

Trail Blazing the Worcester Intercollegiate Outdoor Initiative



**Andrew Gray, Emma Nollman,
Maddie Veccia, and Daniel Onyema**

Trail Blazing the Worcester Intercollegiate Outdoors Initiative

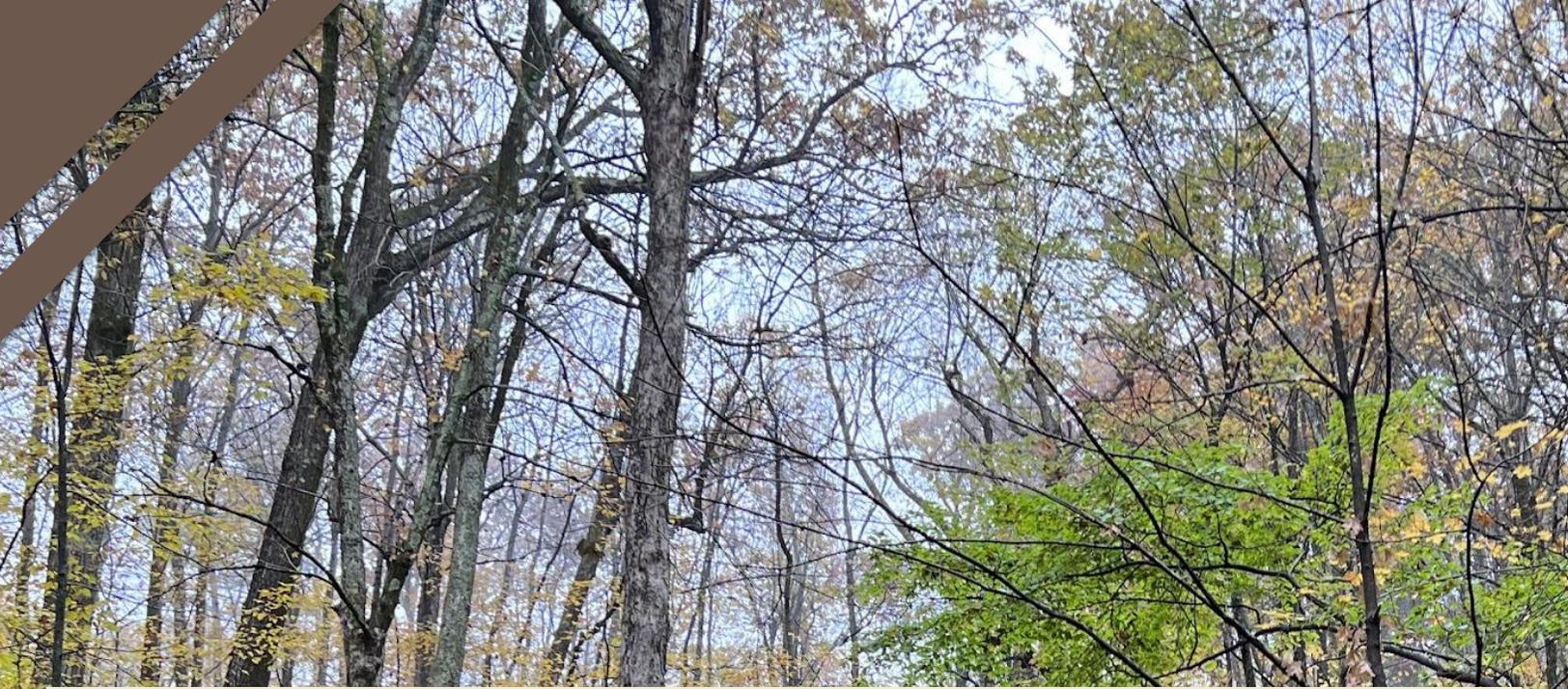
An Interactive Qualifying Project submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the degree of Bachelor of Science/Arts.

by
Andrew C. Gray
Emma P. Nollman
Daniel C. Onyema
Madelyn R. Veccia

Date:
16 December 2022

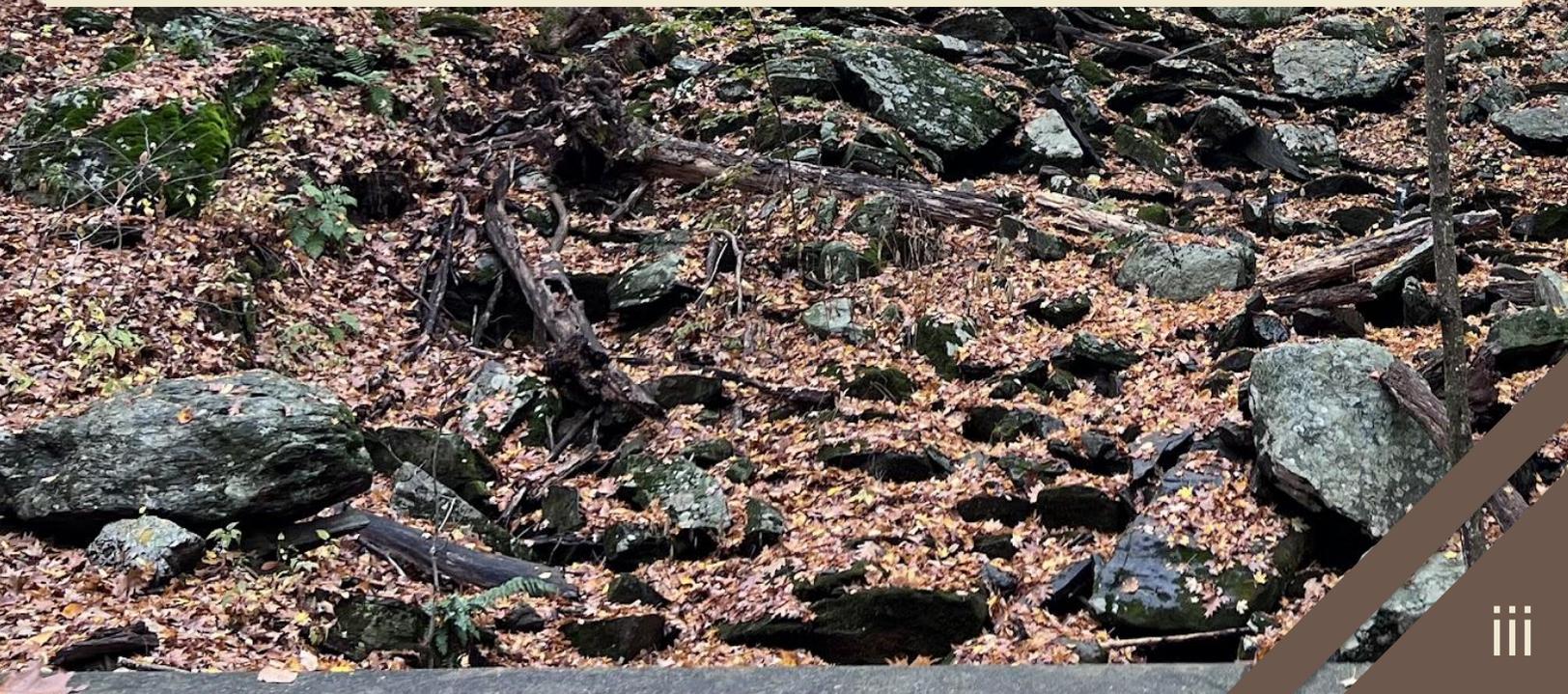
Report Submitted to:
Greg Doerschler
Greater Worcester Land Trust
Laura Roberts
Worcester Polytechnic Institute

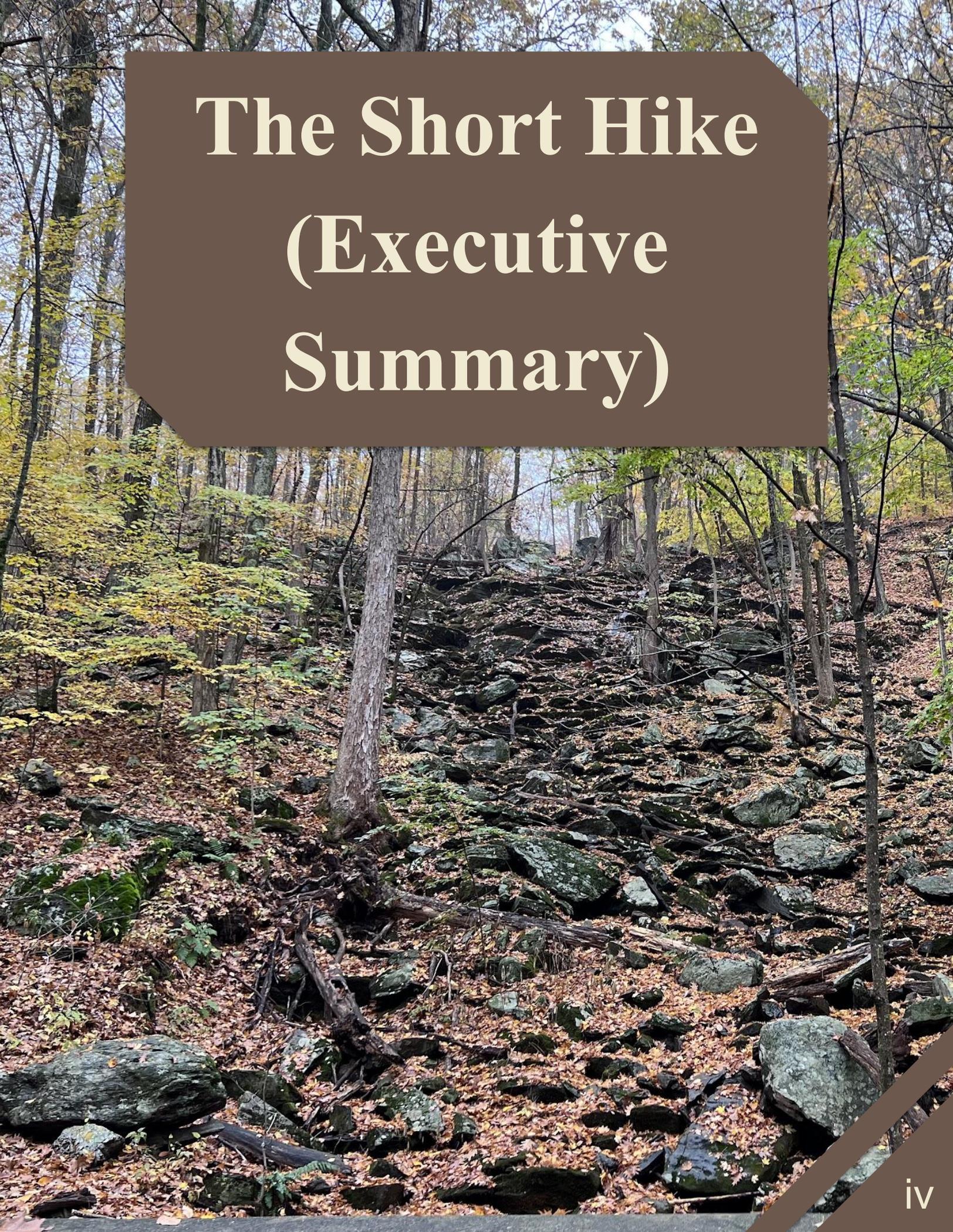
This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Projects>.



Abstract

Worcester college students do not spend enough time outside due to their workload and limited access to nature. This project improved the well-being of Worcester college students by creating a sustainable plan to revamp the Worcester Intercollegiate Outdoors Initiative (WIOI). We gathered data on college students through surveys and interviews, ran an outdoor hike, and created a proposal to sustain the program. Hike participants' self-reported a mean increase in well-being of 44.6%. We recommended using email, Instagram, and word of mouth to reach students. We also recommended the program be student-run by engaging TerraCorps and Federal Work Study students.





The Short Hike (Executive Summary)

Our project sponsor, Greg Doerschler, began work at Clark University organizing hikes for college students there. In 2018, he began the Worcester Intercollegiate Outdoors Initiative (WIOI) in partnership with the Greater Worcester Land Trust (GWLTL), with the goal of organizing hikes for all Worcester college students. The onset of the COVID-19 pandemic prevented Greg from properly initiating the program. Our project team's goal is to assist our sponsor in launching the WIOI and to provide him with recommendations for obtaining the connections and information he needs to get it off the ground.

Nature has the ability to improve one's well-being simply through exposure. Various experts have conducted studies wherein the effects of nature on one's mental health, cognitive functioning, and physical health were observed. When the abundance and quality of green spaces around participants increased, they showed decreased incidence of disorders like stress, depression, and anxiety by 30%, 41%, and 34% respectively (Cox et al., 2017). Additionally, studies show a positive correlation between time in nature and working memory, which increases students' ability to focus and complete school work.

Working memory isn't the only function improved by nature connection; spending more time in nature improves a person's quality of sleep. Participants in multiple studies described feeling better after a short walk in nature and showed better sleep indicators by about 30% compared to the participants walking in urban settings (Gladwell et al. 2016). On top of this, nature can mitigate physical symptoms of diseases. Including self-reported physical health improvements, participants showed decreases in physical symptoms of asthma by 0.93, type 2 diabetes by 0.72, all-cause mortality by 0.69, and more as seen in Table 1 (Twohig-Bennett and Jones, 2018). The mental, cognitive, and physical improvements that come with spending time

Outcome	N (participants)	Odds ratio (95% CI)	Heterogeneity I ²	P-value
Good self-reported health	10 (41873103)	1.12 (1.05, 1.19)	100%	p < 0.001
Preterm birth	6 (1593471)	0.87 (0.80, 0.94)	68%	p < 0.001
Type II diabetes	6 (463220)	0.72 (0.61, 0.85)	73%	p < 0.001
All-cause mortality	4 (4001035)	0.69 (0.55, 0.87)	96%	P = 0.002
Hypertension	4 (11228)	0.99 (0.81, 1.20)	62%	P = 0.91
Small for gestational age	4 (1576253)	0.81 (0.76, 0.86)	65%	p < 0.001
Cardiovascular mortality	2 (3999943)	0.84 (0.76, 0.93)	54%	p < 0.001
Stroke	3 (256727)	0.82 (0.61, 1.11)	59%	P = 0.20
Dyslipidaemia	2 (5934)	0.94 (0.75, 1.17)	57%	P = 0.56
Asthma	2 (2878)	0.93 (0.57, 1.52)	68%	P = 0.78
Coronary heart disease	2 (255905)	0.92 (0.78, 1.07)	48%	P = 0.26

Table 1: This table displays nature's impact on different health issues (Twohig-Bennett et al., 2018, 634).

outdoors can greatly impact a college student's life.

Despite these benefits, many Worcester college students do not get to spend time outdoors regularly. While transitioning into adulthood, many new responsibilities are thrust upon students, often forcing them to put off things such as time outdoors and socializing. Colleges and other organizations should present opportunities for students to make new connections in nature, as students may have difficulty finding time to organize such events themselves. Time spent in nature can provide college students emotional renewal, stress relief, and opportunities to strengthen relationships (Lincoln et al., 2022). College students can physically and mentally benefit from spending 20 minutes of their time outdoors (Rogers, 2021). This highlights the importance of outdoor activities for college students and their well-being.

On top of getting little time outdoors due to their workload, college students, along with much of the world, found themselves confined to their homes by the COVID-19 social restrictions. One study found that 85-95% of people in Spain, Israel, Italy, Croatia, Lithuania, and Slovenia visited green spaces prior to COVID-19 (Francesca et al., 2020). However, COVID-19 dropped green space usage in these countries from anywhere between 7-54% due to general lack of motivation to go outside and fear of spreading the virus (Francesca et al., 2020). The most commonly reported motive for visiting green space for all studied countries, except Lithuania, was physical exercise (Francesca et al., 2020). Experts Ammar et al. (2020) found that COVID-19 was disincentivizing college students from going outside. College students went from sitting an average of five hours daily to an average of eight hours daily. This led to an overall decrease in life satisfaction (Hermassi et al., 2021).

