Trail Adventures for Veterans

Based on Nature-Adventure Rehabilitation, our second programming idea, trail adventure programming, is targeted to veterans who prefer physical, outdoor and group activities such as hiking, trekking, cycling, and camping. Nature Adventure Rehabilitation (NAR) is a supplemental intervention to CBT and Exposure Therapy (ET) for those who are not yet ready to engage, have not improved significantly, or have been treatment dropouts for the previously mentioned evidence-based approaches.⁴⁹ It is a “group” rehabilitative approach, which focuses on activities that involve challenges through pre-planned tasks to foster personal growth and group cooperation in a natural environment. Common activities include trekking, wilderness activities, cycling, and other adventure stimulation, all of which could be done at Memorial Park.

This type of rehabilitation is health-oriented instead of pathology-oriented thus reducing the stigma attached.⁴⁹ Research from randomized clinical trials finds that over the course of NAR implementation, veterans’ post-traumatic symptoms and depression were reduced while their emotional and social quality of life, perceived control over illness, and hope and functioning were significantly improved.^{49–51} Additionally, the focus on sporting activity, rather than traditional therapy, allows for alignment with resources already available at Memorial Park. Given the topography of Memorial Park, hiking the trails and cycling are the most ideal and feasible programming ideas. The ultimate goal of this programming is to help veterans build camaraderie, outdoor skills, and achieve personal growth in the context of a team-based, therapeutic adventure model. Ideal locations would be Yellow, Orange, Triangle, and Green trails, which are more intense and challenging trails per our observations and conversations with park staff.

Outward Bound for Veterans currently provides programming which follows the Nature Adventure Rehabilitation model and helps thousands of returning service members and recent veterans readjust to life at home through powerful wilderness courses that draw on the healing benefit of teamwork and challenge through the use of the natural world.⁵³ By taking part in wilderness expeditions that are physically, mentally and emotionally challenging and purposefully scaffold familiar experiences with authentic achievements veterans build self-confidence, pride, trust and communication skills leading to positive emotional and mental outcomes. Peter Steinhauser at Outward Bound is eager to continue talking about potential future programming with MPC using their existing model.

Wounded Warrior Project is another potential partner. Their focus is on specific veterans as they define warrior as “veterans and service members who incurred a physical or mental injury, illness, or wound while serving in the military on or after September 11, 2001.” Their mission is to assist

every veteran, family member, and caregiver to have a better transition to civilian life. One of their well-known programs, “Project Odyssey,” provides an opportunity for veterans to overcome the obstacles they face by offering activities such as hiking, scavenger hunts, and rock-climbing. These activities could easily take place at Memorial Park. Project Odyssey is a 90-day mental health program that begins with a five-day rehabilitative event that provides warriors with communication and resiliency skills to cope with PTSD and other military service-related stressors. Using the power of nature as a backdrop, warriors and caregivers get to take a step back from everyday routines. This allows them to gain a new perspective on life back home. The program offers warriors ways to manage and live a productive and fulfilling life with the invisible wounds of war. Ryan Kules at Wounded Warrior Project is interested in discussing the possibilities of working with Memorial Park and provided the description of their programming above.

Idea 3: Solidarity Run with Veterans -- In partnership with Team Red, White and Blue Houston

Our third programming idea is to collaborate with Team Red White and Blue to host their “Run as One” event at Memorial Park every year—ideally on Veterans Day or Memorial Day. Run As One is a unique engagement opportunity where members of Team Red, White & Blue, Team Rubicon, and The Mission Continues, along with members of their community and veteran supporters come together for a day of solidarity to showcase how exercise, community, and inclusivity combine to combat mental health challenges.⁵⁴ Run As One began in 2012 and continues to showcase the power of unity and physical fitness with the remembrance of Clay Hunt, who took his own life after battling PTSD and depression.⁵⁴ Run As One strengthens bonds among veterans, providing them with social support and community. This event also provides an opportunity to strengthen the relationship between average Houstonians and the growing veteran population in Houston and can help Houstonians in making the linkage between Memorial Park and veterans more broadly. Not only does this program provide value to veterans in Houston, it supports the efforts of Memorial Park to highlight the importance of soldiers in the Park’s history and encourage veterans to attend wellbeing programming at Memorial Park or take stewardship of Memorial Park’s immense resources. Jude Betancourt, Chapter Captain at Team RWB Houston connected us with Michael Murphy, their Veterans Engagement Director who is happy to serve as the contact for such programming and excited for any partnership that makes an impact on local veterans.

Contact Information for Veterans Programming

Idea 1: Meditative Walks in Nature for Veterans

Partner	Contact Name	Email	Phone Number	Website	Address
Mental Health America of Greater Houston	T'Liza Kiel	tkiel@mhahouston.org info@mhahouston.org	713-523-8963	https://mhahouston.org/	2211 Norfolk, Suite 810 Houston, TX 77098
US Veterans Initiative	Stasea Waller	swaller@usvetsinc.org	Stasea Waller: 832.390.3628 832.203.1626	https://www.usvetsinc.org/houston/	1418 Preston St #2 Houston, TX 77002
Combined Arms	Bryan Escobedo, Operations Manager	bescobedo@combinedarms.us	832.450.0588	https://www.combinedarms.us	2929 McKinney St, Houston, TX 77003

Idea 2: Trail Adventures for Veterans

Partner	Contact Name	Email	Phone Number	Website	Address
Outward Bound for Veterans	Peter Steinhauser, Executive Director	psteinhauser@outwardbound.org	773.339.0044	https://www.outwardbound.org/veteran-adventures/outward-bound-for-veterans/	910 Jackson St, Suite 140, Golden, CO 80401
Wounded Warrior Project	Ryan Kules, combat stress recovery director	RKules@woundedwarriorproject.org	O: 202.644.9144 M: 202.425.9272 F: 202.898.0301	https://www.woundedwarriorproject.org/programs/combat-stress-recovery-program	2200 Space Park Dr Suite 100 Houston, TX 77058

Idea 3: Solidarity Run with Veterans

Partner	Contact Name	Email	Phone Number	Website	Address
Red, White and Blue	Michael Murphy, Veterans Engagement Director	michael.murphy@teamrwb.org	832.813.2214	https://www.teamrwb.org/event/run-as-one-virtual/	

Teen Programming

This section describes a proposal for the implementation of a structured teen volunteer program at Memorial Park. It begins with an evidence-based justification for a teen-focused program. The latter half of the section describes the intended goals of a teen-focused volunteer program and outlines details of the program's structure.

The importance of connecting Houston teens to nature

The existing volunteer program at Memorial Park is an asset that may be utilized to promote mental health and wellbeing. Currently, opportunities to participate in conservation or trail maintenance activities are concentrated on weekdays and primarily restricted to adults over the age of 18.⁵⁵ These time and age restrictions effectively exclude a group that may benefit greatly from the mental health benefits of nature exposure: teenagers.

Teens are impacted by a variety of stressors, such as the pressures of social media,^{56,57} academic demands,⁵⁸ and increasingly competitive college admissions.⁵⁹ The computer-based nature of social media and schoolwork often results in teens spending increasingly long hours in front of digital screens and consequently fewer hours outdoors. In addition, Houston teens are also subject to the nuisances of urban living, like crowding, noise pollution, and traffic.⁶⁰ These stressors can contribute negatively to teens' mental wellbeing. The most recent data from the National Institute of Mental Health notes that in 2017, 13.3% of teens experienced a major depressive episode,⁶¹ while 31.9% suffered from an anxiety disorder.⁶²

Exposure to green space can help to counteract these stressors and improve teens' mental wellbeing.⁶⁰ Particularly for teens who lack access to private green space at their home, public spaces like Memorial Park provide critical access to nature.⁶³ The teenage group tends to fall outside the boundaries of most youth-focused programming, yet often cannot participate in adult-focused volunteer programs due to the time and age restrictions mentioned above. A teen-focused volunteer summer program at Memorial Park would increase the number of teens involved in active nature experiences, while at the same time provide them with nature-based mental wellbeing benefits.

Furthermore, teens may gain additional mental health benefits through the act of simply volunteering.⁶⁴ Literature suggests that volunteering can provide individuals with social connections and a sense of purpose, both of which are positively correlated with psychological wellbeing.⁶⁴ Regular, long-term volunteering reduces the likelihood of experiencing a depressive episode and increases levels of self-reported happiness.⁶⁵ Environmentally-focused volunteerism, in particular, is highly associated with satisfaction gained from positively contributing to environmental causes, learning new skills, and becoming more connected to the natural world.⁶⁶

A volunteer program at Memorial Park would allow teens to access significant mental health benefits during an objectively stressful life period, without the stigma of explicitly seeking mental health treatment. Even those teens that do not experience defined psychological issues like depression and anxiety may find value in the opportunity to form social connections and make a positive contribution.

The value of teen volunteers to MPC

In addition to providing benefits to Houston teens, a teen volunteer summer program would also be valuable to MPC. First, a cohort of consistent teen volunteers would strengthen the volunteer base at Memorial Park. According to Daniel Millikin, the Conservation Programs Manager at MPC, the park has struggled to build a consistent rotation of regular volunteers, despite high turnout at special events and among corporate groups. A structured teen volunteer program would create an additional pool of knowledgeable and trained MPC “employees.” Teen volunteers would not be held to the same level of responsibility as MPC staff or interns, but they could supplement these positions by giving tours during peak visiting season or assisting with conservation efforts at the park. Furthermore, the teen volunteer program may serve as a pipeline into college-level intern programs or entry-level employment at Memorial Park.

Additionally, a teen volunteer program would likely attract an additional visitor base to Memorial Park. In discussions with our team, Carolyn White, the Conservation Director at MPC, expressed her desire to draw a larger and more diverse audience to the park and to the trail system in particular. To this end, a teen volunteer program may attract teens and families that would otherwise be unlikely to utilize the park. It is common for high schoolers to seek out summer opportunities to enhance their college applications, fulfill required volunteer service hours, or to simply occupy themselves while not in school. Even if the teens attracted to the volunteer program for the aforementioned reasons are not familiar with or interested in MPC’s conservation mission, their participation in the program may spur new interest in visiting the park in the future. Furthermore, strategic and widespread advertising for the program can be used to draw in students from a wide range of high schools throughout Houston.

The “Teen Team” at Memorial Park

This subsection provides an outline of a teen-focused volunteer program at Memorial Park. It includes a sample program structure, suggestions for administration, and recommendations for advertising.

Program Goals

1. Connect Houston teens to nature through Memorial Park Conservancy.
2. Empower teens to further Memorial Park's conservation mission and promote nature-based mental health benefits.

Program Structure

Overview: The “Teen Team” at Memorial Park is a cohort of teenage volunteers that help to advance MPC’s mission by assisting with conservation projects and enhancing visitors’ park experience.

Participant Ages: The Teen Team is geared toward Houston-area high school students. It is open to teens ages 14-17. Eligible teens must be at least 14 years old by the start of the program and no older than 17 by the conclusion of the program.

NOTE: While a portion of high schoolers may be over the age of 17, restricting the age range helps ensures that the program serves its targeted audience. High schoolers 18 and older are eligible to participate in adult volunteer programs at Memorial Park.

Dates and Duration: The program takes place during the summer vacation when school is out of session. The earliest start dates and the latest end dates should align with the schedule of the Houston Independent School District to maximize the number of teens available to participate. In order to make the time commitment manageable, the program should not require a full summer commitment from participants. Two, independent 5-week sessions align well with the 4th of July vacation and allow teens to choose whether they would like to commit a half summer or a full summer to the program.

Exact daily start and end times are dependent upon the schedule kept by MPC staff, but an 8:30 am-4:30 pm schedule aligns closely with the hours kept by high schools in the Houston Independent School District.

Cost for Participants: Because the Teen Team is a volunteer program, participants are unpaid. The program is free to participants. Though a fee charged to participants may help to offset the cost of administering the program, it would likely limit the number of teens who are able to participate.

Selection: To control the volume of participants, an application process should be implemented. The application should not be exhaustive or unnecessarily exclusive. However, the application process may help to determine applicants’ interest in and intended commitment to the program. Application questions may include “What makes you a good candidate for the Teen Team?” and “What do you hope to learn from being apart of the Teen Team?”, for example.

Cohort size: The exact size of the Teen Team cohort is dependent on the volume of applications each session and availability of supervisory staff for the program. Teen volunteers will need to be supervised by at least one adult staff member at MPC. At minimum, at least one supervisory staff should be available for every 10 teens. However, a cohort any larger than 20 teens may prove difficult to administer, supervise, and find appropriate work for.

Orientation and Training: Since it is likely the first time that many teen volunteers will be performing conservation work, mandatory training should be incorporated into the program. In the initial orientation period, participants should be familiarized with the geography of Memorial Park, as well as the park's common flora and fauna. Participants should also be taught how to safely operate basic tools used in conservation and trail maintenance activities, such as shovels, hedge shears, and hand pruners.

Liability: Because members of the Teen Team are under 18 years of age, they must sign a liability waiver. An existing waiver for volunteers is available on the Memorial Park website, on the "Volunteer" page.

Activities: The activities that teen volunteers participate in should directly advance Memorial Park's conservation mission or promote awareness of nature-based mental health benefits. The most in-demand volunteer services at Memorial Park, as identified by Daniel Millikin, are invasive species removal, native species planting, mulch and compost distribution, and other miscellaneous trail conservation work. Participation in conservation work may also confer mental health benefits upon teen volunteers. Literature suggests that gardening, or *horticultural therapy* more formally, can have significant psychological benefits.⁶⁷ While trail maintenance is not identical to more conventional gardening, it may have similar effects on mental wellbeing.

In addition to conservation work, a portion of teen volunteers' time should be devoted to guest interaction and the promotion of Memorial Park's mental wellbeing benefits. Within the Teen Team, a "Junior Docent" role would allow teen volunteers the opportunity to give guided tours of the trails to individuals and small groups that request accompaniment. These guided tours can serve as an opportunity to discuss and promote nature-based mental wellbeing benefits through fact sharing.