Path of Our Investigation

This section explores the methods used to achieve the project goal. Our project goal was to improve the mental and physical health of Worcester college students by revamping the WIOI and creating a sustainable plan for its success. First, we sent a survey to Worcester Colleges (Figure 1) to students and interviewed

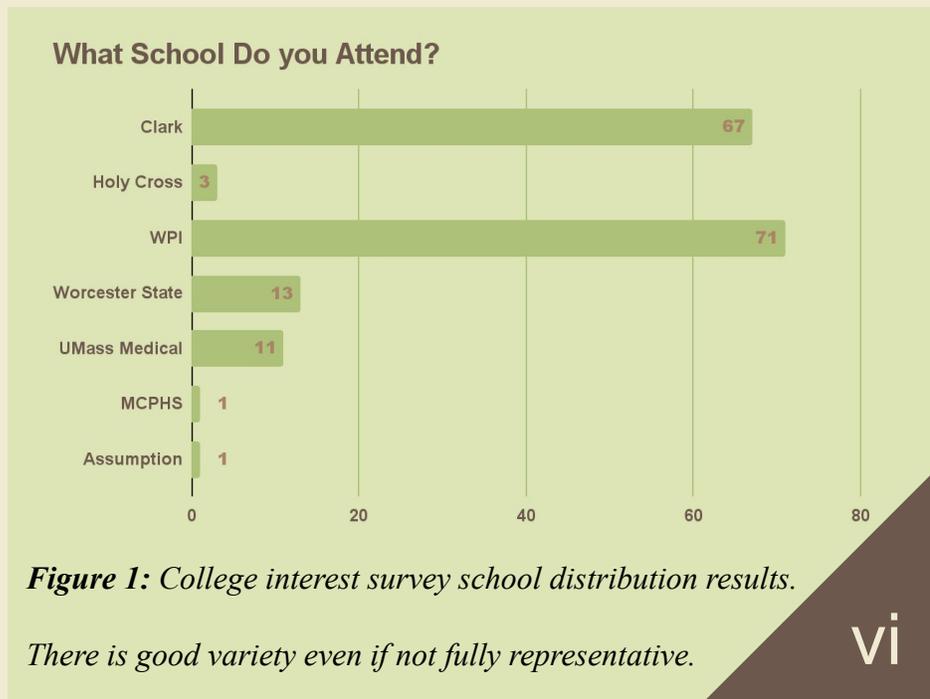


Figure 1: College interest survey school distribution results.

There is good variety even if not fully representative.

college staff. Next, we planned and executed a hike available for all Worcester area colleges. Finally, we created a proposal for our sponsor.

Our first objective was to gather data. We distributed a survey that gathered information about students' availability, preference of outdoor events, knowledge of local green space, transportation, and communication methods. The survey helped us plan an outdoor event, and 263 students across seven Worcester colleges completed the survey. We also interviewed 17 faculty and staff members, shown in Figure 2, to gather data about their events and advertising, as well as to create a network of support for events.

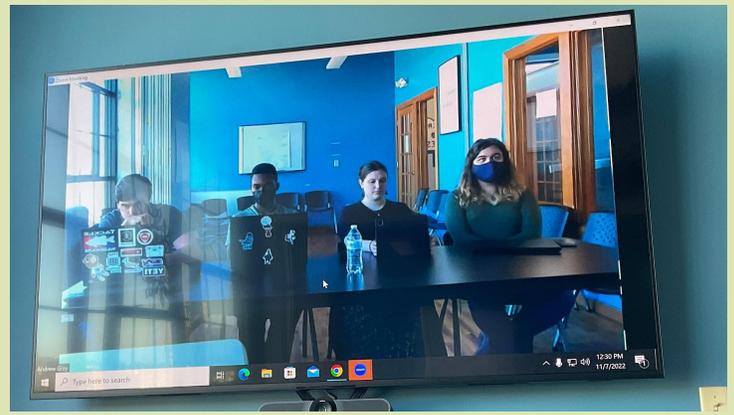


Figure 2: Preparing for an interview.

Hike in the Cascades

Saturday
November 19th
1:00 - 3:00 PM



Meet students from other Worcester colleges!



Scan for more information:



Figure 3: Flyer with QR code sign up, distributed in interviews (Veccia, 2022).

In our next objective, we planned, promoted, and executed an outdoor activity for Worcester college students. We completed a practice hike at Coes Reservoir with other student groups working in the Worcester Community Project Center. Our main hike was a two hour journey through The Cascades, based on survey information from objective one. Our hike involved 15 students from four different Worcester schools. Figure 3 shows our poster for the hike. We conducted pre and post hike surveys to learn more about the wellness of students and how to reach them for future events.

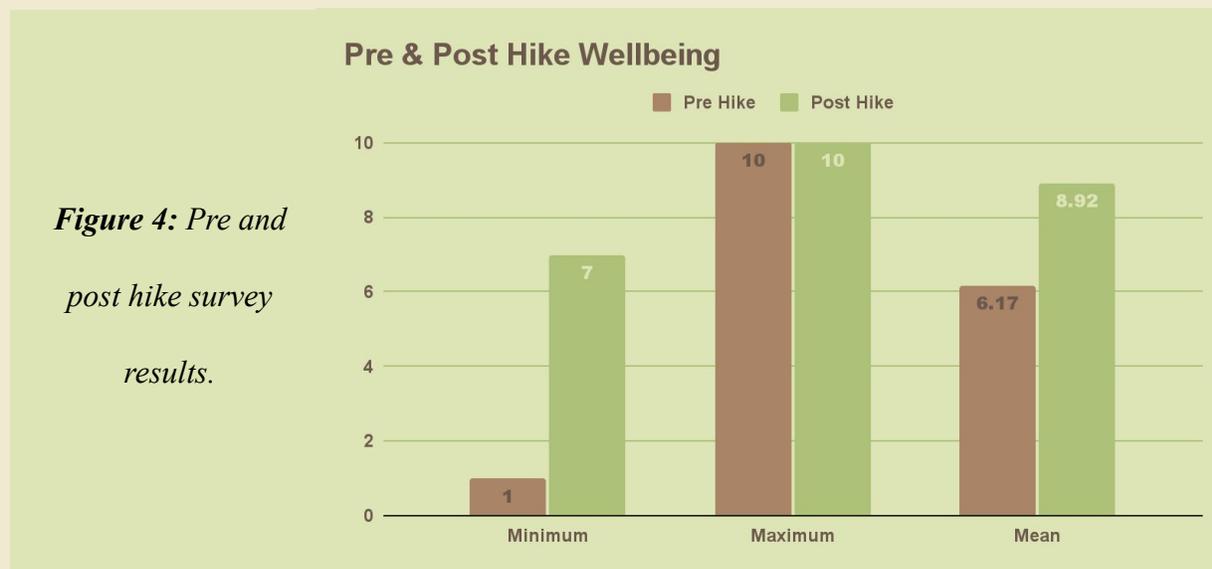
Finally, we created a proposal for the future of the WIOI. We included information learned after conducting our hike; the proposal also explored marketing and advertising methods researched by us. This proposal is useful for our sponsor to help the WIOI continue to grow.

Treasures Found Along the Trail

This section explores the findings made throughout the project. We discuss our findings regarding the benefits of time outdoors and their effects on the students that participated in our hike. Challenges in transportation and scheduling are mentioned. We also explore the interest in an intercollegiate outdoors program such as the WIOI and in the program being student-run. After that, we reviewed advertising techniques and methods that worked and didn't work. These findings will be useful as they provide information on how to run an intercollegiate event and how much desire there is for this program.

Our first finding was that students do benefit from time outdoors. Using our pre and post hike survey data, we saw a mean increase of 2.16 on a perceived well being scale of one to ten, or a 44% average increase (Figure 4). Our second finding was that hikes have several different challenges. One of these challenges is when students have little to no access to transportation. Our survey showed only 90 of 263 participants had reliable private transportation, and the issue was mentioned in several interviews. Students are also busy and are not always available to go on hikes. On a Sunday afternoon, 115 survey participants said they were available, which is less than half of all participants.

We also learned that there is interest in an intercollegiate outdoors program. Our interviews included staff from every Worcester college, but



only three mentioned programs designed to get students outdoors. Despite that, all faculty and staff stated they were interested in promoting our events. Additionally, our survey showed that 63% of respondents engaged in a hike on their own time. This shows students are interested in outdoor activities, specifically hikes. The intercollegiate outdoors program is most appealing to students and faculty when it is student-run. On the intercollegiate hike we ran, multiple students expressed how they preferred the student-run hike. Also, Jeanine Went, founder and

director of HECCMA, relayed her preference for working with student groups. This is a fact that the WIOI can and should take advantage of to facilitate the program's success in the future.

To run a successful event, we wanted to reach as many interested students as possible. There is no one solution that works best for all college students, thus the most beneficial modes of advertising need to be used together to effectively market events. Figure 5 shows how 31.6% of students said social media was one of their main ways of keeping updated about clubs, friends, and school events. While nearly 30% of students use email, faculty and staff at six of the eight schools we interviewed described the struggle of using email to communicate with students. Conversely, club officers are very receptive to emails and will get information to club members through internal communication methods. Within clubs, word of mouth works wonders, and in general it is the third best way to promote events to students. Successful marketing is great, but a good logo can keep students connected and involved. In our survey, 73% of students didn't know what the GWLT is, and many did not recognize the original WIOI logo. A good logo grabs people's attention, provides the viewer with basic information about its subject matter, and improves the recognition of the organization.

Most Popular Methods of Reaching Students

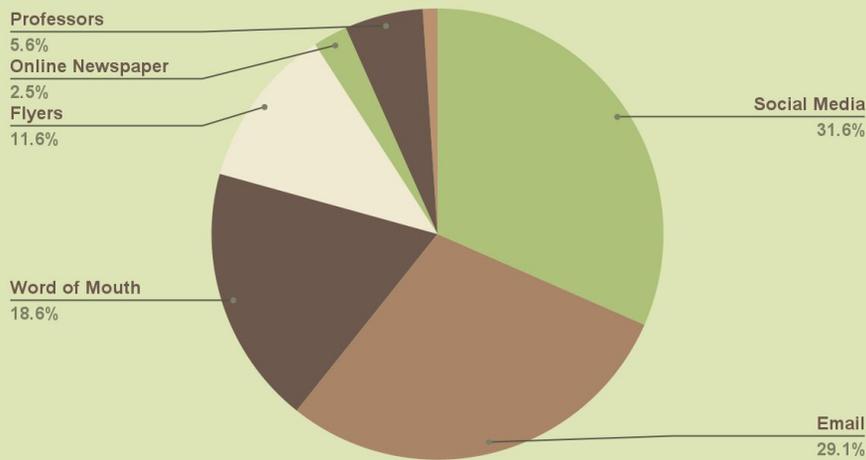


Figure 5: College Interest Survey results for what platform students learn about events.

Map of Recommendations

Based on our findings, we recommended a strong online presence to help the program grow. We created an Instagram account for the WIOI, and used the account to promote our hike. Although the Instagram following of the project is small, it is able to reach all Worcester schools because 80% of students use Instagram as their primary social media platform. We also provided our sponsor with an email list of interested students and faculty to promote events to their members. Likewise, a prominent website is important for a proper online

presence. The current website is outdated and difficult to find, as it is a subsection on the GWLT website. Students need a central location to learn about the WIOI, and it is not feasible to do that in person. Logos are also important for brand recognition, as mentioned in our findings. A professional should design the logo based on concepts created by the team. One possible option to get students involved is a logo contest using our email list. For recognition of the WIOI, social media platforms, websites, and a good logo are essential.

Our team also recommended the program work to be student-run. Prepping contacts and resources alone has required the dedication of four individuals during a 40-hour work week for seven weeks. Students and faculty also liked that we ran the project as a student team. The Terracorps is an organization specializing in environmental volunteering and land conservation. The organization has a Community Engagement Coordinator that could work alongside the WIOI to get student volunteers engaged with the program. Another resource is the Federal Work Study. Students complete work through off campus community service or on campus jobs. As each Worcester college has their own Federal Work Study, that uses the same process, there could be a consistent stream of students from each school to help the program. The Instagram page, in Figure 6, can be run by students as well. The WIOI has an opportunity to grow by getting students involved in the planning and management of the program.

End of the Trail

To keep the program on track, we created a Proposal Plan of Action for our sponsor to follow. The plan includes suggested next steps, based on requests from our sponsor, for the WIOI. These steps include suggestions for marketing, email correspondence, and grants. As the program continues to grow, we hope to see other intercollegiate programs to get students active and beyond just their campus. Thank you to everyone who took our survey and participated in our interviews, and we hope that you spend time exploring the great outdoors.

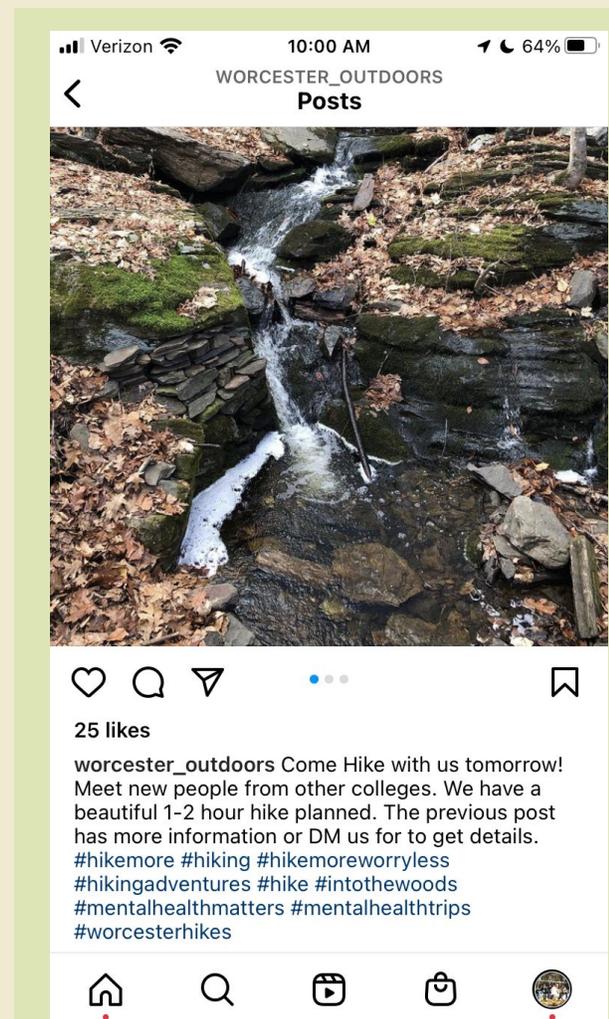


Figure 6: Event promotion

on Instagram.



Acknowledgments

This project couldn't have been completed without the help of our sponsor Greg Doerschler and advisor Laura Roberts. We would also like to thank all those who we interviewed and surveyed over the course of this project as their cooperation allowed us to succeed. Lastly, we are especially grateful to Brew on the Grid for sustaining us through our early days in the project center.



Trail Blazers

Andrew Gray

is an Electrical & Computer Engineering Major pursuing an MS in Management. He participates in baseball. He worked on the research and writing about the project sponsor, Objective 3, and Findings 2-4. He also focused on background editing and facilitating interviews.



Daniel Onyema

is a Computer Science Major. He also plays the trumpet and the baritone horn. He worked on the research and writing about the COVID-19 challenges, Objective 2, Finding 1, and Recommendation 1. He is the group paper editor, and helped with all sections on writing and research.

Emma Nollman

is a Mechanical Engineering Major as well as Psychology and Robotics Minor. She participates in Ballroom Dance Team as Secretary and the Art Club. She worked on the research and writing of the nature's benefits sections, Objective 1, Finding 5, and Recommendation 2. She is the note taker during interviews and edited the project sponsor info, Objective 1, and Findings chapter.



Maddie Veccia

is an Interactive Media and Game Design Major pursuing a BA/MS as well as a Computer Science Minor. She participates in The Alliance. She worked on the research and writing of college students' lack of nature exposure, Objective 2, Finding 4 and Recommendations 1 and 2. She also edited the college student info and Objective 3. She was the lead digital designer for report formatting and asset creation.