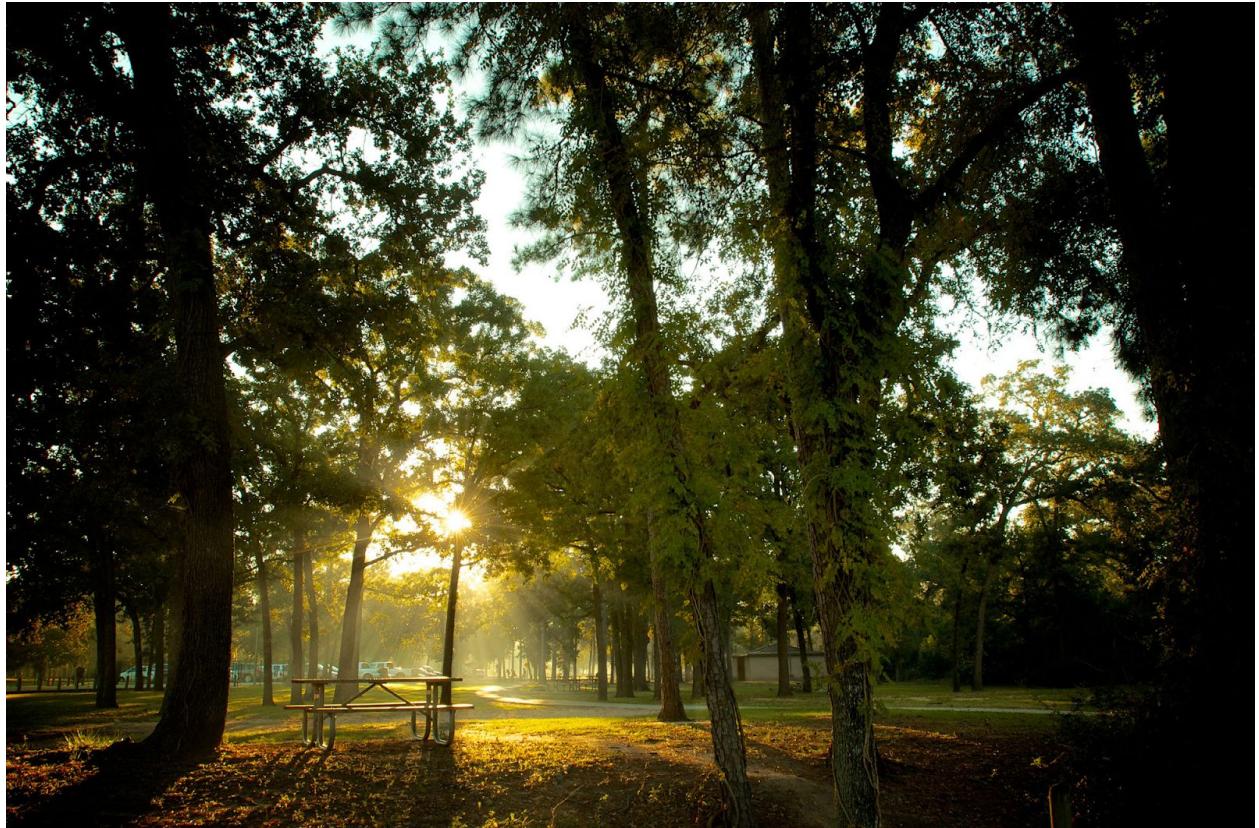
Program Administration

Staffing: As mentioned previously, The "Teen Team" requires at least one supervisory staff member. However, this staff member could also be a summer intern with interests in environmental education, volunteer administration, or conservation. Teen volunteers may find a collegiate-age volunteer to be more relatable, as well as a good source of knowledge. Additionally, the seasonal schedule of many interns aligns with the duration of the teen volunteer program.

Funding: The implementation of an entirely new volunteer program will require funding from MPC. Some program costs, like volunteer t-shirts or additional tools, may be able to be acquired through donation or grant funding. One source of funding may be Rice University's Center for Civic Leadership, whose Philanthropy in Theory and Action course provides students with the means to award grants to nonprofit organizations each year.

Advertisement: Program advertising should aim to reach a broad audience across Houston, not just in the neighborhood immediately surrounding Memorial Park. Currently, park volunteers are recruited primarily through the MPC website. In order to appeal to and access a high number of teens, multiple forms of advertising should be used. Posting should be placed on websites specifically targeting teens seeking volunteer opportunities, such as teenlife.com and serveforgood.org. Both public and private Houston high schools should be provided with information, such as a sample email or paper flyers, to disseminate to their students. Lastly, MPC should utilize its Facebook, Twitter, and Instagram accounts to publicize the program.

Appendices



https://kinderfoundation.org/major-gifts/urban-green-space/memorial-park/memorial-park-sunrise_courtesy-of-memorial-park-conservancy/

Appendix A: Annotated Bibliography

Green Space & Mental/Physical Health

Banay, Rachel F., Peter James, Jaime E. Hart, Laura D. Kubzansky, Donna Spiegelman, Olivia I. Okereke, John D. Spengler, and Francine Laden. Greenness and Depression Incidence among Older Women. *Environmental health perspectives* 127, (2019)

- This study examines surrounding residential greenness and depression risk prospectively in the Nurses' Health Study.
- Method: A total of 38,947 women (mean age throughout follow-up 70 yr [range 54–91 yr]) without depression in 2000 were followed to 2010. (mostly old white women).
- Key finding: In this population of mostly white women, we estimated an inverse association between the highest level of surrounding summer greenness and the risk of self-reported depression. Greater greenness to be associated with reduced incidence of depression, strengthening the evidence base supporting the greenness–mental health relationship. *Yet, did not find evidence of the association between greenness and depression appear to be mediated by physical activity.

Orioli, R. et al. Exposure to Residential Greenness as a Predictor of Cause-Specific Mortality and Stroke Incidence in the Rome Longitudinal Study. *Environmental Health Perspectives* 127, 027002 (2019).

- This longitudinal study estimates associations of two measures of residential greenness exposure with cause-specific mortality and stroke incidence.
- Methods: population-based cohort of 1,263,721 residents in Rome (city) aged ≥30y, followed from 2001 to 2013
 - Background: Urban settings are often characterized by artificial environments and buildings, high levels of stress, traffic, noise, air pollution, and heat, and the opportunities to have contact with nature are rare.
 - biophilia hypothesis: human beings have developed an innate affinity for natural environments and other forms of life through the evolution processes ([Wilson 1984](#)). Exposure to greenness and access to green spaces for urbanites may have a positive influence on their health through a variety of mechanisms.
- Finding: Living in greener areas was associated with better health outcomes, which could be partly due to reduced exposure to environmental hazards.

Kua, E. H. & Sia, A. Green Environment and Mental Health in the City. in *Mental Health and Illness in the City* (eds. Jorgensen, P. M., Okkels, N. & Kristiansen, C. B.) 1–20 (Springer Singapore, 2016).

- Background:
 - Green urbanism is an important component of sustainable and liveable cities in developed and developing countries. Parks and gardens in cities have aesthetic, health, and social benefits, and they improve the quality of life in an increasingly urbanized society. Densely populated megacities with inadequate provision of green spaces are associated with poorer mental health.
 - The natural environments have restorative characteristics which could mitigate stress and aid in the recovery from fatigue. Research has shown that exposure to green spaces can be psychologically and physiologically restorative by improving mental health, reducing blood pressure and stress levels, as well as encouraging physical activity. Some cities, including Singapore, are incorporating green environments into urban design as important aspects of city planning, given their possible positive influence on mental health and even cognitive functions.

Minorities

Gobster, P. H. Managing Urban Parks for a Racially and Ethnically Diverse Clientele. *Leisure Sciences* 24, 143–159 (2002).

- Minority park users came from farther away to use the park, more often came by car, used the park less frequently, and were more likely to visit in large, family-oriented groups than White park users. Minority groups are more likely than Whites to engage in passive activities like picnicking, socializing, and watching sports. Groups differed in their preference of group sports - basketball for Blacks; soccer for Latinos; volleyball and golf for Asians; and golf, tennis, and game playing for Whites. Although social interaction was found to be an important aspect of minority park use, results also suggest that most interaction takes place within rather than between groups.

Tinsley, H. E. A., Tinsley, D. J. & Croskeys, C. E. Park Usage, Social Milieu, and Psychosocial Benefits of Park Use Reported by Older Urban Park Users from Four Ethnic Groups. *Leisure Sciences* 24, 199–218 (2002).

- Travel time to the park was lowest for White users and higher among Asian, Hispanic, and Black users, respectively. White users visited the park on average several times a week, while other ethnic groups visited between once a week and once a month. All groups wish they could visit more often. The majority of White users walk to the park, but minority users tend to drive. Minority groups are more likely to visit the park with family or with an organized groups than Whites, who tend to visit alone or with small groups.

Wolch, J. R., Byrne, J. & Newell, J. P. Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and Urban Planning*. 125, 234–244 (2014).

- Latinos may encounter racial and nativist barriers to visiting parks, like a lack of Spanish-language information, inequitable patterns of park supply, and subjection to racist comments. Surveyed Latinos enjoyed visiting the park to partake in family-oriented activities like picnicking, barbecuing, and playing sports. Visitors cited escaping the city, observing the scenery, and enjoying the mental solitude as benefits. Notable constraints to visiting include: parking shortages, overcrowding, litter, lack of companions, experiences of racism, and sub-standard facilities. Being dependent upon public transportation inhibited many participants from visiting parks.

Johnston, M. & Shimada, L. D. Urban Forestry In a Multicultural Society. *Journal of Arboriculture* 30, 8 (2004).

- The increasingly multicultural character of modern urban society creates challenges and opportunities for the urban forester. For the urban forestry strategy to respond effectively to contemporary social issues, it must include policies and programs that promote social inclusion and the involvement of disadvantaged ethnic communities. This can be accomplished through a distinct community strategy. Although the fundamental principles of community involvement still apply, their application needs to reflect the multicultural diversity of the individual city or neighborhood. The education, consultation, and participation elements of the community strategy are delivered through a wide range of events and activities specifically designed to promote social inclusion and the engagement of ethnic communities.

Dai, D. Racial/ethnic and socioeconomic disparities in urban green space accessibility: Where to intervene? *Landscape and Urban Planning* 102, 234–244 (2011).

- Access to green spaces is important to physical activities and public health → do disparities in green space exist?
- This study aimed to *quantify potential spatial accessibility* (e.g. location and distance) to green spaces and evaluate the *racial/ethnic and socioeconomic disparities in green spaces access* (in urban green space in metropolitan Atlanta, Georgia)
- Key results
 - Spatial accessibility to green spaces in Atlanta was *not* evenly distributed
 - Neighborhoods with a higher concentration of African Americans had significantly poorer access to green space
 - Poor access in low socioeconomic areas

Heynen, N., Perkins, H. A. & Roy, P. The Political Ecology of Uneven Urban Green Space: The Impact of Political Economy on Race and Ethnicity in Producing Environmental Inequality in Milwaukee. *Urban Affairs Review* 42, 3–25 (2006).

- Relational processes of commodification of urban nature produce forests that epitomize past and present structural inequities (e.g. income inequality, uneven property ownership)
- This study found (via urban-forest canopy-cover data, U.S. Census data, and qualitative data from in-depth interviews with government and community leaders with direct knowledge of the city's urban forest) that there is a socially inequitable distribution of urban trees within Milwaukee
 - Therefore contributing to an inequitable quality of life for certain individuals in Milwaukee
- Key findings
 - non-Hispanic White populations correlated with more canopy cover and Hispanic populations with less
 - No negative correlation with African-American-major neighborhoods, but they found trees to be more of a nuisance/liability than a benefit (caused property damage and diminished “neighborly relations”)

Gobster, P. H. Urban parks as green walls or green magnets? Interracial relations in neighborhood boundary parks. *Landscape and Urban Planning* 41, 43–55 (1998).

- Case study of Chicago's Warren Park; acts like a “green magnet” (versus a “green wall” between racially different neighborhoods) and demonstrates potential of similar parks to be active agents in improving interracial relations
 - Surrounded by predominantly White and predominantly non-White neighborhoods
- Key findings
 - Different proportions of racial/ethnic groups in different activity areas off the trail (e.g. highest proportion of Whites at golf area, of African-Americans and Hispanics at the basketball courts)
 - Limited interaction between those of different race, but was confounded by age, activity, and environmental setting
- The area's history of racial and ethnic diversity, social diversity, and strong constituency of neighborhood and community groups allows for Warren Park to work reasonably well in serving diverse neighborhood residents
- Authors suggest that similar boundary parks are ideal for contact between diverse groups to take place
 - “Voluntary nature of leisure participation may remove some of the negative sentiment associated with structured programs for integration”

Scenic views

Brown, D. K., Barton, J. L. & Gladwell, V. F. Viewing Nature Scenes Positively Affects Recovery of Autonomic Function Following Acute-Mental Stress. *Environ. Sci. Technol.* 47, 5562–5569 (2013).

- This study sought to measure how viewing a nature scene versus a built (i.e. manmade, urban) scene prior to a stressor changed autonomic function during recovery from said stressor.
 - Note: the *autonomic nervous system* (ANS) is “a control system that acts largely unconsciously and regulates bodily functions such as *the heart rate*, digestion...” In the case of this study, it measured heart rate variability.
 - ANS is key in governing stress response and body recovery post-stress
- This study looks at the relationship between nature and ANS *without combining it with exercise*
 - Understand the effects of *viewing alone*
- Methods: 10 mins of slideshow of pictures showing either nature or built environment → mental stressor (a cognitively demanding test with a “socio-evaluative component”)
- Main finding: ANS function increased during stress recovery if nature scenes were viewed prior, compared to built scenes
 - Viewing physiological/biological component of mental health

Bratman, G. N., Hamilton, J. P. & Daily, G. C. The impacts of nature experience on human cognitive function and mental health. *Ann. N. Y. Acad. Sci.* 1249, 118–136 (2012).

- This review synthesizes work from several disciplines (incl. environmental psychology, urban planning, medical lit) to understand effects of nature experience on human cognitive function and mental health
- Relating to effects of scenic views of nature:
 - “Prevailing theories about the attraction to (and possible restorative effects of) viewing or having physical contact with natural landscapes most often stem from the supposition that human beings are not fully adapted to urban environments and that something may be missing when we are deprived of contact with nature...” (Kaplan and Kaplan)
 - “Merely seeing or being present within nature can reduce stress through the automatic generation of physiological and psychological responses”
 - Self-ratings of positive affect (elation, affection) and lowered fear found in studies that viewed nature vs. urban scenery (Ulrich)
 - Whereas urban viewers experienced aggravation, anxiety, sadness

Social activity

Peters, K., Elands, B. & Buijs, A. Social interactions in urban parks: Stimulating social cohesion? *Urban Forestry & Urban Greening* 9, 93–100 (2010).