Table of Contents

Cover Page	i
Title Page	ii
Abstract	iii
Executive Summary	iv
Acknowledgements	xi
Trail Blazers	xii
Table of Contents.....	xiii
Table of Figures	xv
Table of Tables	xvii
Chapter 1: Head of the Trail	1
Chapter 2: Following the Background Trail	3
Nature Improves Mental and Physical Health	4
College Students Lack Exposure to Nature	7
A Trail to Connect College Students to Nature	10
Chapter 3: The Path of our Investigation	11
Ethical Consideration	12
Objective 1: Gather data and conduct interviews to gauge interest and establish connections	13
Conducting Interviews With Organizations and College Faculty Advertises Event and Creates	
Connections	14
Objective 2: Plan, promote, and execute one or more outdoor activities for Worcester college students and	
collect feedback on their experience	15
Practicing and Preparing for our Main Hike Ensured its Success	15
Pre-Activity and Post-Activity Surveys to Conduct	16

Table of Contents

Objective 3: Create and present a proposal to promote and execute more outdoor activities using the framework of the current WIOI	16
Chapter 4: Treasure Found Along the Trail	17
Finding 1: Time Outdoors Improves Mental Health	18
Finding 2: Outdoor Activities Have Many Obstacles	19
Finding 3: There is Interest in Intercollegiate Outdoors Programs	20
Finding 4: Student-Run Initiatives are Preferred	21
Finding 5: Promoting Events Needs Multiple Resources	22
Chapter 5: Map of Recommendations	25
Recommendation 1: Marketing Helps the Program Stay on Path	26
Recommendation 2: Run in a Pack	28
End of the Trail	30
References	32

Table of Figures

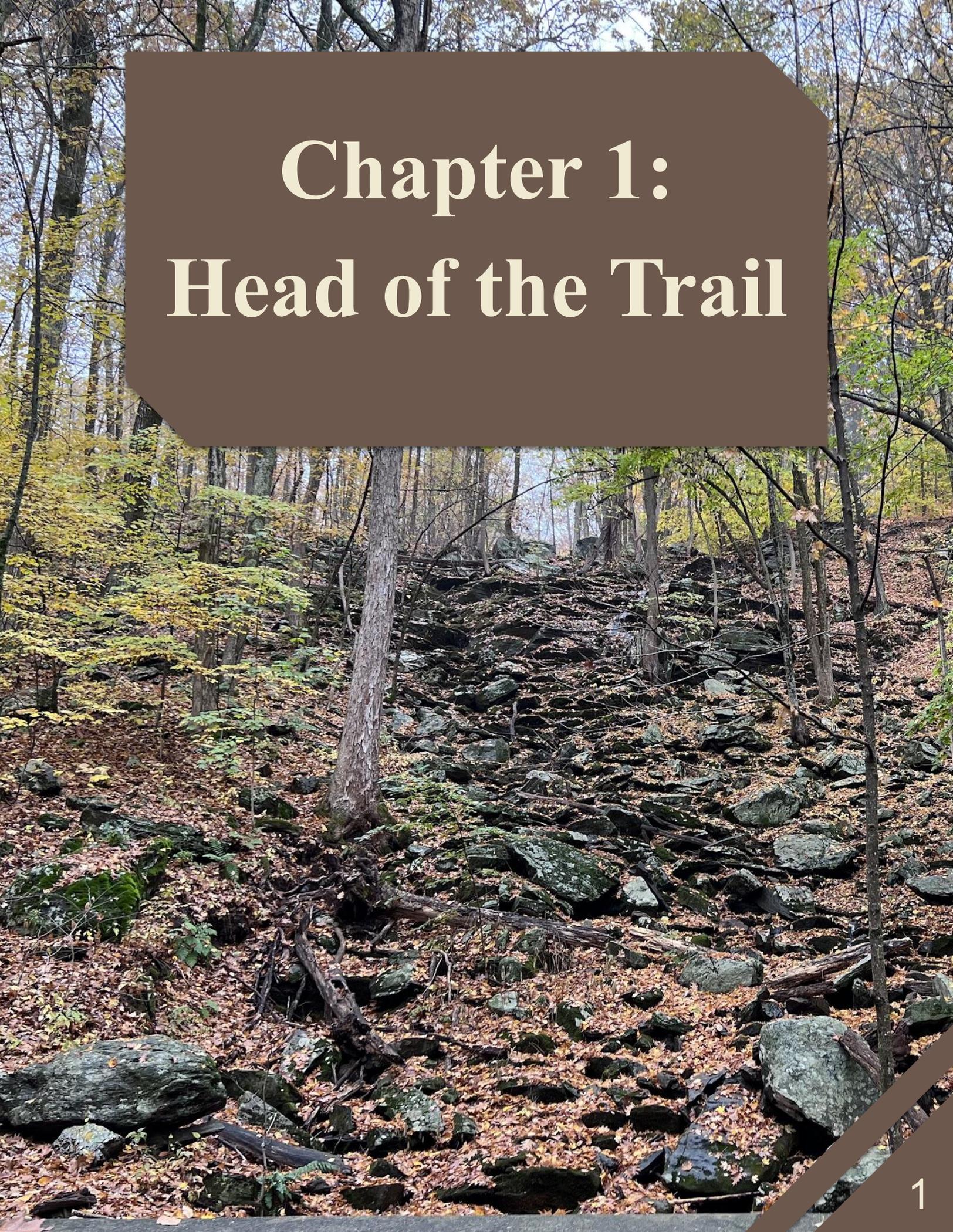
Figure	Page	Description
1	vi	College interest survey school distribution results. There is good variety even if not fully representative.
2	vii	Preparing for an interview
3	vii	Flyer with QR code sign up, distributed in interviews (Veccia, 2022).
4	viii	Pre and post hike survey results.
5	ix	College Interest Survey results for what platform students learn about events.
6	x	Event promotion on Instagram.
7	2	The project team at Coes Reservoir (Nollman, 2022).
8	5	Two graphs describing the relationship between nature experience and stress on the left and working memory on the right (Bratman et al., 2019, 4).
9	6	This graph shows the decrease mean sleep scores from before taking a walk and after taking a walk which shows an improvement in sleep quality (Ma et al., 2022, 6).
10	8	Perceived stress level changes over time by Adventure Activities (Chang et al., 2019, Figure 6).
11	8	Mean perceives stress level changes over time (Chang et. al, 2019, Figure 2).
12	9	Participant life satisfaction before and after COVID-19 (Hermassi et al., 2021).
13	9	Participant life excellence before and after COVID-19 (Hermassi et al., 2021).
14	10	Photograph of the Cascades, an example of Worcester public land (Greater Worcester Land Trust, n.d.).
15	12	The goal and objectives mapped out to show the process taken to complete the process.
16	13	College interest survey school distribution results. There is good variety even if not fully representative.
17	14	Photographs from a volunteer event where the WIOI was promoted (Nollman, 2022) (Doerschler, 2022).

Table of Figures

Figure	Page	Description
18	14	Flyer with QR code sign up, distributed in interviews (Veccia, 2022).
19	15	Photograph from Coes Reservoir Boardwalk.
20	16	Photograph from the intercollegiate hike.
21	18	Pre and post hike survey results.
22	19	Survey results on transportation.
23	20	Survey results on availability.
24	20	Schools' responses on whether their wellness centers hosts activities.
25	21	Preparing for an interview.
26	22	Pie chart showing the ranking of promoting resources.
27	23	Our logo concept to represent the outdoors and Worcester colleges.
28	23	The original WIOI logo (GWLTL, n.d.).
29	24	Post hike survey results about our logo.
30	26	Flow chart of the recommended marketing plan.
31	26	Event promotion on Instagram
32	27	Worcester Intercollegiate Outdoors Initiative website home page (GWLTL, 2022).
33	29	Terracorps website home page (Terracorps, 2022).
34	31	Trail Blazers.

Table of Tables

Table	Page	Description
1	v	This table displays nature's impact on different health issues (Twohig-Bennett et al., 2018, 634).
2	4	Table displaying the correlations between green spaces in neighborhoods and depression, anxiety and stress (Cox et al., 2017, 150).
3	7	This table displays nature's impact on different health issues (Twohig-Bennett et al., 2018, 634).

A photograph of a forest path covered in rocks and fallen leaves, with trees showing autumn foliage. The path is a mix of large and small grey rocks, with a thick layer of brown and orange leaves scattered across them. The trees are mostly thin, with some showing yellow and green leaves. The background is a dense forest of similar trees.

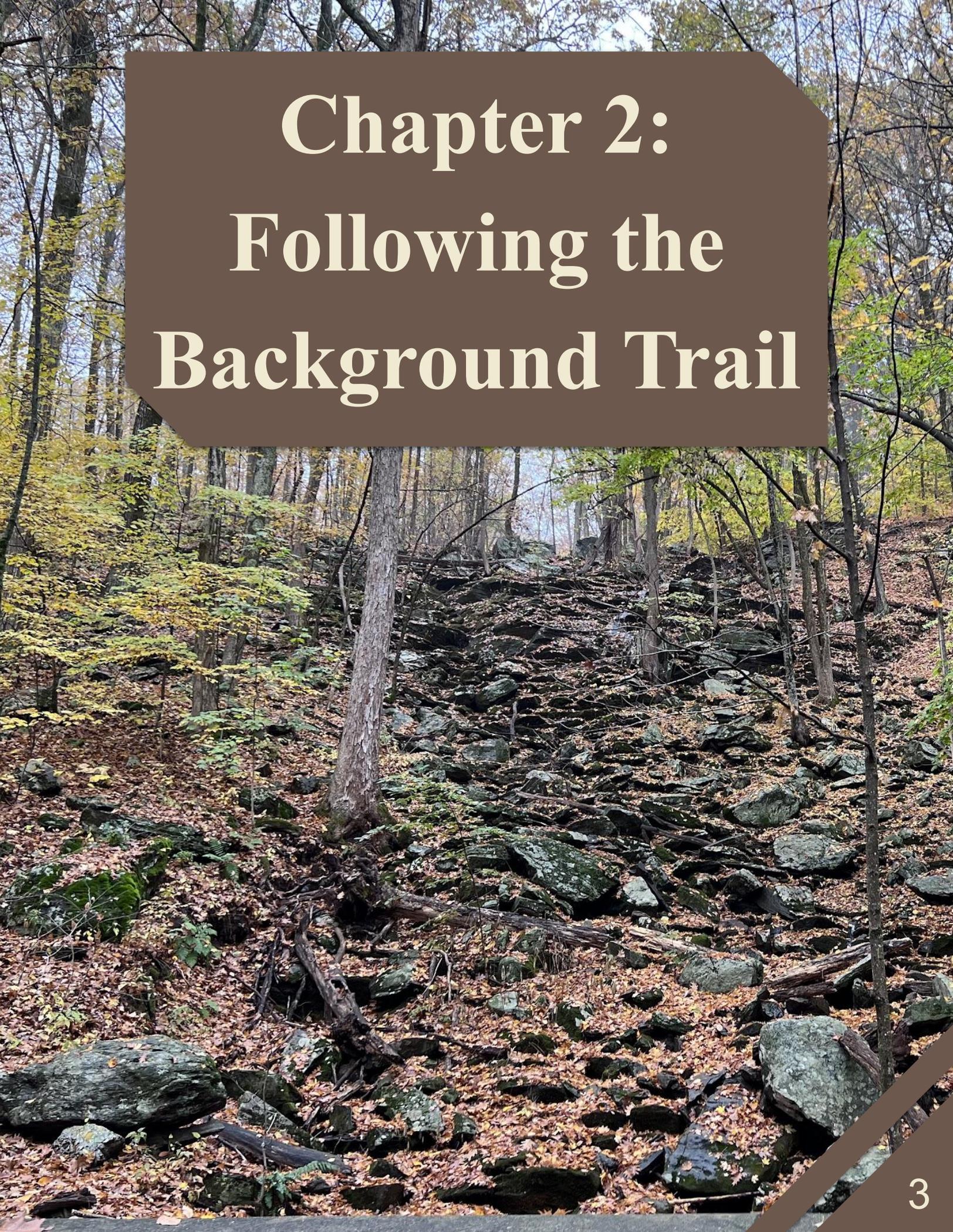
Chapter 1: Head of the Trail



Figure 7: The project team at Coes Reservoir (Nollman, 2022).

From the Grand Canyon to Nantucket beaches, the outdoors are endless. Spending time in nature, as seen in Figure 7, shows a multitude of benefits to a person's well-being. Nature can reduce stress, improve sleep, and increase memory. Despite these many benefits, college students in particular do not spend enough time in nature due to their busy schedules. Student time outdoors was also greatly reduced by COVID-19, forcing many to spend the vast majority of their time indoors for remote learning. College schedules and the size of the city make activities in nature difficult.

There are eight colleges in and around Worcester and many students do not know the vast green spaces in their area. There are 1000 acres and 60 parks available in Worcester (Park Spirit, 2020). Our project sponsor is the Worcester Intercollegiate Outdoors Initiative (WIOI), aided by the Greater Worcester Land Trust (GWLTT). The program is dedicated to getting Worcester college students into nature. With this project, our main goal was to improve the mental and physical health of Worcester college students by revamping the WIOI and creating a sustainable plan for its success. This paper explores the benefits of outdoor activities, why college students generally lack exposure to nature, the effort to revitalize the WIOI, and findings from the project.

A photograph of a forest landscape. The foreground and middle ground are dominated by a steep, rocky slope covered in fallen brown leaves and scattered dark rocks. Several trees with thin trunks are scattered across the slope, some with green leaves and others with yellow or brown foliage. The background shows a dense forest of taller trees with a mix of green and yellow leaves. The sky is visible through the canopy, appearing overcast. A dark brown, semi-transparent banner is overlaid on the top half of the image, containing the chapter title in white serif font.

Chapter 2: Following the Background Trail

In this chapter, we began by synthesizing the best practices related to the improvement of mental and physical health that are agreed upon by experts in this field. Next, we gave a brief overview of college students' lack of exposure to nature that was made more prevalent by COVID-19. We conclude by introducing the GWLT and its relationship with the WIOI.

Nature Improves Mental and Physical Health

Nature, along with its scenic beauty, can be seen to improve a person's mental health, cognitive functioning, and physical health. Generally speaking, humans have a tendency to feel at peace in nature; taking walks, going on hikes, or even decompressing in the sun after a long day gives a feeling of tranquility. This section gives insight into how being outside, even for a short period of time, can greatly improve one's well-being. Spending time in nature reduces the effects of mental health disorders, improves sleep, and improves physical health issues.

Mental Health disorder symptoms decrease with an increase in quality green space experience. A study done by Puhakka (2021), collected personal anecdotes from students that took part in outdoor recreation with their college introduction program. She writes that one student said, “how interacting with nature improved their mood, increased positive feelings such as joy and happiness, and decreased anxiety and negative feelings” (5). As quoted, we can see that the students had a decrease in anxiety and depression. To further explain why people feel better after being in nature, we looked at Cox et al. (2017), a study on how neighborhoods with more green space decrease depression, anxiety, and stress (150). This study defined vegetation cover by the amount of plants, trees, and animals in the surrounding area of a person's neighborhood; in Table 2, it is seen that vegetation cover has a negative correlation with both depression (-0.41), anxiety (-0.34), and stress (-0.30). This study showed an increase of plants in your

Table 1. Nested model averaging of ordinal regression showing negative relationships between two visible components of nature around the home and three mental-health disorders while adjusting for sociodemographic factors.