- To determine the extent to which urban parks facilitate social cohesion and how social interaction and place attachment can contribute to said cohesion
 - Particular focus on native and immigrant groups
 - Consider: can these urban parks serve as meeting points for different ethnic groups?
- Previous literature demonstrates that regular interactions between people across ethnic divides 1) provides the basis for bonding, and therefore social cohesion 2) helps individuals participate in society and create feelings of acceptance
 - Cultural disposition and behavioral codes are key factors that *discourage* minority ethnic communities from using those spaces
- Key finding: urban parks can be seen as inclusive places where people of different ethnicities can spend leisure time (but *not necessarily connect outside of their already-formed social groups*)
 - Collective activities (meeting others, picnics) more important to non-Western/non-native individuals
 - “We can conclude that most social interactions are cursory, for example, people have a short chat or just say hello... visitors do not have many intensive social interactions with people they do not know. There are more weak and one-off interactions than strong and more structural interactions...”
 - “Urban parks that function as everyday places are places in which people feel at home. Visitors can easily connect to the place and to other visitors, because many visitors will already be familiar with each other from the neighbourhood. Urban parks that function as a ‘world of strangers’ attract a variety of people. People feel welcome because these urban parks are open and accessible. Although the functions of parks differ, both types provide a vital locality where everyday experiences are shared and negotiated with a variety of people.”

Zhou, X. & Parves Rana, M. Social benefits of urban green space: A conceptual framework of valuation and accessibility measurements. *Management of Environmental Quality: An International Journal* 23, 173–189 (2012).

- This review focuses on the social benefits of “urban green space”; measured via monetary value and accessibility
- “Urban green space provides environment to facilitate social contact. Social interactions take place more frequently in a preferable environment than other places. On the one hand, high rise buildings separate residents, resulting in social disconnection; on the other hand, the crowded urban environment makes it difficult to contact with others, delimiting productive social communications (Coley et al., 1997). Kweon et al. (1998) note that older people in an inner city with greater accessibility to green space have more social ties than others. Also, a sense of community can be created when frequently using the outdoor green space (Kearney, 2006).”
- “The social benefits obtained from the urban green space are not mutually exclusive. Contact with neighborhood and engagement in social activities brings great psychological satisfaction and dissipates unhappiness (McAuley et al., 2000).”

Note: most studies re: green space and social ties look at how including green space in local communities / neighborhoods (i.e. those that are physically nearby), specifically, can be socially beneficial or be a means for social cohesion within these communities

Urbanicity

Over half the world’s population currently lives in urban areas, with 68% projected to live in cities by 2050 (United Nations 2018).

Peen, J., Schoevers, R. A., Beekman, A. T. & Dekker, J. The current status of urban-rural differences in psychiatric disorders. *Acta Psychiatrica Scandinavica* 121, 84–93 (2010).

- This review of urban–rural differences in psychiatric disorders conclude that urban rates may be marginally higher and, specifically, somewhat higher for depression.
- Method: A meta-analysis of urban–rural differences in prevalence was conducted on data taken from 20 population survey studies published since 1985. Pooled urban–rural odds ratios were calculated for the total prevalence of psychiatric disorders, and specifically for mood, anxiety and substance use disorders.
- Finding: Significant pooled urban–rural odds ratio were found for the total prevalence of psychiatric disorders, and for mood disorders and anxiety disorders. No significant association with urbanization was found for substance use disorders. Urbanization may be taken into account in the allocation of mental health services.

Lederbogen, F. et al. City living and urban upbringing affect neural social stress processing in humans. *Nature* 474, (2011).

- Background: Cities have both health risks and benefits, but mental health is negatively affected: mood and anxiety disorders are more prevalent in city dwellers and the incidence of schizophrenia is strongly increased in people born and raised in cities.
- Current city living was associated with increased amygdala activity, whereas urban upbringing affected the perigenual anterior cingulate cortex, a key region for regulation of amygdala activity, negative affect and stress. These findings were regionally and behaviourally specific, as no other brain structures were affected and no urbanicity effect was seen during control experiments invoking cognitive processing without stress.
- Our results identify distinct neural mechanisms for an established environmental risk factor, link the urban environment for the first time to social stress processing, suggest that brain regions differ in vulnerability to this risk factor across the lifespan, and indicate that experimental interrogation of epidemiological associations is a promising strategy in social neuroscience.

Veterans

Gelkopf, M., Hasson-Ohayon, I., Bikman, M. & Kravetz, S. Nature adventure rehabilitation for combat-related posttraumatic chronic stress disorder: A randomized control trial. *Psychiatry Research* 209, 485–493 (2013).

- Nature Adventure Rehabilitation (NAR) is presented as a supplemental intervention for those not yet ready to engage, have not improved significantly or have been treatment dropouts to evidenced-based approaches such as Cognitive Behavioral Therapy (CBT) and Exposure Therapy (ET). This is a group therapeutic approach which focuses on activities that involve challenges through pre-planned tasks to foster personal growth and group cooperation. Common activities include trekking, wilderness, adventure, camping, rope courses, canoeing, cycling, and sailing-related. It is health-oriented instead of pathology-oriented. The article goes into some of the theoretical frameworks of why this works and how it targets PTSD therapy through behavioral activation, natural cycles of emotional regulation and perceived control. It is advertised? As a sporting activity and not a “mental health therapy” so that there is no stigma attached.
- Methods section is useful for structure of a program. Waiting List (WL) control group...WL slots were always less than number of clients on list? Groups of 6 - 10.
- Over the course of a year Posttraumatic symptoms (PTS), emotional and social quality of life, perceived control over illness (PCI), hope and functioning improved significantly (/medium?) 10% reduction in PTS, 10% reduction in depression, 30% improvement in functioning
- Improvement also due to sense of solidarity & being in a group environment
- *How did they determine that these improved symptomatology were due to NAR?*
- Key words: Nature Adventure Rehabilitation (NAR), experiential learning paradigm

Poulsen, D. V., Stigsdotter, U. K. & Refshage, A. D. Whatever happened to the soldiers? Nature-assisted therapies for veterans diagnosed with post-traumatic stress disorder: A literature review. *Urban For. Urban Green.* 14, 438–445 (2015).

- Nature-assisted therapy (NAT) for veterans with post-traumatic stress disorder (PTSD)
 - NAT has become more common and recognized in both practice and research; emerged in UK and US offering rehabilitation of soldiers suffering from traumatic experiences after active service in WWI and WWII.
 - PTSD: a psychiatric condition causing serious changes in the individual's life; physically, mentally and socially 1) avoidant/ numbing (thoughts, feelings, conversations are avoided) 2) intrusive recollection (images, thoughts, perceptions or dreams) 3) hyper-arousal (sleep disruption, nightmares, irritability or anger)
 - Practice today
 - NAT appears to be a common therapy offered
 - Annerstedt et al. (2011) found positive effect of nature on physical and mental health for diff groups such as ppl suffering from obesity, schizophrenia, dementia, physical disabilities and cancer.
- Wilderness therapy
 - Wilderness: hiking, other nature-assisted activities, ecotherapy, in vivo exposure treatment, group retreats
- Veterans health outcome measures
 - Experience a benefit from being in and working with nature
 - Social outcomes (better family function), capacity for direct attention, higher level of engagement, and a sense of lower stress-level

Poulsen, Dorthe Varning, Ulrika K. Stigsdotter, Dorthe Djernis, and Ulrik Sidenius. Everything just seems much more right in nature': How veterans with post-traumatic stress disorder experience nature-based activities in a forest therapy garden. *Health Psychology Open* 3, (2016).

- This qualitative study explores the impact of nature-based therapy for veterans with post-traumatic stress disorder from the veteran's perspective.
- Method: interviewed 8 Danish veterans w/ PTSD participated 10 week nature based therapy
 - NBT contains of three elements:
 - 1) mindfulness activities and applied mindfulness
 - Breathing techniques, dynamic yoga exercises in nature
 - 2) NBAs
 - physical approach such as wood splitting and planting trees,
 - Through short narratives about special plants, birds breeding and seasonal changes in the forest, knowledge was imparted to the veterans→ Knowledge about nature, by narratives from the gardener during walks in the arboretum, seemed to develop the veterans' fascination for nature.
 - 3) individual therapeutic sessions conducted sitting in a sheltered place or during walks
 - Key finding: results indicated that the veterans have achieved tools to use in stressful situations and experienced an improvement in their post-traumatic stress disorder

symptoms. → One year after the intervention, the veterans in general used nature for slightly different purposes than before the treatment, and several of them focused on physical and mental restoration. Indicates that veterans found their own way in using nature in a restorative perspective.



Picture 3. Participants felt sheltered when sitting below the branches of the huge tree.

Bettmann, Joanna E., Scheinfeld, David E., Prince, Kort C., Garland, Eric L., Ovrom, Katherine V. Changes in psychiatric symptoms and psychological processes among veterans participating in a therapeutic adventure program. *Psychol. Serv.* (2018).

- This study examined changes in mental health symptoms and related psychological processes over the course of a 6-day Outward Bound for Veterans (OB4V) program and at a 1-month follow-up.
 - OB4V: national program that provides fully funded therapeutic initiatives that combine outdoor group adventure activities (e.g. hiking, canoeing, etc) w/ facilitated therapeutic group sessions engaging participants cognitively, affectively, and behaviorally. Primary goal of OB4V is to provide an experience where veterans build camaraderie, outdoor skills, personal growth in a team-based, therapeutic adventure model.
 - Alternative approach to delivering mental health assistance w/o stigma associated w/ traditional mental health avenues.
- Results showed that, from pre- to post program, participants reported significant improvement in life purpose satisfaction and self-confidence during stressful situations. Further, from pre program to 1-month post program, veterans reported increased psychological mindedness, increased engagement to promote personal growth, decreased mental health symptomatology, decreased emotional suppression, and an increase in positive attitude toward seeking professional psychological help.
- Finding: showing the promise of therapeutic adventure as a modality to address veterans' mental health issues.

Appendix B: Details of Trail Visits

Dates of Trail Visits

Trail	Date of visit
Blue	February 15th
Purple	February 19th
Orange	March 15th
Yellow	March 15th
Triangle	March 22nd
Green	April 16th

Reflections of each trail visit

We generated reflection questions in three steps: before the trail visit, during the trail, and after the trail. The questions we created are listed below.

Before trail:

1. What did I expect from this trail?

Questions for reflection (during trail):

1. What are my first impressions of this trail?
2. How do I feel when walking the trail? (Relaxed? On edge? Bored?) What is the noise level? (consider day/time)
3. Describe important geographic components of the trail.
4. How physically accessible is the trail?
5. What are features of this trail that make it unique? (wildlife, scenery, etc.)
6. Conversations with other people on the trail: How often do you come? What could be improved? Ask about their experience
7. General observations/sensory experience

Questions for reflection (after trail):

1. How did my actual experience align with my first impressions? What factors were shaping my original perception?
2. How was my experience navigating the trail? (e.g. consider map apps, other technology support)
3. Who do I imagine walking the trail regularly? (i.e. trail target audience) Who (if anyone) did I see on the trail?
4. Can I picture any type of programming happening with this trail specifically? If so, what?

5. What could have improved my overall experience with the trail?
6. How would my experience be if I was ____? (e.g. based on other characteristics, who likes nature)
7. Describe the trail in five words or less.

Blue Trail

Before trail:

1. The Google Maps listed it as “difficult.” Therefore, I expected it to be on par, difficulty-wise, with the Triangle, which I recalled to be pretty muddy and very steep. It looked a little shorter than some of the other trails.

Questions for reflection (during trail):

1. Muddy; narrow path; pretty accessible
2. Depending on the noise level, foliage cover, and whether other people were around, either relaxed or unnerved. Mainly felt calm and at peace. Very quiet, especially deeper into the trail; more animal/forest noises than people noises.
3. There’s a ravine to one side that’s there for most of the trail walk; lots of foliage (including leaves on the ground) as you go in further which can sometimes block out natural light; narrow path
4. Pretty accessible; some muddy parts, but generally firm ground. Lots of bumpy (e.g. tree roots and rocks) areas, some steep parts that would be difficult for some populations to walk on
5. Lookout spot at the loop-back point
6. Only five other people on the trail while I was there; didn’t ask them because most of them were doing high-intensity exercise (e.g. jogging, biking); all of them looked like they were regulars/familiar with the trail system

Questions for reflection (after trail):

1. As stated earlier, my original perception was based on the difficulty information from Google Maps. Overall, it was less strenuous than I expected, but still had lots of opportunity to feel a sense of adventure (e.g. lookout spot, covered feeling, steep/rocky portions)
2. I got slightly lost around the loop-back point and Google Maps helped me get back on track. Other than that, the available signage (blue arrows) generally helped me stay on the path.
3. Young adults. Adults of all ages (though not any senior citizens), often with dogs (both on and off leash), all solo; there were also bikers on the path which surprised me, considering the narrowness/steepness of the path
4. Honestly, not really; I think programming might take away the unique aspects of the trail (solo, meditative thinking)... maybe a meditative group experience?
5. Clearer signage at the loop-back point; felt slightly nervous at some points, but that may have been a result of my experience as first-timer on the Blue Trail
6. This would not be a great experience for families with young kids or senior citizens; I think they would be too worried about safety/falling to enjoy the serenity of the trail. I think this would be a calming experience for any novice (or more experienced) adult trail walker.
7. Secluded, meditative, quiet, slightly challenging

Purple Trail

Before trail:

1. Chill, easy, very flat. Google maps listed it as easy.

Questions for reflection (during trail):

1. A little confusing to find trailhead, very muddy
2. We both feel pretty neutral. Can hear highway in background but it's pretty muted if you're not thinking about it
3. Lots of mud. Bc purple trails connects to all other trails, there are a lot of forks/offshoots. Many are unmarked.
4. It's pretty flat but the mud makes it slippery.
5. Very shaded, mix of walking surfaces (gravel, boardwalk, dirt), very wide
6. Conversations
 - a. (black male + female couple in 30s?) - not first time but infrequent visitors, not easy to navigate, just moved to Houston
 - b. (white male in 30s?) - comes often, not easy to navigate but he enjoys the "adventure", from Montrose
 - c. (white male + asian woman in 20s + dog) - come once a week, easy to navigate especially purple trail, from west u, wish there were separate trails for bikers/walkers
 - d. (2 latino men in 20s) - first time, thought they were at Arboretum (which clearly means navigation isn't good), from hillcroft
7. Quieter the "further" in you got, not super visually pleasing, no naturey smells

Questions for reflection (after trail):

1. Kind of boring, but a very active focus on walking due to all the mud. Google Maps description made me think it would be low-effort
2. Google Maps was useful, but if we didn't have it we probably would've made a couple wrong turns
3. I imagine young-mid age adults, which is what we saw. Ethnically diverse. There were no kids
4. This trail would be really suited to group activities like guided walks bc it's really wide
5. Less mud and less confusing signage would've helped. The unmarked forks on trail could be marked with informative or fun signs
6. If I was
 - a. A kid - slippery and too muddy to be fun
 - b. An older person - probably too muddy, but otherwise easy
7. Muddy, flat, slippery, varied, quiet

Orange trail

Before trail:

1. Difficult (on google map), challenging, expected to see bikers

Questions for reflection (during trail):