Variables	Depression		Anxiety		Stress	
	<i>M</i>	Standard error (SE)	<i>M</i>	SE	<i>M</i>	SE
Vegetation cover	-0.41 (0.15)**		-0.34*	0.16	-0.30*	0.15
Actual abundance	-		0.26	0.16	0.25	0.16
Actual richness*	-		-		-	
Afternoon abundance	-0.43 (0.15)**		-0.54**	0.18	-0.35*	0.18

Table 2: Table displaying the correlations between green spaces in neighborhoods and depression, anxiety and stress (Cox et al., 2017, 150).

neighborhood decreased participant depression by 41%, anxiety by 34%, and stress by 30%. Additionally, a BioScience book by Bratman et al. (2019) delves deeper into the evidence of associations between green space experience and a decreased incidence of disorders (3). Some of these disorders are seen in college students, including anxiety disorders, depression, and attention deficit and hyperactivity disorder (ADHD). A study, reported on by Twohig-Bennett and Jones (2018), showed that an increase in green space activity provided positive health effects (628). This study found a decrease of 0.05 in participants salivary cortisol and 2.57 in heart rate when participants spent more time in nature. These numbers are physical indicators of stress; salivary cortisol is related to the stress of a person which will inevitably lead to more adverse effects, such as an increased heart rate. The data presented shows a decrease of physical stress indicators as a result of exposure to nature. When more time is spent in nature the effects of mental health disorders are lessened.

Studies show a positive correlation between time in nature and working memory. In Figure 8, the graph on the right displays working memory in relation to nature experience (Bratman et al., 2019, 4). A majority of the groups displayed an increase in their working memory's ability to process information with more time in nature. Group B did not show an increase, because the participants became more stressed when in nature (Bratman et al., 2019, 4). This is useful information, as some individuals get stressed when in certain natural environments. However, when you find a green space that you enjoy, the positive effects seen in other groups occur.

To add to his first study, Bratman et al. (2015) saw that a person's reported rumination and prefrontal cortex blood flow decreases. The perceived rumination pre-walk to post-walk had a mean change of -2.33, and MRI scans taken of participants showed the blood flow rate in the brain of -6.89 (Bratman et al., 2015). Rumination is a process where one cannot stop thinking, mainly in the prefrontal cortex.

Additionally, the blood flow indicates where the brain is functioning, thus more blood flow means more brain activity. In most people there is less activity in their prefrontal cortex as they grow up because this area of the

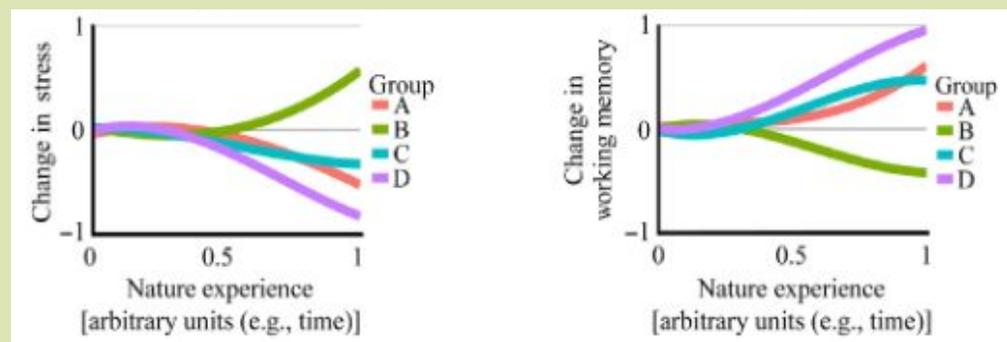


Figure 8: Two graphs describing the relationship between nature experience and stress on the left and working memory on the right

(Bratman et al., 2019, 4).

brain makes impulsive decisions (Kolk et al. 2022). Less activity in the brain means one will have less thoughts and impulses which will improve one's focus and working memory. To ensure there was no physical reason for these improvements, heart rate and respiratory rate were checked and showed an increase in both urban and natural areas, meaning no effect was from physical changes. Working memory improves when walking in nature when one perceives a decrease in their rumination or stress. The improvement of students' working memory increases their ability to focus and complete school work.

Spending more time in nature improves a person's quality of sleep. Ma et al. (2022) compared the impacts of urban and park settings and how they affected the sleep of university students. The participants completed 30-35 minute walks at a moderate pace, evaluating their sleep with the Pittsburgh Sleep Quality Index and personal feedback. The study concluded that there was a medium effect of time spent outdoors on improved sleep (Ma et al., 2022). The pre-test to post-test evaluations of perceived sleep and quality of sleep increased no matter the walking environment. However, there was a greater improvement of sleep quality for the participants that walked in nature versus in an urban setting. Similarly, Gladwell et al. (2016) studied the sleep quality of participants in relation to the natural or urban walking setting they took during lunch breaks. To show the changes in sleep, this research focused on heart rate variability (HRV). The people who walked in green areas had sleep durations 20 minutes longer than

those who walked in urban areas (Gladwell et al. 2016). While the researchers reported the sleep duration difference in Figure 9 as not significant, they found that the HRV reports were significantly different (Gladwell et al. 2016). These HRV variables all had around a 0.33 effect size, meaning the people walking in nature had better sleep indicators by about 30% compared to the people walking in urban settings (Gladwell et al. 2016). Perceived sleep and statistically analyzed sleep variables show improvements in a person's quality of sleep with outdoor activity in nature.

On top of mental health and sleep, nature can impact physical health risks of diseases.

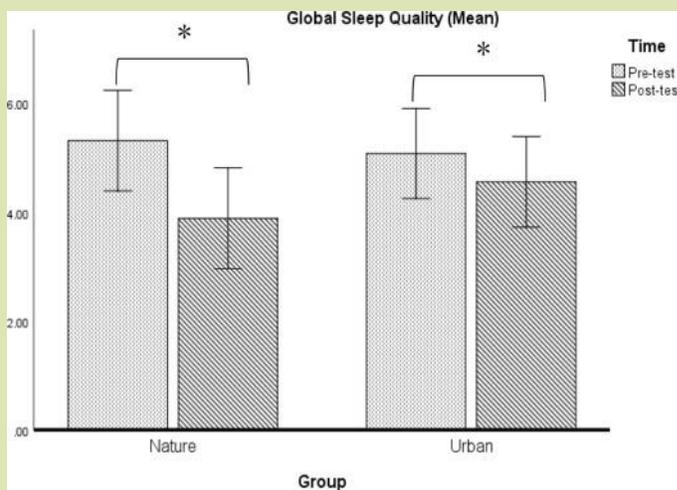


Figure 9: This graph shows the decrease mean sleep scores from before taking a walk and after taking a walk which shows an improvement in sleep quality (Ma et al., 2022, 6).

Twohig-Bennett and Jones (2018) report on a study that showed positive health effects with an increase of green space activity (628). Reported in Table 3, some important benefits to note are a later occurrence of type II diabetes by 0.72, all-cause mortality by 0.69, cardiovascular mortality by 0.84, and an increase of good self-reported health of 1.12. These numbers show the correlation of more green space to an improvement of health conditions or a decrease in the likelihood of an illness occurring.

An article reviewed by Daniel Bubnis and Emily Swaim, (2022) presents a study by James, et al.(2016) that concluded women living in more green neighborhoods were 34% less likely to die from respiratory diseases. The main reason is the better air circulation in nature which means less pollen going through your body. On the topic of air circulation, the article suggests how this aspect of nature helps slow the spread of diseases such as COVID-19. This is because, based on a study by Bulfone. et al. (2021), viruses are 18.7 times more likely to be transmitted indoors than outdoors. Also, being out in nature can expose you to less lethal microorganisms to give your immune system practice at fighting them off. A person can greatly improve their physical health by spending more time outside rather than indoors. The mental, cognitive, and physical improvements that come with spending as little as 30 minutes a day outdoors can greatly impact a college student's life.

College Students Lack Exposure to Nature

College students don't spend enough time in nature. This is the result of many factors, from workload to other obligations. The COVID-19 pandemic also caused many college students to not spend crucial time outdoors in nature. College students have a lot of stress and newfound

Outcome	N (participants)	Odds ratio (95% CI)	Heterogeneity I ²	P-value
Good self-reported health	10 (41873103)	1.12 (1.05, 1.19)	100%	p < 0.001
Preterm birth	6 (1593471)	0.87 (0.80, 0.94)	68%	p < 0.001
Type II diabetes	6 (463220)	0.72 (0.61, 0.85)	73%	p < 0.001
All-cause mortality	4 (4001035)	0.69 (0.55, 0.87)	96%	P = 0.002
Hypertension	4 (11228)	0.99 (0.81, 1.20)	62%	P = 0.91
Small for gestational age	4 (1576253)	0.81 (0.76, 0.86)	65%	p < 0.001
Cardiovascular mortality	2 (3999943)	0.84 (0.76, 0.93)	54%	p < 0.001
Stroke	3 (256727)	0.82 (0.61, 1.11)	59%	P = 0.20
Dyslipidaemia	2 (5934)	0.94 (0.75, 1.17)	57%	P = 0.56
Asthma	2 (2878)	0.93 (0.57, 1.52)	68%	P = 0.78
Coronary heart disease	2 (255905)	0.92 (0.78, 1.07)	48%	P = 0.26

Table 3: This table displays nature's impact on different health issues (Twohig-Bennett et al., 2018, 634).

responsibility, making time outdoors essential for their wellbeing.

College students often struggle to find time to spend among nature. During childhood, the time we spend outdoors is often determined and facilitated by our parent(s) or guardian(s). As we grow older, and need to learn how to live on our own, keeping track of time spent outdoors becomes one of many things we must learn. For college students especially, the transition to adult life can be difficult and chaotic. College life can be overwhelming on its own, but having to learn to live without the support of a parent or guardian is difficult. For college students, spending time outdoors may not be something at the forefront of their minds when they have tests and homework to consider. This is why it is up to colleges and other organizations to create opportunities for college students to spend that necessary time outdoors among nature. Without specific events and activities designed for them, it can be difficult for college students to find the time to be outdoors.

College students can reap many benefits from time spent in nature. Time spent in nature provides college students opportunities for emotional renewal, strengthening of relationships, and relieving of stressors (Lincoln et al., 2022). College students are usually in positions where as little as 20 minutes of time spent outdoors can show increased physical health and stress reduction (Rogers, 2021). Figure 10 and Figure 11 show the perceived lowering of stress levels in college students as they prepare for, and later go out on an outdoor activity.

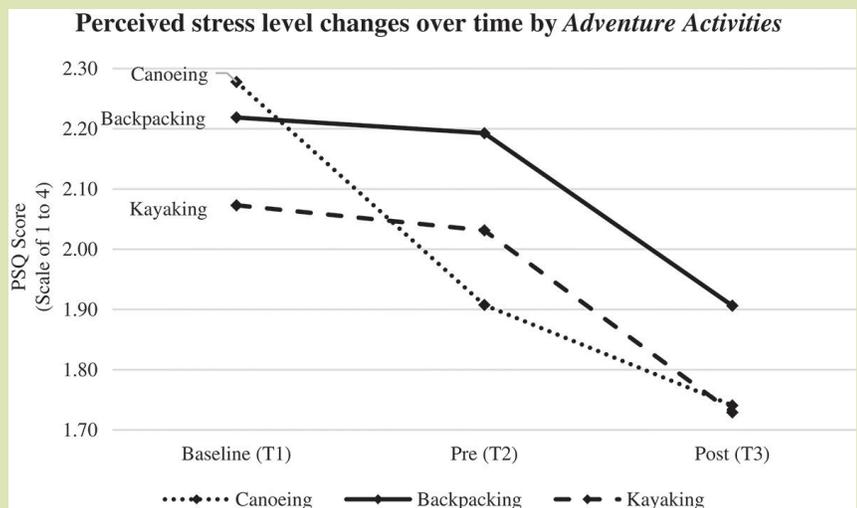


Figure 10: Perceived stress level changes over time by Adventure Activities (Chang et al., 2019, Figure 6).

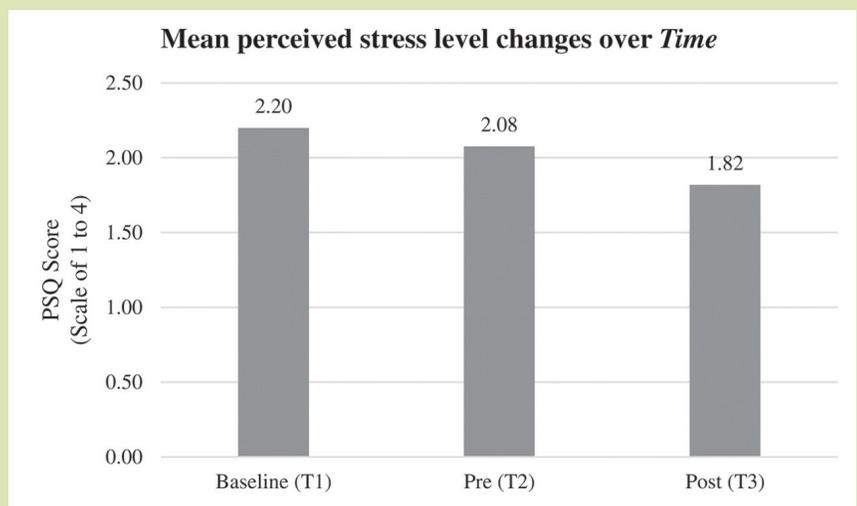


Figure 11: Mean perceived stress level changes over time (Chang et al., 2019, Figure 2).

With only one activity, these college students have a decrease in stress. This shows the importance of outdoor activities for college students and their wellbeing.

On top of getting little outdoor time due to their workload, college students, along with much of the world, found themselves confined to their homes by the COVID-19 social restrictions. Francesca et al. (2020) conducted a study on the changes of visitation of green spaces during COVID-19 in Spain, Israel, Italy, Croatia, Lithuania, and Slovenia, as well as the subject's motivations for visiting green spaces. In this study, they found that 85-95% (varies between countries) of individuals visited green spaces frequently before COVID-19 (Francesca et al., 2020). Due to fear of spreading the virus and general decreased motivation to go outside, green space excursions in most of the observed countries had dropped during COVID-19; with the exceptions of Lithuania and Slovenia, which both surprisingly increased by less than a percent (Francesca et al., 2020). Croatia's green space usage dropped by 9%, Israel's by 7%, Italy's by 53%, and Spain's by 54%, making COVID-19's impact on global outdoor recreation

evident (Francesca et al., 2020). The most commonly reported motive for visiting green spaces for all studied countries, except Lithuania, was physical exercise (Francesca et al., 2020). Experts Ammar et al. (2020) found that because COVID-19 was acting as a disincentive for going outside, overall physical activity during the pandemic had also dropped: college students went from spending an average of five hours a day sitting to an average of eight hours a day. In one of Hermassi's studies

(2021), males and females rated their satisfaction of life in a questionnaire, wherein the total score could range from five to 35 arbitrary units. As seen in Figure 12, males rated their life satisfaction before and during COVID-19 as 28.8 ± 4.26 and 16.4 ± 5.25 respectively, and females rated their life satisfaction before and during COVID-19 as 27.5 ± 5.26 and 11.8 ± 6.67 respectively. A similar trend occurred with Hermassi's life excellence questionnaire shown in Figure 13.

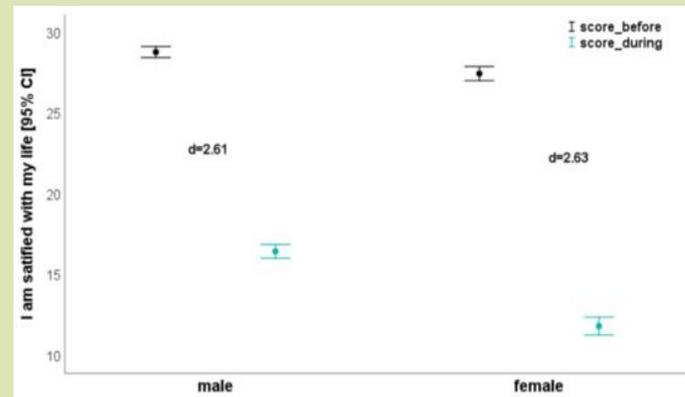


Figure 12: Participant life satisfaction before and after COVID-19 (Hermassi et al., 2021).