1. Quiet, peaceful, perhaps not that difficult? (saw two kids coming out from the trail right before I entered)
2. Like yellow trail, no noise pollution: heard bird singing, wind blowing, squirrels and snakes moving sound but could hear more city-like sound than yellow trail (perhaps it is less deep than yellow trail). Overall, pretty quiet and good scenery. Less steep and muddy than yellow trail. Felt more flat (less challenging) than yellow trail.
3. Very narrow (but more bearable than yellow trail), seems there are 3 routes to go to purple trail but signs were not accurate (transition), Google map did not show the entire trail (only certain parts).
4. Definitely more accessible than yellow trail (less muddy, more flat -bridges). But often times, there was big branch of wood that blocked the trail
5. Good scenery, quiet, snakes and squirrels and a lot of bike signs
6. Only saw a dad with two kids but didn't get to talk to them (they went out to purple trail)
7. Less noise pollution, narrow trail (but not as narrow as yellow trail), tree canopy

Questions for reflection (after trail):

1. Unlike my first impression, it was actually much more easier (compared to yellow trail). Trails were much more flat, less muddy and felt like it was more touched by humans (many bridges) and signs. Also the google map says "difficult" but i felt it was less challenging than yellow trail.
2. Used google map (but showed only half). Signs were accurate but signs to show where I can leave this trail and go to purple trail was not clear! (had to go all around to find the exit)
3. I would imagine family coming on this trail (kids are okay), but not elderly (due to some of tree branches blocking the trail)
4. Programming that has adventurous characteristics + walking seems fine
5. Signage can be improved to let people know where is the exit
6. Compared to yellow trail, it was more accessible by oneself (didn't see any big challenges). But can't imagine people walking the trail and encountering bikers at the same time (pretty narrow path)
7. Quiet, moderate, less muddy, more touched by human, meandering. Compared to yellow trail, it felt more moderately difficult (less challenging + less muddy/slippery) and more human trace (e.g. signs + more noise than yellow trail + man-made bridges)

Yellow trail

Before trail:

1. moderate/difficult, challenging, expected to see bikers

Questions for reflection (during trail):

1. Very quiet, peaceful
2. There was no noise pollution at all. I felt like I was in a deep forest. (heard bird singing, wind blowing, leaves shaking, animals moving sound). Felt disconnected from the city. However, the trail was muddy, slippery and had many steep climb, descent, and drops. (I fell once). Overall, felt little bit nervous (sweating) on the trail.
3. Very muddy (slippery in steep climb/ descent), narrow (two people can barely pass), a lot of steep hills and drops, tree roots on the ground.
4. Wouldn't recommend for elders, going alone. Often had to jump and climb up to pass the trail. Would recommend for people who like adventurous, challenging, more experienced trail hikers and wear boots or about to throw away sneakers.
5. Scenery was very good (woody, covered by trees). Especially when sun shines, leaves reflect the sunlight.
6. Didn't meet anyone
7. A lot of trees, could not hear any car sound/ city noise

Questions for reflection (after trail):

1. I did not know it would be this challenging. steep hill was muddy and made harder to access. My actual experience was little bit worse than I expected because of the muddy trail but other factors such as scenery and trail atmosphere were better than I expected. Also the google map says "moderate" but i felt it was more challenging than orange trail, which was marked "difficult."
2. Used google map. Signs were pretty accurate except for one part: transition to different trails was little bit misleading. In terms of location of the map and the sign direction (there are two forks: one for purple trail vs. one for orange trail) *would be better to inform which way is to purple vs. orange trail.
3. I didn't see anyone but I would imagine people who are experienced trail hikers, who like adventurous and challenging trails.
4. Programming that has challenging, adventurous characteristics and no group activities
5. Muddy trail should be improved! (Perhaps put more wood on the ground?); Some parts were covered by wood (like a bridge)
6. I would not come to this trail if I do not have proper shoes at first, alone, if I have kids/ elders (definitely can't access deeper). I would not want to walk on this trail if there are many bikers (too narrow path)
7. Quiet, green, slippery (muddy), adventurous, challenging. *At first, meditative but at the end, i couldn't appreciate the nature/ quiet space because I was too worried about passing/ accessing the steep, slippery, muddy trail

Triangle trail

Before trail:

1. Just my previous impression based on our first visit with Carolyn... very muddy, trickier than I had expected, sometimes difficult to navigate mud/water, strange set up (with the tunnels as the entrance/exits). Unlike the other trails, Google Maps did not include this one (or Hogg Woods), so I did not take away a level of difficulty from this.

Questions for reflection (during trail):

1. Difficult to find trailhead; there wasn't any sort of signage from where I parked at the Running Trails Center. I had to cross reference with Google Maps and the map that was provided on the MPC website. Even once I found the trailhead, I wasn't completely sure if I was really at the start of the Triangle because there was no map (although there was a post for a map to be placed on). Also, if I hadn't been on the trail before with MPC staff, I don't know if I would've even approached the tunnel because it looked really questionable/not safe and didn't have a real path to walk on (it was mostly water). The actual trail was similar to what I'd remembered -- steep and jagged -- although not as muddy.
2. Energized, on alert, like I'm getting a workout. Constantly hearing car noise from the main roads. Fair amount of wildlife noise. No people noise.
3. Lots of elevation changes (high and low points); more exposure to urban Houston than some of the South side trails; narrower path (compared to Blue and Purple); there was a lot of variety in walking terrain (dusty, muddy, watery, rocky)
4. Definitely for able bodied adults (including teens); would caution anyone younger or older
5. Most unique aspect is probably the continuous elevation
6. Saw absolutely no one on the trail

Questions for reflection (after trail):

1. I was more aware of the outside world than I'd remembered per our first visit; maybe this was more noticeable to me because I had been on the Southside trails (esp Blue) and found that they were more isolated from car/city noise
2. Signage really wasn't great; as mentioned earlier, I had difficulty finding the trailhead in the first place. Once on the trail, there were no arrows to guide me (to my recollection). At the intersection point with Hogg Woods, there was a map indicating where I was, but did not tell me how to stay on the Triangle trail itself -- I ended up using Google Maps to make sure I didn't stray into HW
3. Adventurous adults who want a quickish hike
4. This might be a good trail for some Veterans programming
5. Signage on how to get to the trail and within the trail itself
6. Not great for families; way too many places for kids to fall. The path will be slightly tricky for even very fit adults, so definitely not for senior citizens either.
7. Challenging, adventurous, elevated, rocky, exposed

Green trail

Before trail:

1. Challenging and a good workout

Questions for reflection (during trail):

1. Hard to find the trailhead. Once we found it, it wasn't marked as the green trail. Feels woodsy almost right away
2. Feel relaxed and "alone"
 - a. There is substantial car traffic near the beginning and end of trail with low amounts of trees. We went 3-4 pm so may be rush hour? Very quiet in middle
3. Dried up creek which you can see from several overlooks. Sandy surface. Lots of exposed tree roots. Curves with blind turns.
4. Not at all. Only appropriate for people with good body control
5. Lots of foliage, lots of curves and turns, definitely feels like you're in the woods, when the creek is full after a rain you can probably see water, there's a small pond
6. We only saw bikers and a couple runners, couldn't stop them to talk
7. No other walkers, mostly solo bikers + noise from bikers announcing their presence.

Questions for reflection (after trail):

1. Wasn't as challenging as described by MPC staff we talked to, but it was secluded like they said. Relaxing once we were deep into trail
2. Hard to find trailhead, google maps navigation slower bc we were in the woods, doesn't interact with other trails so no need for/we didn't see that much signage (just occasional markers)
3. Saw white people and bikers. A couple runners.
4. Maybe the veterans adventure therapy?
5. Being able to find it and having a clear trailhead, a map showing how far along you are on the trail since it doesn't loop back
6. Not old people or kid-friendly, if I wasn't from there I probably wouldn't know about it
7. Sandy green shaded curvy hilly

Appendix C: Interviews with MPC Staff

We spoke with Hailey Darby, a Visitor Services Assistant, Anne Vance, an Annual Giving Manager, and Suzanne Formanek, an Operations Supervisor.

Responses from each phone interview with three MPC staff members

Interview 1: Hailey Darby, a Visitor Services Assistant

- If you could use a few words to describe each major trail, what would they be?
 - elevation changes
- Do you see any major differences in usage between each trail? (e.g. audience, frequency of use, etc.)
 - Not a lot of children or people of color
 - Regulars who do a lot (a lot of older retirees) -- mainly purple in the morning
- Are there any trails which are underutilized? If so, why might that be?
 - Not a lot of people on red and yellow
 - Navigation -- because trail connections are confusing
- Do you have any tips on how to generate sign content that will best appeal to MPC users? What do you think someone should know before they go on a trail?
 - Mileage, time to complete, noise level from train and highway, elevation changes,
 - Resting spot across from the house, benches
 - Signs prompting social interaction
 - Bird facts or prompts to stop and listen
- Do you have any information of trail difficulty level?
 - Yellow, orange, green are most hilly
- (more personal) What is your favorite trail?
 - orange/yellow
- Is there anyone else who we should talk to?
 - Anne Vance (development team) knows marked and unmarked trails well

Interview 2: Anne Vance, Annual Giving Manager

- If you could use a few words to describe each major trail, what would they be?
 - Yellow: doesn't walk it much; cycling trail
 - Fun if you're on two wheels
 - Highly eroded
 - Orange: highly eroded
 - Purple
 - Default trails
 - Big Purple (goes along Buffalo Bayou; finishes at dog wash station)
 - 1. Flat elevation but also sand hill challenges (being purposeful with walking)
 - Little Purple (goes NW; finishes at rugby parking lot)
 - 1. Peaceful, easygoing, all-weather trail (esp if the trails have just reopened)
 - Blue: cycle trail; changes in elevation make it fun
 - Green: loves it
 - But hasn't been on it since Tax Day flood, Harvey...
 - Long with exciting elevation changes
 - Triangle: peaceful place
 - Cyclists enjoy this as well
- Do you see any major differences in usage between each trail? (e.g. audience, frequency of use, etc.)
 - No
 - New (as in finally acknowledged as a trail) road trail... south of purple, leads to big purple)
- Are there any trails which are underutilized? If so, why might that be?
 - Ebbs and flows depending on time of year (esp w/ equestrian ones)
 - SLT is jammed
 - North Eastman has dedicated group of users; trying to keep it a secret
 - Escaping popularity of SLT, big purple
 - Not a marked trail; open flat area near railroad
 - Really goes nowhere...
 - Passive recreation
- Do you have any tips on how to generate sign content that will best appeal to MPC users? What do you think someone should know before they go on a trail?
 - Series of questions people should ask themselves:
 - Do you want to challenge yourself physically?
 - Are you a beginner/what is your confidence level?
 - 1. "Psychologically the easiest"
 - Do you want a peaceful time?
 - Wants a marking system similar to ski slopes

- “Green is for beginners”
- Never felt like trails were poorly marked
 - Appropriate amount; don’t want to overwhelm users
 - Less is more
 - Navigation confidence depends on the individual; their sense of direction and self
- (more personal) What is your favorite trail?
 - Has a clear head while on purple trail
 - Focused on nature aspects; will take pictures (for work reasons)
 - Comparing trail during diff times of the year
 - Keeping a quiet mind to “hear as much as possible”
- Other notes
 - Huge variety amongst staff re: opinions of trail
 - Core group of staff members who use the trails
 - Lost an hour of time trying to navigate Red and Blue; they became impassable
 - Hasn’t used any of the tunnels
 - Impassable when wet
 - One leads to the arboretum (from Triangle)
 - NW trails (north of Memorial Dr) near equestrian grounds → Triangle
 - One under 610
 - Scared of potential snakes (tunnels are too dark to see)

Interview 3: Suzanne Formanek, Operations Supervisor

- Do you see any major differences in usage between each trail? (e.g. audience, frequency of use, time it takes, etc.)
 - Yellow/Orange: most technical (biggest up and down), hardest elements for bikers to navigate -bikers want topographical changes
 - Would you make a distinction between them?
 - Purple: main connector trail, widest trail, parts where it's sandy and narrow
 - Is there always mud?
 - Blue: easier than Y/O; more suited for walking and jogging
 - Green: more difficult for riders; one of the more interesting ones?
 - Completely different experience going one way vs. the other (east to west vs. west to east); "it's cool both ways"
 1. Easier to access starting at the western end b/c there's parking
 - Triangle: the best (in her perspective)
 - Elevation change
 - "You don't feel like you're in Houston anymore"
 - You can get lost in there (in a good way)
 - Her favorite by far; most interesting, least populated, harder to get to
- Are there any trails which are underutilized? If so, why might that be?
 - Southside trails get a lot of attention
 - Triangle/NW trails near polo club have much less traffic
 - People don't know they're there
 - They don't know how to get to there from parking lot
 - Good for people who like solitude
 - Have to go through tunnels
 - Poor signage
 1. You'd have to ask someone or figure it out on your own
 2. It's on the MPC map, but the color used is less bold compared to South Side trails
- Do you have any tips on how to generate sign content that will best appeal to MPC users? What do you think someone should know before they go on a trail?
 - Easily accessible using as few words as possible (on signs)
 - Referencing picture signs
 - Describe the trails on the map by difficulty level; also referenced ski signage
 - Which trails are good for families, dog walking, etc.?
 - Wayfinding signage so people know how to get to the trail head, Where to park, which direction to go after, etc.
 - People should have a map (app or pictures) of the trails so they can have some reference once they're on the trail
 - Incl. phone numbers in case of emergency (e.g. MPC front desk)
 - Should know there's no facilities (bathroom or water fountain)

- Should be aware of rules
 - 1. People have been complaining of off-leash dogs and bikers that don't signal/announce themselves
- Be more inviting/fun/cool! Trails are fun, not scary
 - 1. Some might think they're too secluded
- Should putting your dog on a leash be on sign? Before you can go on a trail?
 - Put a sign up
 - Believes in educational component -- here's *why* we have rules, "it's for your dog's safety"
 - Only form of punishment is to call HPD (to issue a ticket). MPC has no power to be punitive, to fine, etc.
- Do you have any information of trail difficulty level & how long does it take?
 - Greater Houston Offroad Biking Association partners with maintenance and management of the trails -- might have related resources
 - Our approximations (at a leisurely walking pace) are probably accurate
- (more personal) What is your favorite trail?: Triangle
 - "You can kinda hear 610" but all you see is green/sky around you; good way to experience nature
 - Such a good/free resource in Houston
- Is there anyone else who we should talk to?
 - Greater Houston Offroad Biking Association (GHOBA)
- Other notes
 - No enforcement/patrol over park rules -- educating our users is important; rules are for everyone's safety and enjoyment, this is a shared resource
- Trail steward program? Adolescent? What do the volunteers do right now?
 - Danny (and Eric) are in charge of volunteering on the trails
 - Volunteers help lessen perception of "scary" trails

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