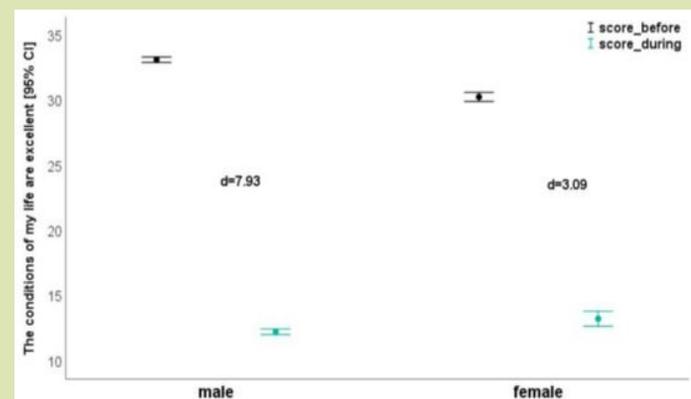


Figure 13: Participant life excellence before and after COVID-19 (Hermassi et al., 2021).

Knowing the benefits of the time spent in nature, how college students don't spend enough time outdoors, and how COVID-19 further restricted physical activity, there are organizations that help get students outdoors.

A Trail to Connect College Students to Nature

The Worcester Intercollegiate Outdoors Initiative (WIOI) recognizes the importance of spending time in nature. The Clark Outing Club and Nature Connection served as the initial inspiration for the program. The Outing Club focused on all kinds of trips, while the Nature Connection focused more on GWLT land. Over the span of 14 years, our project sponsor facilitated 450 activities with 1400 unique students across both groups (G. Doerschler, personal communication, November 21, 2022). In 2018, the program began working with the GWLT to expand the WIOI. The vision for this collaboration included not only engaging with a wider spectrum of students, but creating pathways for students from different campuses to interact with one another. Unfortunately, the COVID-19 pandemic brought most of the Intercollegiate Outdoors efforts to a halt because of the struggle to keep connections with colleges and students.

The GWLT, founded in 1987, works to conserve Worcester lands. This land extends all across the city, including locations such as the Cascades, as seen in Figure 14, and Donker Farm. In order to protect the conserved

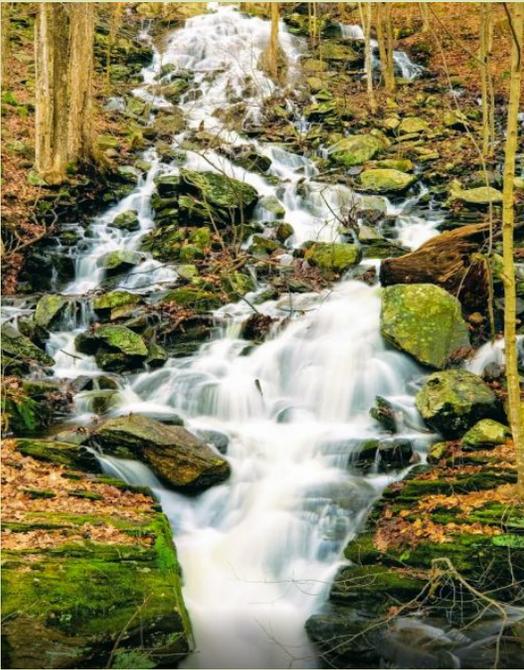
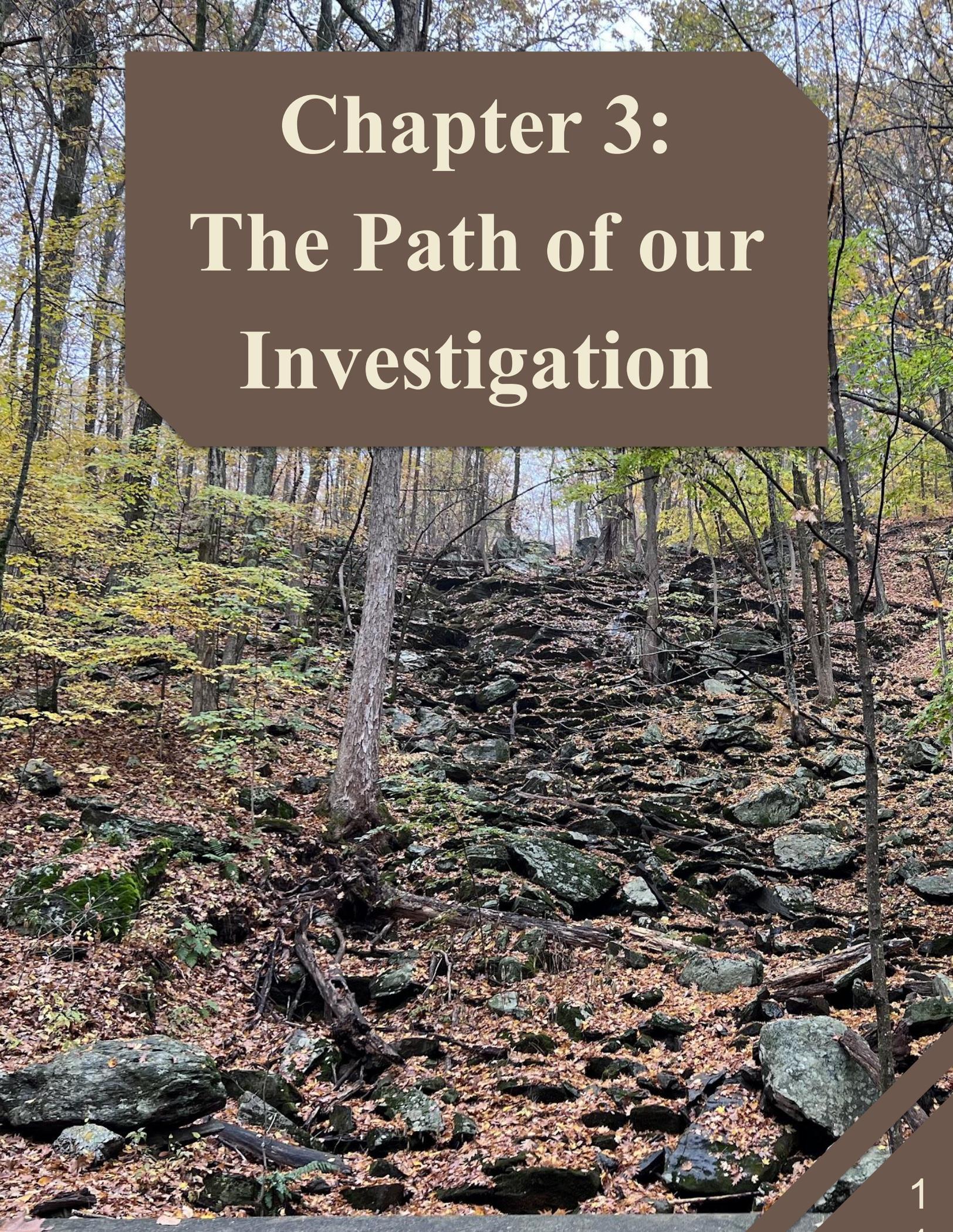


Figure 14: Photograph of the Cascades, an example of Worcester public land (Greater Worcester Land Trust, n.d.).

land, the GWLT runs volunteer events for the community to get outside and clean up trails. There are also community events like group hikes and photo opportunities (Worcester Telegram & Gazette, 2007). Much of this conserved land is near the various Worcester Institutions, making the land a great local opportunity to experience all the benefits of nature. Due to the benefits of nature and how college students do not spend enough time outside, a program like the WIOI is essential for the Worcester area colleges.

The WIOI reached out to the Worcester Community Project Center to revive and bolster their efforts, and help make the initiative sustainable. Our team is working with the WIOI to connect the colleges and get students out into nature.



Chapter 3: The Path of our Investigation

This section explores the methods used to achieve the project goal. Our project goal was to improve the mental and physical health of Worcester college students by revamping the Worcester Intercollegiate Outdoors Initiative and creating a sustainable plan for its success (Figure 15). To start, we conducted 17 interviews with college wellness centers, clubs, and organizations with similar interests to our project. We also sent out a survey to more than 10 student groups to gather information and gauge interest. Next, we planned and executed a hike available for all Worcester area college students. Finally, we created a proposal for our sponsor to help keep the initiative thriving in the future.

The goal of this project was to improve the mental and physical health of Worcester college students by revamping the Intercollegiate Outdoors Initiative and creating a sustainable plan for the future.

Gauged interest, availability, and ability among Worcester college students and faculty, clubs, and community organizations.

Planned, promoted, and executed one or more outdoor activities for Worcester colleges students and collected feedback on their experience.

Created and presented a proposal to promote and execute more outdoor activities using the framework of the current WIOI.

Figure 15: The goal and objectives mapped out to show the process taken to complete the process.

Ethical Considerations

We received approval from the Worcester Polytechnic Institute (WPI) Institutional Review Board (IRB) to complete our studies. The approval letter can be found in Supplemental Materials, and the IRB approved the surveys and interviews with record number: IRB-23-0174. In order to keep the survey ethical and fair, all information was anonymous. Participants were given a basic introduction of the scope of our project, risks, and potential benefits. Unless a student wanted to provide their contact information, separate from their survey answers, no identifiable data was collected. Similarly, all interviews asked for consent to note taking, as well as whether they wanted to remain anonymous.

Objective 1: Gather data and conduct interviews to gauge interest and establish connections

We distributed a survey, shown in Figure 16, that gathered information about students' availability, preference of outdoor events, knowledge of local green space, transportation, and communication methods to find out about events. We also interviewed faculty and staff members to gather data. These interviews focused on creating a network of support for events.

What School Do you Attend?

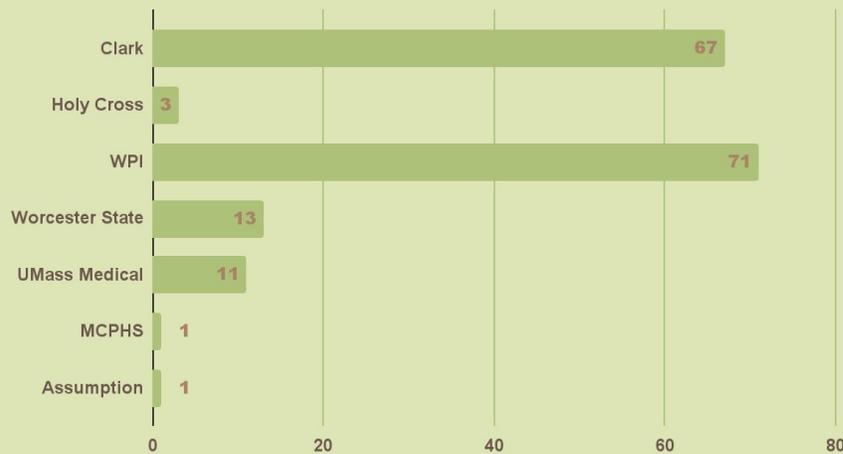


Figure 16: College interest survey school distribution results. There is good variety even if not fully representative.

We utilized a survey to contact students at all Worcester colleges in the limited time frame of the project, although surveys can be biased, unrepresentative, and time consuming if done incorrectly. We received survey responses from the outdoors and outing clubs of Assumption University, Clark University (Clark), College of the Holy Cross (Holy Cross), WPI, and UMass Chan Medical School (UMass); Massachusetts College of Pharmacy and Health Sciences (MCPHS) Student Government Association; Clark's Arboretum Advocates Club; WPI's Green Team and Adventure Club; and UMass's Community Garden Interest Group and Wilderness Medicine Group. To address this, we created multiple drafts, received feedback, and designed the questions to be impacted by these limitations as little as possible (Finke, 2017). We distributed the survey through a brief email explaining the project, as many students would not read the email if it was too long (Mejia, 2017). Converse et al. (1986) suggests implementing the survey as a pretest to uncover any issues there may be. Therefore, we tested the survey on a test group of students before contacting these schools. The survey was open and regularly monitored for the duration of the project, to ensure students from all schools responded.

Conducting Interviews With Organizations and College Staff Advertises Event and Creates Connections

Faculty and staff were another good resource for student activities promotion and wellness at the eight schools. We used the interviews to gather information and to establish a network of support for the WIOI. The network was important to assist us with distributing information about our event and survey to students at every school. Figure 17 shows a volunteer event that helped promote the WIOI. Rowley (2012) conveys how asking



Figure 17: Photographs from a volunteer event where the WIOI was promoted (Nollman, 2022) (Doerschler, 2022).

the same questions to be consistent gives you the ability to compare people's views. From this, we designed our faculty interviews to have similar questions, focusing around events for student wellness and how these events were promoted. Goldstein (2002) describes how interviews can lead to biased results, as only groups with interest will respond to our request. To mitigate the bias, we interviewed and advertised with Wellness and Counseling Centers

from Clark, Quinsigamond Community College (QCC), WPI, UMass, Assumption University (Assumption). Anna Maria's Student Activities; WSU's Fitness Center; Holy Cross professors of Environmental Studies; and the Community Engagement services of Clark. Wellness and Counseling focused on promoting well-being events, Student Activities promoted events to all students, the Fitness Center focused on student fitness activities, Environmental Studies focused on outdoors activity, and Community Engagement specialized in volunteering and engaging with the community. Figure 18 shows the flyer sent and distributed at the Worcester colleges. These different staff members were able to provide us



Figure 18: Flyer with QR code sign up, distributed in interviews (Veccia, 2022).

with differing perspectives on student activities and their planning, as well as establish connections for our events.

We contacted the Higher Education Consortium of Central Massachusetts (HECCMA) and Mass Audubon to interview them on their connections between the colleges in the area. Based on recommendations from Goldstein (2002), we created interview questions, found in the Supplemental Materials, to give us insight into how colleges are already connected, as well as potential connections. The information gained from HECCMA, Mass Audubon, and other colleges, provided us with valuable data and helped us promote events.

Objective 2: Plan, promote, and execute one or more outdoor activities for Worcester college students and collect feedback on their experience.

We planned, promoted, and executed an outdoor activity for Worcester college students. The activity was a short hike through The Cascades, based on survey information from Objective 1. We conducted pre and post hike surveys to learn more about the wellness of students and how to reach them for future events.

Practicing and Preparing for our Main Hike Ensured its Success

After reaching out to students and faculty to promote the event, we engaged with other students working on projects in the Worcester Community. Together, we explored Coes Reservoir Boardwalk, shown in Figure 19, which helped us learn to facilitate a hike. This event allowed us to test our pre and post hike surveys.

After practicing, we prepared for the main intercollegiate hike. The hike occurred in The Cascades on November 19th, with attendees coming from WSU, WPI, UMass, and Clark. This hike helped establish connections and generate interest in other events. As our sponsor Greg Doerschler says: “in order to run events, one needs students.



Figure 19: Photograph from Coes Reservoir

Boardwalk. (Veccia, 2022))

But, to get students, one must run events.” Figure 20 shows a photograph from the event.



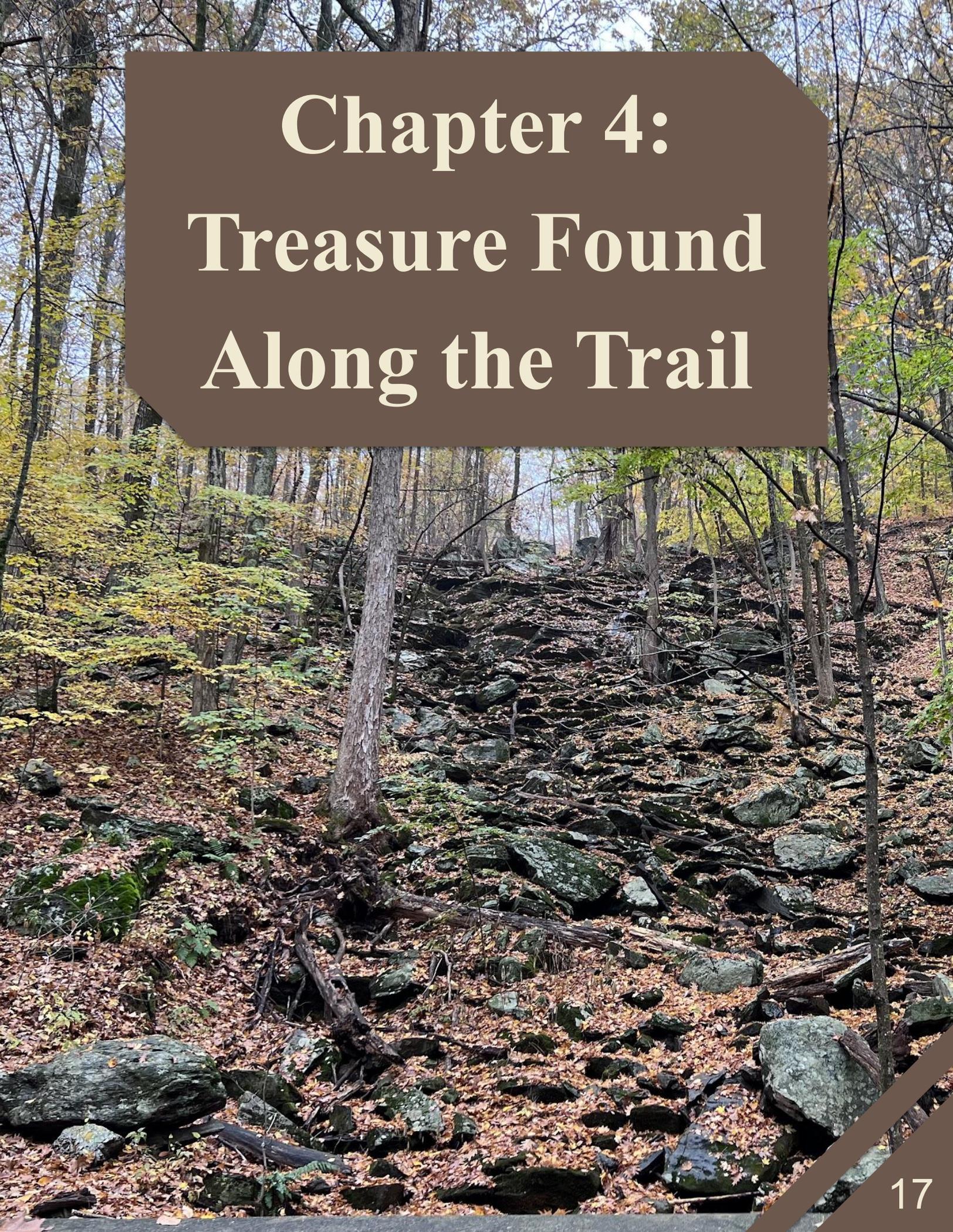
Figure 20: Photograph from the intercollegiate hike.

Pre-Activity and Post-Activity Surveys to Conduct

We gauged the participants' perceived well-being before and after the hike. The conducted pre and post hike survey data gathered students' reaction to the event, contact information to be used for other events, and possible improvements to the hike. This information will be useful to help our sponsor pitch the project to other students and organizations that showed interest. Student feedback helps our sponsor run other events and reach students.

Objective 3: Create and present a proposal to promote and execute more outdoor activities using the framework of the current WIOI.

The last step of this project was to create a final deliverable with recommendations for the WIOI. The proposal contains information from the surveys conducted, interviews completed, and other research to benefit our sponsor. Penrod (2003) outlines how to create a good proposal, including commentary about our goals and thoughts for the initial run of the event. He then suggests possible improvements based on the experience of running an event. After running the outdoors event, we collected information on what was successful to reach and engage students. Although the project time frame was limited, the information and comments in our recommendations were valuable to our sponsor. Some information came from student suggestions for improvements from the post-hike survey and comments. In the coming chapters, we will discuss our findings and recommendations. We provided these questions to our sponsor to help plan for future events and make adjustments as needed.

A photograph of a forest path covered in rocks and fallen leaves. The trees have sparse foliage, suggesting autumn. A large, dark brown, semi-transparent banner is overlaid on the top half of the image, containing the chapter title in white serif font. The path leads uphill through the woods.

Chapter 4: Treasure Found Along the Trail

This section explores the findings made throughout the project. We discuss our findings regarding the benefits of time outdoors and its effect on the students that participated in our hike. Challenges in transportation and scheduling are mentioned. We also explore the interest in an intercollegiate outdoors program such as the WIOI and the preference for it being student-run. After that, we review advertising techniques and methods that worked and didn't work. These findings will be useful as they provide information on how to run an intercollegiate event and how much desire there is for this program.

Finding 1: Time Outdoors Improves Mental Health

Mental health benefits are seen when college students go outdoors. Participants on hikes showed improvements in their mental health and well-being. Anecdotes from interviewees and hike surveys confirmed the importance of outdoor activity.

When we led participants on a hike on November 19th, we conducted pre and post hike surveys, where we compared perceived well-being of students before and after the activity. Prior to the hike, participants had a mean perceived well-being of 6.17 out of 10. In the post survey, the results jumped to 8.92 on a perceived well-being scale from 1-10 seen in Figure 21. This aligns with our observations, as students got to meet others with similar interests to them, and interacted with each other enthusiastically. Although the sample size is small, there is a noticeable increase of 44.6% in well-being. This well-being increase aligns with a study done by Puhakka (2021) that showed

Pre & Post Hike Wellbeing



Figure 21: Pre and post hike survey results.

a positive correlation between outdoor activity and college student well-being; these findings are corroborated by Cox et al. (2017) and Twohig-Bennett and Jones (2018). Data from outside research and our own research both show the importance of time outdoors on well-being.

Our observations of the hike also align well with what we learned from our interviews with the eight schools. When speaking to our interviewees on well-being, three interviewees at two schools mentioned the concept of “the eight dimensions of wellness”, and all interviewees targeted at least one dimension of wellness (Swarbrick, 2012). According to wellness center staff members, the eight dimensions of wellness are: physical, environmental, social, spiritual, intellectual, occupational, emotional, and financial; all of which are interdependent. The dimensions of social and physical wellness were evident in the hike event that we ran. For colleges wondering what kind of events will improve student well-being, an intercollegiate hike is a great opportunity.

Finding 2: Outdoor Activities Have Many Obstacles

Hikes have several different challenges. One of these challenges is when students have little to no access to transportation. Students are also busy and are not always available to go on hikes.

Many college students do not have reliable transportation. Only 90 of the 263 survey participants had reliable private transportation, as shown in Figure 22. Transportation was mentioned as an issue to many of the faculty and wellness staff that helped run off campus events. No schools were available to provide shuttles or vans, and 18 survey participants mentioned transportation as an issue. The WPI outing club reached out to us to carpool outing club students to the event which was only possible because our team had people to drive them. Transporting students to events is an issue for organizing intercollegiate events.

Transportation Availability

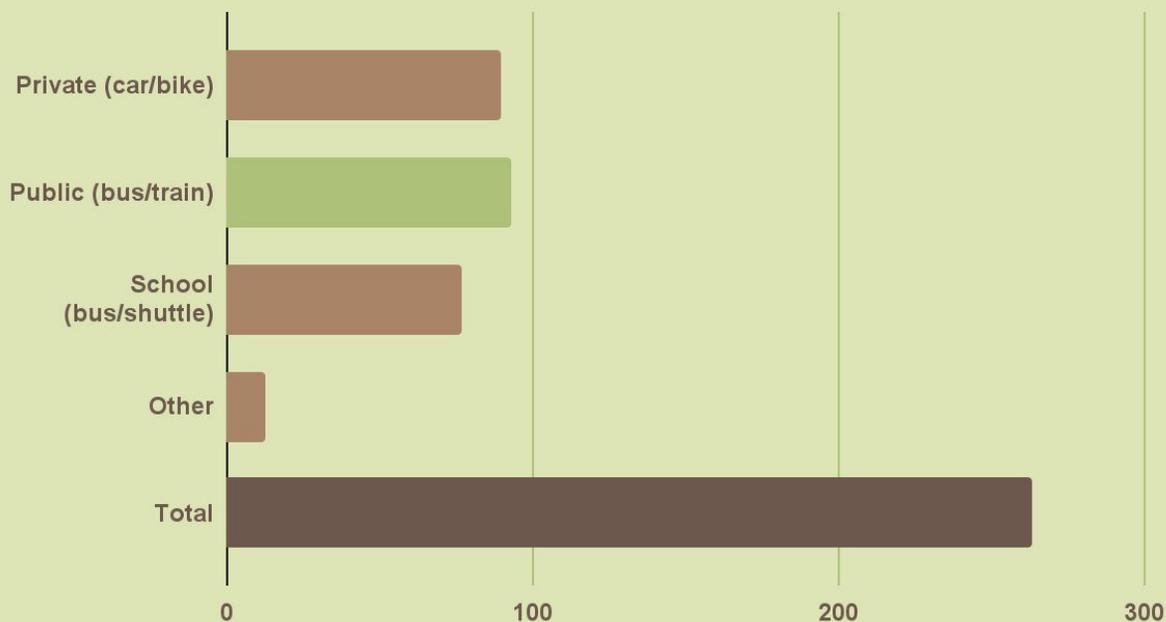


Figure 22: Survey results on transportation.

Availability and time was also an issue. The most convenient time across schools was Sunday afternoon, with 115 survey participants available at that time, as shown in Figure 23. Less than half of participants were available at any given time, which makes event planning difficult. There were also nine students who said they

were interested but unable to attend. As college students ourselves, we understand the lack of free time. Despite these difficulties, many students find a way to get outside.

Finding 3: There is Interest in Intercollegiate Outdoors Programs

One of the main goals of the WIOI is to connect colleges through outdoor activities. Faculty and staff interviews showed interest in a program to get students outdoors and involved with other schools. Survey results also showed an interest in intercollegiate activities.

In our interviews, only Clark, WPI, Worcester State University, and Holy Cross had wellness staff mention that their school runs programs specifically designed to get students outdoors, as seen in Figure 24. Despite that, all interviewees stated their interest in further promoting events. To be as representative as possible, we included at least one faculty or staff member from each Worcester college in our interviews.

Preferred time - Afternoon 12:00 - 4:00 PM

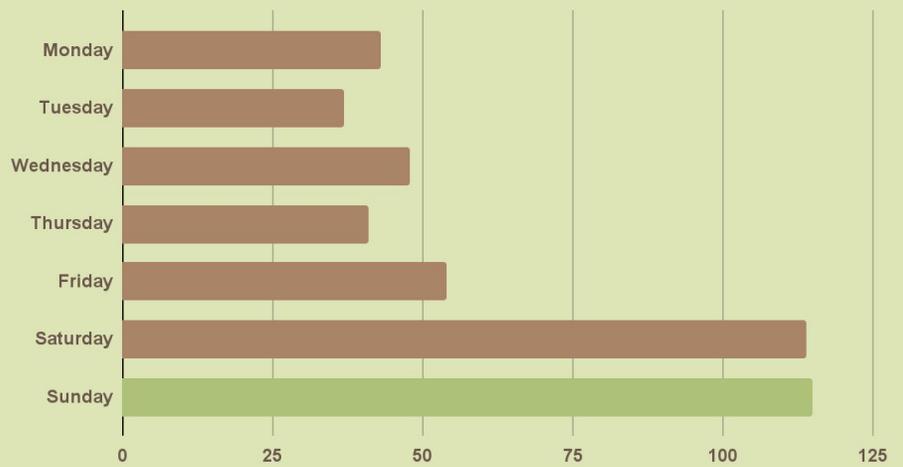


Figure 23: Survey results on availability.

<i>Organization/Institution</i>	<i>Wellness Center has activities focused on nature and wellness? If so, what?</i>
Clark University	Hosts outdoor walk
Worcester Polytechnic Institution	Wellness walks, planning on making an outdoor space to improve wellness
MCPHS	No
Assumption University	No
QCC	Mindfulness program encouraging being in outdoors
UMass Chan Medical	Hosts various outing events on wellness week
Worcester State University	Directed students to bike rentals
Anna Maria	Host nature walks around campus and cleanups on Earth Day
Holy Cross College	Encouraged students to use hike trails

Figure 24:
Schools' responses on whether their wellness centers hosts activities.

Wellness center staff interest coincides with student interest in outdoor events. Of our 263 survey responses, 63% of students engaged in a hike on their own time. One survey question asked students what activities they would be interested in, and the most popular event was a hike. Students were interested in all options and some added other possible event ideas. Along with this, we engaged with 15 students from four different Worcester institutions on our intercollegiate hike. Multiple hike participants asked if there would be any other activities in the future, expressing their interest in future events. The three outing clubs we interviewed also mentioned great participation in their outdoor events. This shows students are interested in outdoor activities, especially hikes.

Finding 4: Student-Run Initiatives are Preferred

Student-run programs are generally preferred by college staff, college students, and other organizations. This highlights an opportunity for the WIOI to grow. Figure 25, shows us preparing for our interviews. Our interviews are where we learned about many college staff's preference for student groups.

We found that student-run events were much more appealing to both students and organizations. Jeanine Went, founder and director of HECCMA, expressed her preference for working with student groups. HECCMA was not the only organization that had a preference for student-run programs however. Mass

Audubon not only expressed a similar preference for working with students, but even had experience hiring students. This enthusiasm for working with student groups is something that assisted us in our project and can benefit the WIOI as well.

Student-run outing clubs also had success in getting other students to attend. Three of the outing clubs we discussed events with did not mention student involvement as a problem. However, six out of eight schools mentioned student attendance as an issue. Faculty found it difficult to reach students, but students did not have difficulty doing so.



Figure 25: Preparing for an interview.

Students are more willing to work with other students rather than non-student faculty or organization heads. One of those we interviewed from Mass Audubon was a WPI alumni. We found they were particularly eager to assist us as they were familiar with the WPI project culture. Our interview with a Clark student project group reflected a similar sense of student community and cooperation. We shared resources and were able to mutually assist each other with our project goals. Finally, multiple students from our pilot hike expressed to us they preferred that the hike was student-run. Colleges, their students, and other organizations prefer working with students and student groups. This is a fact that the WIOI can and should take advantage of to facilitate the program's success in the future.

Finding 5: Promoting Events Needs Multiple Resources

To run a successful event, we wanted to reach as many interested students as possible. There is no one solution that works best for all college students. Therefore, the most beneficial modes of advertising need to be used together to effectively market events.

Nearly 30% of survey respondents use email to find out about what is happening at their college, as shown in Figure 26. Students have mentioned how they use email for clubs, classes, and jobs; because of this, there are many emails that students skip, especially ones they don't recognize. A similar account was given by staff from different schools. They send out newsletters, weekly updates, and weekly activities that are happening, but have not seen much attendance for events only promoted this way. Faculty and staff at six of the eight schools we interviewed described the struggle using email to communicate to students. With this in mind, we focused our emails not on

Most Popular Methods of Reaching Students

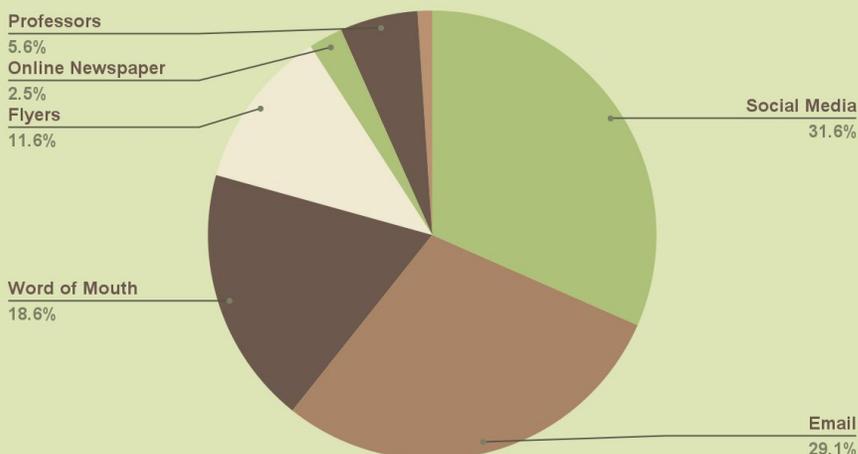


Figure 26: Pie chart showing the ranking of promoting resources.

students directly, but the officers of interested clubs. Emailing club officers allows them to make the information more digestible for their members through the use of other platforms. For example, the WPI Outing Club received our email with the information on the hike, then relayed it to their members via Slack, resulting in a third of our hike

participants being WPI Outing Club members. This also displays the importance of maintaining relationships with club officers as their internal communication methods are a very effective means of marketing events to students. However, email is not the only way to reach students, various social media platforms are available.

Much of marketing happens on social media and the vast majority of students are using Instagram as their primary platform. From the survey (Figure 20), 31.6% of students said social media was one of their main ways of communicating with clubs, keeping up with friends, and learning about school events. Of the survey participants that said they use social media, 80% reported using Instagram as their primary social media platform. This is consistent with the interviews we conducted, as faculty and staff at six of the eight schools we interviewed described Instagram as the most reliable platform to reach students. With these facts in mind, Instagram is an excellent tool for marketing events.

Word of mouth easily gets students to attend events. The interest survey displayed that word of mouth is the third most prevalent way students learn about activities. The students we talked to expressed they are more likely to attend an event because a friend or peer told them about it. Similarly, in the interviews we conducted, half of the interviewees said word of mouth was a method they used to promote events. In one such interview, Dr. Michael Hirsh mentioned an event their wellness center ran where students informed their friends about the festivities during the event which at least doubled the number of attendees.

A well designed logo and an eye catching color pallet can be beneficial when marketing the WIOI. People, especially college students, use logos to quickly gain information about organizations and programs. A good logo grabs people's attention and provides the viewer with basic information about its subject matter. Our logo concept is shown in Figure 27, while the original WIOI logo is shown in Figure 28.

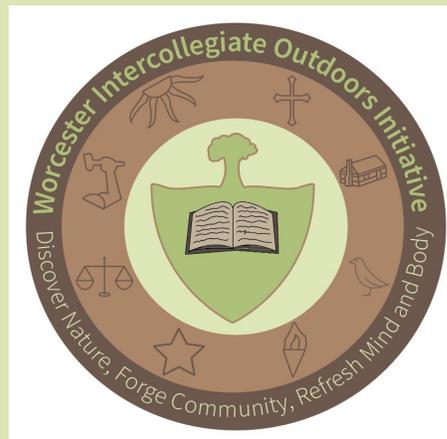


Figure 27: *Our logo concept to represent the outdoors and Worcester colleges.*

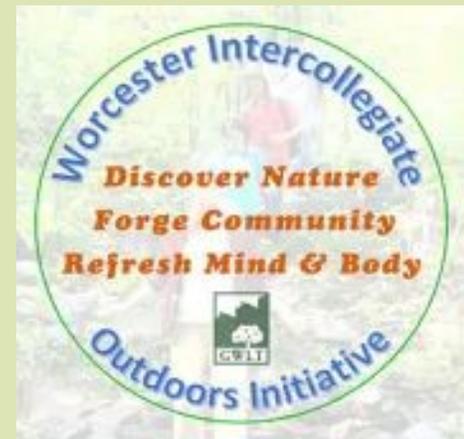


Figure 28: *The original WIOI logo (GWLT, n.d.).*

The college interest survey showed that 73% of students don't know what the GWLT is, and those who did know mainly said they had only heard of it. Additionally, in the post hike survey we asked the hikers what they thought of the original logo as well as a basic design we created, shown in Figure 29. The main outcome was that there were too many words on the logos, but they preferred the professional quality of the original logo. Also, there was overwhelming approval of the new color palette and symbolism of the new logo compared to the old logo. A simple effective logo should be professional to effectively market to college students.

Colleges, especially in Worcester, are closed off from one another. Because of this, physically going to college campuses is almost a necessity for event marketing. This is where tabling comes in as an effective way to promote events. Tabling is when the organizers of an event sit in a central area of campus in order to advertise said event to students as they walk by. Tabling was recommended by four of the colleges we interviewed, who cited it as a particularly effective marketing strategy for events. Outdoor clubs, college staff, and our sponsor have used tabling to successfully promote events in the past.

Emailing known contacts, establishing a social media presence, word of mouth communication, creating a memorable logo, and tabling at colleges are all effective methods to promote an event. When all methods are used in conjunction to communicate with and reach students, the WIOI will grow. In order to maintain large event attendance, it is imperative to keep all these aspects in mind and utilize as many of them as possible.

Do you feel our logo is representative of your experience?

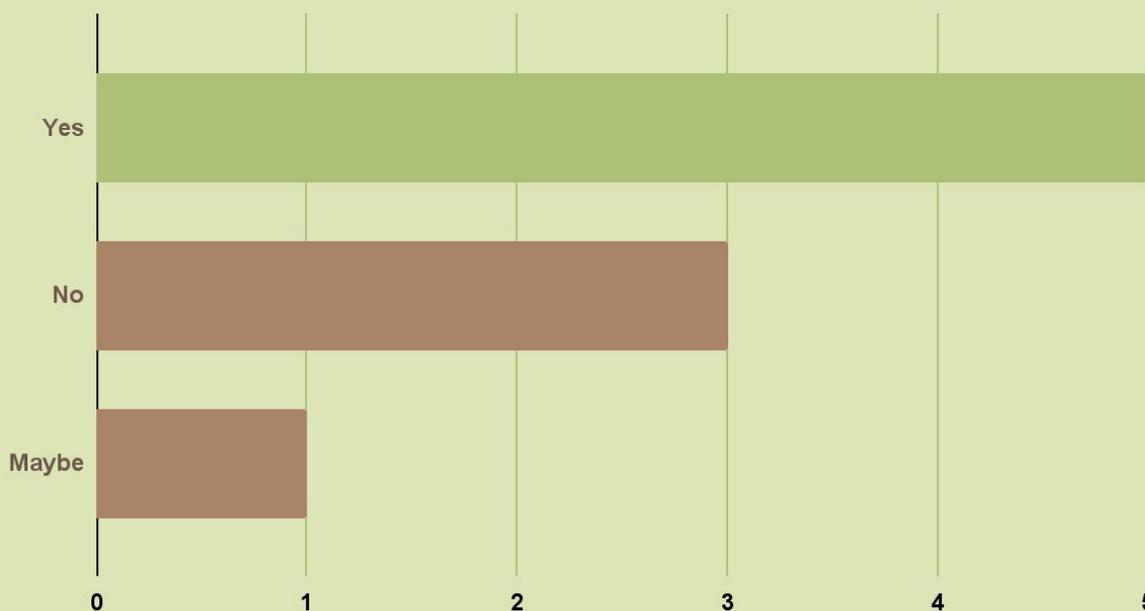
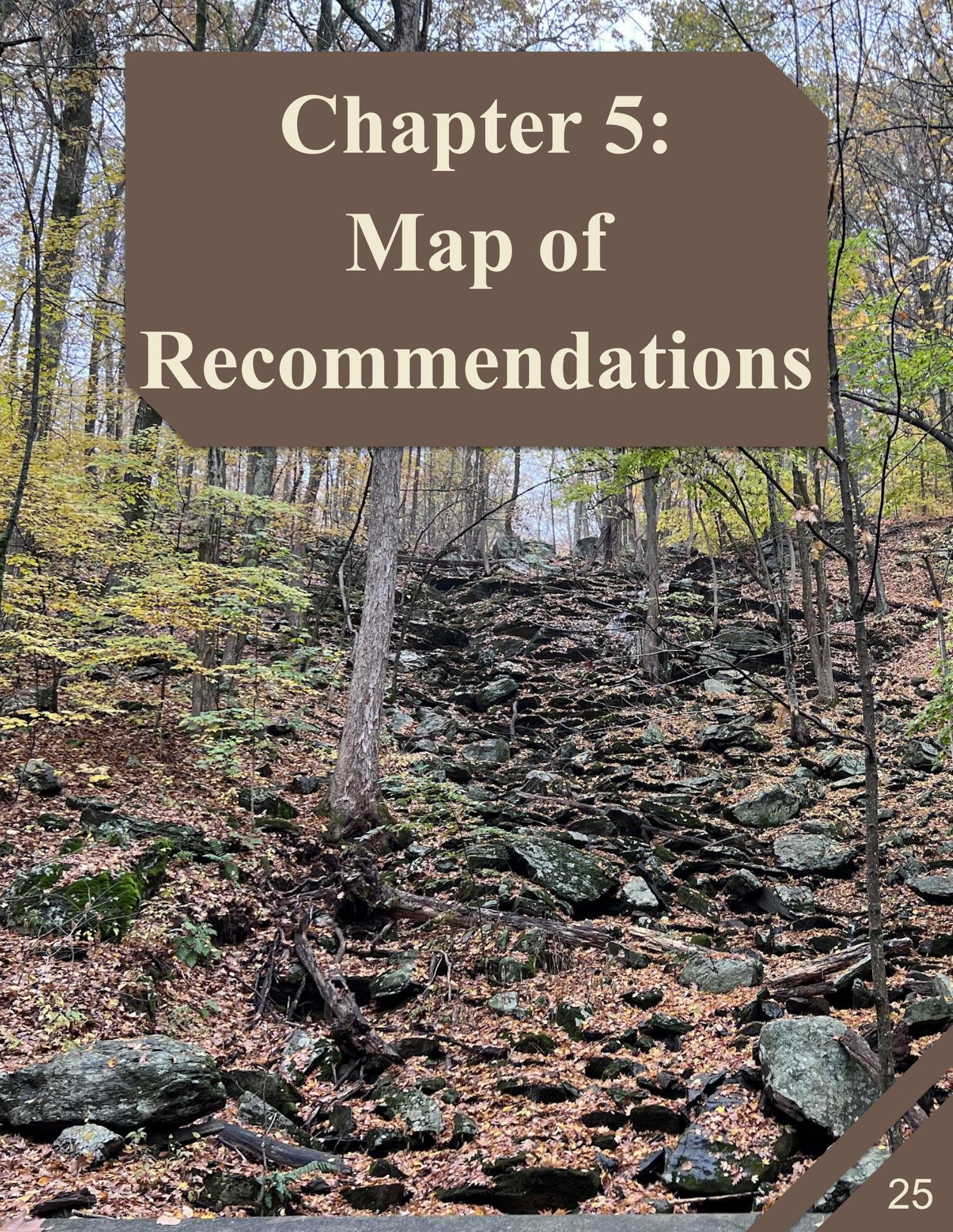


Figure 29: Post hike survey results about our logo.

A photograph of a forest floor covered in fallen leaves and large rocks, with trees in the background. The scene is a dense forest with many trees, some with yellow and green leaves, and a ground covered in brown and orange fallen leaves. Large, dark rocks are scattered across the forest floor. The background shows a dense forest of trees with some yellow and green leaves.

Chapter 5: Map of Recommendations

This section explores our recommendations after working to revitalize the WIOI. We discuss the need for an online presence in order for the program to grow. We also explain how the WIOI requires a team to run effectively. These recommendations are prepared for our project sponsor, but they are applicable to any faculty or staff who wish to run events.

Recommendation 1: Marketing Helps the Program Stay on Path

In order for the WIOI to continue growing and attracting new members, an online presence should be established. This includes maintaining an Instagram page, as well as a website to discover more about the program. A professional logo also helps for recognizability and promotion. Figure 30 shows the aspects of marketing that we recommended using.

Based on the results of Finding 5, we created an Instagram account for the WIOI, and used the account to promote our hike. Figure 31 shows a post from the Instagram page. Before following many college accounts, we received less than six likes on our posts. We then followed Worcester college accounts related to the outdoors and wellness in order to reach groups with a similar interest. After following these accounts, our posts jumped to 26 likes. We associated the increase in post interaction with following the college accounts. Although the Instagram following of the project is small, it is able to reach all Worcester schools and any clubs with an outdoors or



Figure 30 (above): Flow chart of the recommended marketing plan.



Figure 31 (right): Event promotion on Instagram.

environmental focus. This benefits our sponsor for faculty promotion, but reaffirms what many faculty suspected as the best way to reach students. We recommended that the Instagram page be used to promote events and to grow the WIOI following. Posts should come weekly, and content related to the outdoors gets the most likes.

Email is still used by many students to learn about events. Finding 5 shows the widespread usage of email to promote events. These emails can be sent out to the Worcester colleges using contacts established through our interviews. We provided our sponsor with an email list of interested students and faculty for events and event promotion. It was not published, in order to protect these students and faculty. The list contains 35 contacts, with every school represented, including names contacted by us and given to us by other interviewees. The list should be used for informing student groups to promote events to their members. Each contact has information about how responsive they are to highlight which contacts would be most useful. This email list is an important tool for promoting events and maintaining relationships across the many Worcester college campuses.

Likewise, websites are important for a proper online presence. Between history, schedules, and event information there is a lot to know about the WIOI. While it would be ideal for each person to learn about the WIOI in person on a hike, this is not feasible. That is why it is important to have a central location where all that information is stored and accessible. Having a standalone website can be an extremely useful marketing tool. The current website presence, as seen in Figure 32, is outdated and difficult to find, as it is a subsection on the GWLT

website. The ideal new website should be professionally designed, as a clean website requires knowledge of multiple programming languages. Professional web designers can also help make the page visually appealing. By creating a new website, the WIOI can continue to grow its online presence.

Logos are also important for brand recognition, as mentioned in Finding 5. A professional should design the logo based on suggestions given by the team.



Figure 32: Worcester Intercollegiate Outdoors Initiative website home page (GWLT, 2022).

Student feedback of the old logo and our suggestions are included in Finding 5, to help the designer. One possible option to get students involved is a logo contest using our email list. There are many creative students in Worcester that can help the WIOI. Students can provide our sponsor with logo designs, as well as learn about the program. This is a fun way to get logo suggestions, aside from what the team created. A professional logo creates recognition for students when in person or online.

In order to establish an organization such as the WIOI, a multifaceted communications strategy is needed. The vast majority of college students use social media, email, and websites as their main form of communication. Instagram, email, and a website are essential for promoting events and marketing necessary information to Worcester college students. Finally, a well designed logo will facilitate brand recognition, while an eye-catching color pallet is essential for design work. While there is a lot of work that goes into maintaining an online presence, it will allow the program to expand and grow into the future with ease.

Recommendation 2: Run in a Pack

Initiatives need a team to function properly. We spent our project term prepping contacts and resources for the WIOI. That work alone has required the dedication of four individuals during a 40-hour work week for seven weeks. All of this shows it takes a lot to run an initiative like the WIOI, especially at its inception.

The program needs to be student led. Multiple interviewees described our initiative as inviting, interesting, and credible because it is student led. This was further supported at our hike event when students said they liked the fact that the hike was organized and run by students. These anecdotes display the need for student involvement to keep the WIOI connected to colleges and be welcomed by them. Furthermore, the inspiration for the program ran successfully for many years at Clark, and thus can benefit from having a credible ally to make connections and potential grants.

To get students involved, there must be incentives for them to participate. The main suggestion is to work with career centers at colleges to organize internship opportunities and volunteer lists for potential college helpers. This is a concrete place designated at each college where interested students can learn more about the program and get involved. Since we are not continuing with the initiative after the project, getting students consistently involved is an important step. Terracops, which is an organization that believes, “Land is the foundation

of health and well-being”, as seen in Figure 33 (Terracorps, 2022). The Terracorps specializes in environmental volunteering and land conservation. The organization has a Community Engagement Coordinator that could work alongside the WIOI to get student volunteers engaged with the program. The GWLT hosts a Land Stewardship Coordinator, but the WIOI could be expanded by working with a community engagement specialist.



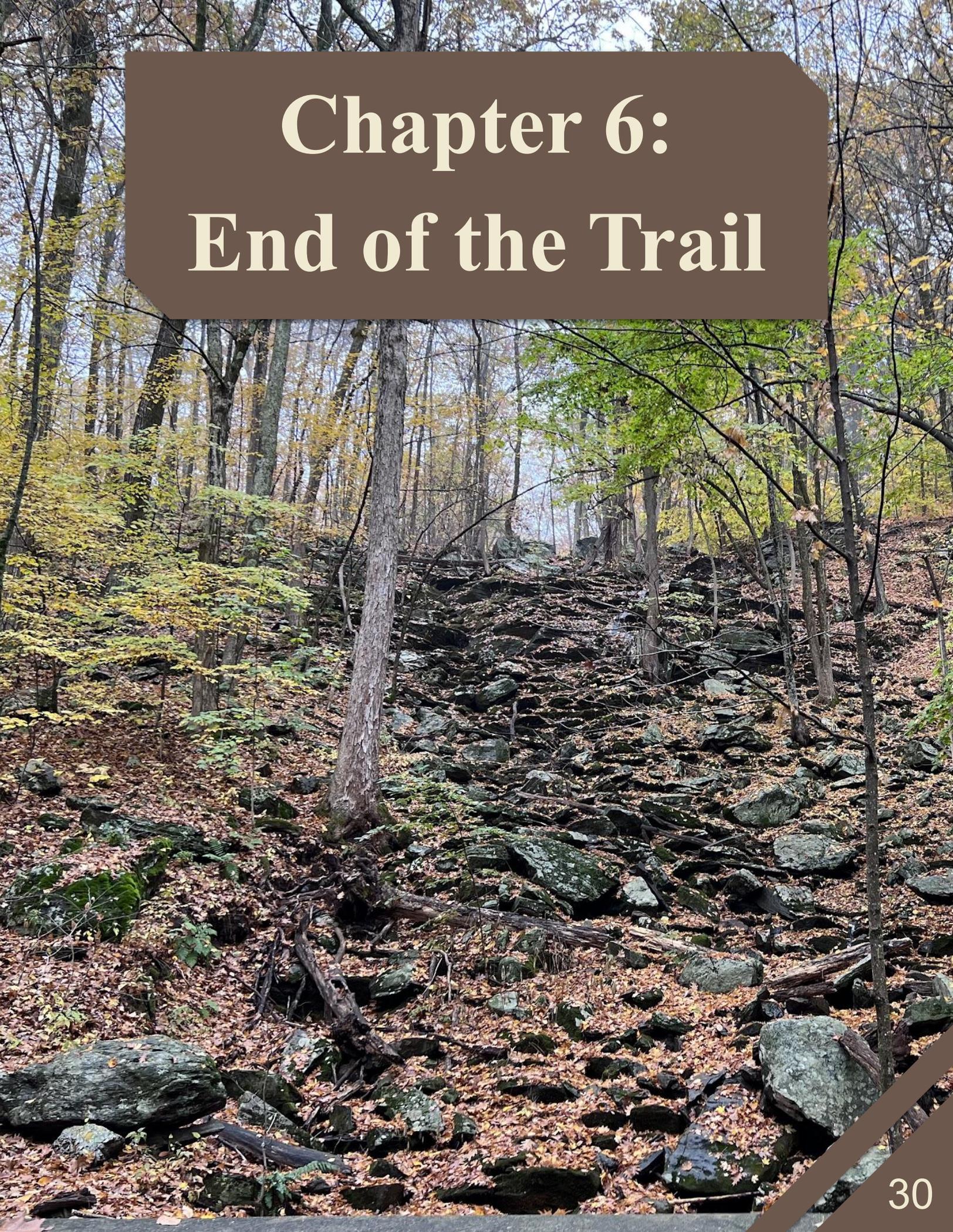
Figure 33: *Terracorps website home page*
(Terracorps, 2022).

Another resource for students is the Federal Work Study. Students apply as part of their student aid package at their college. Then, students complete work through off campus community service or an on campus job. The community service students could help the WIOI run events as part of their required hours, if the program is approved by the respective schools (WPI, n.d.). As each Worcester college has their own Federal Work Study that uses the same process, there could be a consistent stream of students at each school to help the program.

Hiring students or professionals in design will bolster the program's foundation. Without assistance to complete tasks it can be challenging to get everything done that is desired. Their skills will improve the internet presence, increase the reach of the program, and keep sustainable connections. A recognizable logo is also something that would be useful for people who are already familiar with the WIOI and looking for more events to attend. A professional should design this logo, as logo design is difficult. We provided our project sponsor with logo concepts to give to a professional designer. What ties logo design to other design work such as flyers and websites is a color palette. We even benefited from having a set color pallet and were able to create basic designs for this paper.

Students want initiatives that are student-run. The WIOI has an opportunity to grow by getting students involved in the planning and management of the program. Schools have integrated platforms to reach students about volunteer opportunities that the WIOI can use to get a long term stream of students to work with. Additionally, many faculty and staff members are willing to collaborate in the future. Lastly, there are a great number of professionals to manage the design and structure of the WIOI marketing to widen its horizon.

Chapter 6: End of the Trail

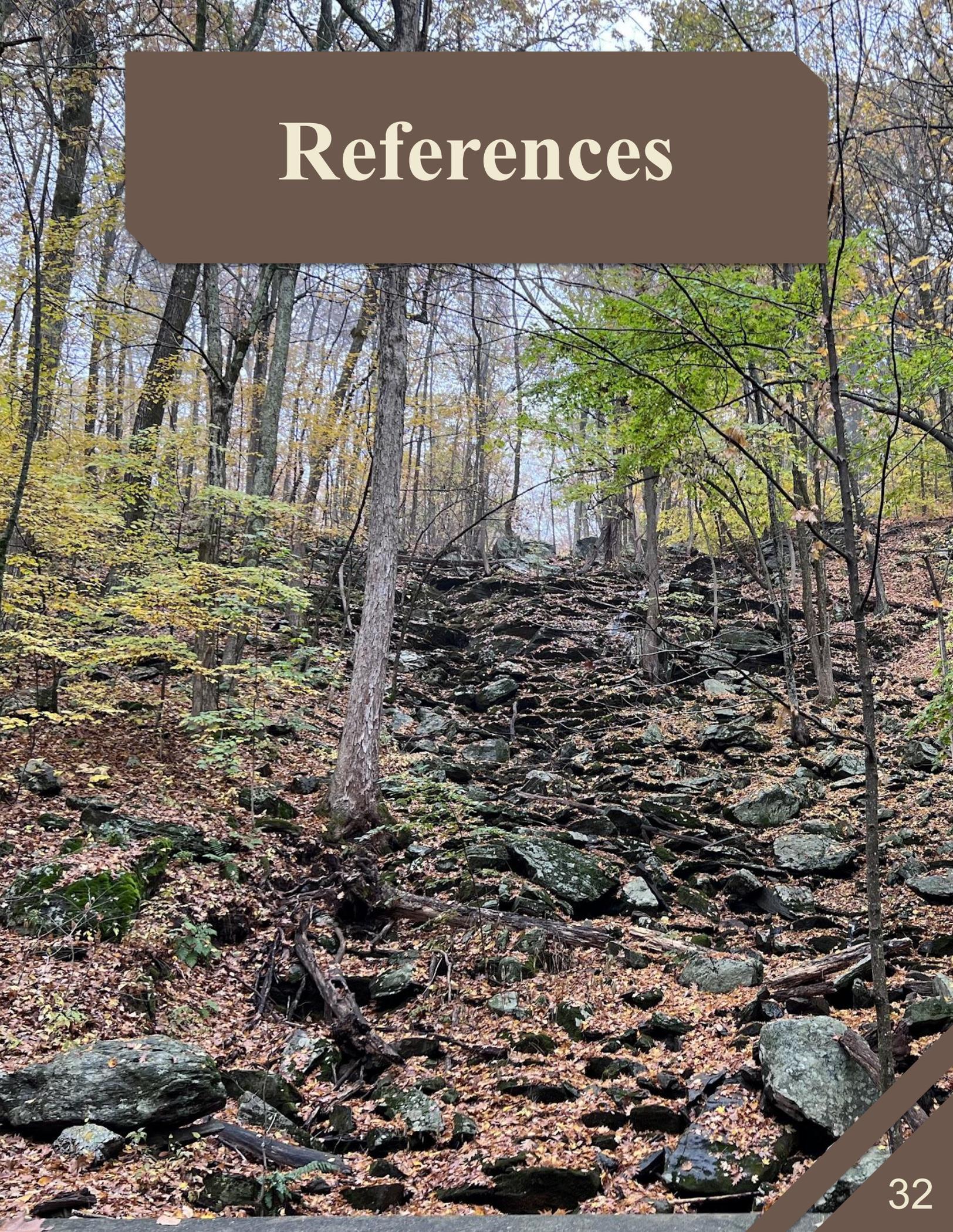


To keep the program on track we created a Proposal Plan of Action for our sponsor to follow. The plan includes next steps, based on requests from our sponsor, for the WIOI. These steps include suggestions for marketing, email correspondence, and grants. As the program continues to grow, we hope to see other intercollegiate programs to get students active and beyond just their campus. Thank you to everyone who took our survey and participated in our interviews, and we hope that you spend time to explore the great outdoors. The Trail Blazers thank you for reading (Figure 34)!



Figure 34: Trail Blazers.

References



- Ammar, A., Chtourou, H., Boukhris, O., Trabelsi, K., Masmoudi, L., Brach, M., Bouaziz, B., Bentlage, E., How, D., Ahmed, M., Mueller, P., Mueller, N., Hsouna, H., Aloui, A., Hammouda, O., Paineiras-Domingos, L., Braakman-Jansen, A., Wrede, C., & Bastoni, S.,. On Behalf Of The Eclb-Covid Consortium. (2020). COVID-19 home confinement negatively impacts social participation and life satisfaction: A worldwide multicenter study. *International Journal of Environmental Research and Public Health*, 17(17) <https://doi-org.ezpv7-web-p-u01.wpi.edu/10.3390/ijerph17176237>.
- Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., de Vries, S., Flanders, J., Folke, C., Frumkin, H., Gross, J. J., Hartig, T., Kahn, P. H., Jr, Kuo, M., Lawler, J. J., Levin, P. S., Lindahl, T., Meyer-Lindenberg, A., Mitchell, R., Ouyang, Z., Roe, J., Scarlett, L., & Daily, G. C. (2019). Nature and mental health: An ecosystem service perspective. *Science advances*, 5(7), <https://doi.org/10.1126/sciadv.aax0903>.
- Bratman, G. N., Hamilton, P. J., Hahn, K. S., Daily, G. C., Gross, J. J., Baxter, L., Berkman, E. T., & Meyer-Lindenberg, A. (2015). Nature experience reduces rumination and subgenual prefrontal cortex activation. *PNAS*. ISBN 112 (28) 8567-8572. <https://doi-org.ezpv7-web-p-u01.wpi.edu/10.1073/pnas.1510459112>.
- Bubnis, D. & Swaim, E.. (2022). 8 Health benefits of getting back to nature and spending time outside. *Healthline Media*. <https://www.healthline.com/health/health-benefits-of-being-outdoors#better-breathing>.
- Bulfone, T. C., Malekinejad, M., Rutherford, G.W., & Nooshin, R.. (2021). Outdoor transmission of SARS-CoV-2 and other respiratory viruses: A systematic review. *The Journal of Infectious Diseases*, 223(4). 550–561. <https://doi.org/10.1093/infdis/jiaa742>.
- Centering land and community: Growing leaders. (2022). *TerraCorps*. <https://terracorps.org/>.
- Converse, J. M., & Presser, S. (1986). Survey questions: Handcrafting the standardized questionnaire. *Sage Publications*: Thousand Oaks, CA.
- Cox, D.T., Shanahan, D. F., Hudson, H. L., Plummer, K. E., Siriwardena, G. M., Fuller, R. A., Anderson, K., Hancock, S., & Gaston, K. J. (2017). Doses of neighborhood nature: The benefits for mental health of living with nature. *Bioscience*, 67(2), 147–155. <https://doi.org/10.1093/biosci/biw173>.
- Finke, A. (2017). *How to conduct surveys: A step-by-step guide, 6th ed.* Sage Publications: Thousand Oaks, CA.
- Gladwell, Kuoppa, P., Tarvainen, M. P., & Rogerson, M. (2016). A lunchtime walk in nature enhances restoration of autonomic control during night-time sleep: Results from a preliminary study. *International Journal of Environmental Research and Public Health*, 13(3), 280–281. <https://doi.org/10.3390/ijerph13030280>.
- Goldstein, K. (2002). Getting in the door: Sampling and completing elite interviews. *PS: Political Science & Politics*, 35(4), 669-672. doi:10.1017/S1049096502001130.

- Hermassi, S., Sellami, M., Salman, A., Al-Mohannadi, A., Bouhaf, E. G., Hayes, L. D., & Schwesig, R. (2021). Effects of COVID-19 lockdown on physical activity, sedentary behavior, and satisfaction with life in qatar: A preliminary study. *International Journal of Environmental Research and Public Health*, 18(6) <https://doi-org.ezpv7-web-p-u01.wpi.edu/10.3390/ijerph18063093>.
- Kolk, S. M., Rakic, P. Development of prefrontal cortex. *Neuropsychopharmacol.* 47, 41–57 (2022). <https://doi.org/10.1038/s41386-021-01137-9>.
- Larson, L. R., Mullenbach, L. E., Browning, M. H., Rigolon, A., Thomsen, J., Metcalf, E. C., Reigner, N. P., Sharaievska, I., McAnirlin, O., D'Antonio, A., Cloutier, S., Helbich, M., & Labib, S. M. (2022). Greenspace and park use associated with less emotional distress among college students in the United States during the COVID-19 pandemic, 204. <https://doi.org/10.1016/j.envres.2021.112367>.
- Ma, J., Williams, J., Morris, P., & Chan, S. (2022). Effectiveness of mindful walking intervention in nature on sleep quality and mood among university students during Covid-19: A randomised control study. <https://doi.org/10.1016/j.explore.2022.08.004>.
- Mana Medical Associates. (2022). Indoor air vs. outdoor air. <https://www.mana.md/indoor-air-vs-outdoor-air/#>
- Meijia, Z., 2017, The no. 1 mistake people make when writing work emails, CNBC, <https://www.cnbc.com/2017/06/07/the-number-one-mistake-people-make-when-writing-work-emails.html>.
- Puhakka, R. (2021). University students' participation in outdoor recreation and the perceived well-being effects of nature. *Journal of Outdoor Recreation and Tourism*, 36. <https://doi.org/10.1016/j.jort.2021.100425>.
- Penrod, J. (2003). Getting funded: Writing a successful qualitative small-project proposal. *Qualitative Health Research*. 13(6), 821-832. doi:10.1177/1049732303013006004.
- Rogers, C. (2021). Exploring college students' perceptions of nature for health promotion. <https://repository.tcu.edu/handle/116099117/49059>.
- Rowley, J. (2012). Conducting research interviews. Department of Information and Communications, Manchester Metropolitan University, Manchester, UK. www.emeraldinsight.com/2040-8269.htm
- Swarbrick, M. (2012). Swarbrick, M. (2012). A wellness approach to mental health recovery. in ... Research Gate. https://www.researchgate.net/publication/304747943_Swarbrick_M_2012_A_Wellness_Approach_to_Mental_Health_Recovery_In_Recovery_of_People_with_Mental_Illness_Philosophical_and_Related_Perspectives_Abraham_Rudnicked_Oxford_Press.
- The Greater Worcester Land Trust. (n.d.). *The Cascades*. <https://www.gwlt.org/lands-and-trails/four-town-greenway/cascades/>.

Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research*. 166, 628-637, ISSN 0013-9351. <https://doi.org/10.1016/j.envres.2018.06.030>.

Wolf, P., Wolf, J., & Levine, D. (2005). Event planning made easy. *New York: McGraw-Hill. Liite*, 1(1), 3. https://www.academia.edu/download/30566519/event_planning_made_easy.pdf

Worcester Parks. (2020) Park Spirit of Worcester, Inc. <https://www.parkspirit.org/worcester-parks>

Worcester Polytechnic Institute. Federal Work Study Program. (n.d.). <https://www.wpi.edu/admissions/tuition-aid/types-of-aid/federal-work-study-program>.

Worcester Telegram & Gazette. Land trust's legacy will be celebrated at EcoTarium; two decades of preserving open space in, around city. (2007). *Worcester Telegram & Gazette*. <http://ezproxy.wpi.edu/login?url=https://www.proquest.com/newspapers/land-trusts-legacy-will-be-celebrated-at/docview/269007303/se-2>.