ENHANCING NATURAL CAPITAL TO IMPROVE MENTAL HEALTH AND WELL-BEING IN

RURAL COMMUNITIES IN MINNESOTA

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Dakota State University's regulations and meets the accepted standards for the

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ABSTRACT

This paper explores how green space can aid in improved mental health outcomes for individuals who live in rural communities in greater Minnesota. The mental health landscape across the state is complex and layered, complicated by access, insurance, broadband, and employment. At the local level, built and natural policy have the ability to directly impact physical and mental health outcomes for people; positively or negatively. Unfortunately, little literature exists in rural context; shadowed by its urban counterpart. By exploring how broader partnerships and policy can be strengthened, local and county government play a critical role in how communities can support broader mental health interventions. This paper seeks to understand how design, policy, and programming solutions can center parks and green space into the broader conversation of health, and divert away from green space as a "nice to have amenity," and towards critical infrastructure.

ACKNOWLEDGEMENTS

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CHAPTER 1 - INTRODUCTION

In recent decades, a growing body of research has begun to draw connections between the elements of nature and its impact on health and well-being. Researchers and scientists, crossing a range of fields and disciplines, have been exploring efforts to quantify that time spent in nature has mental health and well-being benefits. A handful of epidemiological studies have analyzed the association between level of exposure to natural environments and the impact on mental health. While research has shown the positive correlation between nature and improved health and well-being, few studies have identified the amount of time and what form of nature provides the greatest benefit. A point of consensus in the field of research is that researchers agree that the association between public open space and mental health remain relatively unexplored. Researchers point to the need to create quantifiable nature-based health recommendations. Additionally, they speak to the lack of research in identifying the relationship between the multi-dimensional view of mental well-being and green space and that this relationship remains relatively unknown. This evidence is illustrating a link between the various forms of the natural environment and mental health outcomes, particularly in urban environments (Rugel, et al., 2018). Yet, there is a limited amount of literature and study in rural environments.

It's estimated that nearly one in five adults live with a mental illness (Choi, 2018). This staggering statistic highlights the importance of community interventions. The complex mental health landscape in Minnesota is difficult to navigate and developing community programs or infrastructure to support residents is a complex task. Practitioners and providers have begun to work with communities to support policy decisions that connect people to needed services. By further studying this correlation within a rural context, the findings of this analysis could aid in policy decisions, design standards, care directives, physical activity guidelines, and possibly help thousands of people each year. This paper will explore a rural context and offer recommendations for local and county government on practices to enhance natural capital as a vehicle to improve mental health and well-being outcomes in rural communities in Minnesota. This graduate paper centers natural capital into the greater conversation of health and the role that partnerships, policy, and decision-making have in creating critical infrastructure within community.

This paper refers to natural capital as critical, community infrastructure. According to Emery and Flora, (2006), "Natural capital refers to those assets that abide in particular location, including weather

geographic isolation, natural resources, amenities, and natural beauty (p. 20). For the purposes of this paper, natural capital is an encompassing term for green space, parks, trails, open spaces, sensitive environmental areas, water features, wildlife habitat, plant communities, greenways, aesthetic and scenic resources, and other natural corridors and places that add environmental value to communities. Natural capital forms the basis and foundation for all the other forms of community capitals within a community. This form of capital is sensitive and can be degraded by the other forms of capital.

Problem Statement

The simplest explanation of this paper is to explore how green space can aid in improved mental health outcomes for individuals who live in rural communities in greater Minnesota. The mental health landscape across the state is complex and layered, complicated by access, insurance, broadband, and employment. At the local level, built and natural policy have the ability to directly impact physical and mental health outcomes for people; positively or negatively. Unfortunately, little literature exists in rural context; shadowed by its urban counterpart. By exploring how broader partnerships and policy can be strengthened, local and county government play a critical role in how communities can support broader mental health interventions. This research seeks to understand how design, policy, and programming solutions can center parks and green space into the broader conversation of health, and divert away from green space as a "nice to have amenity," and towards critical infrastructure.

Objectives

Natural capital serves as the foundational form of capital within a community. This form of capital plays an essential role within a city, a county, and within the state. A core issue of enhancing and investing in natural capital in rural communities lies within a complex web of decision-making at a variety of levels and the essential partnerships embedded within. This paper will look to expand on these issues through the following objectives:

1. Objective 1: To better understand current research, in rural and urban contexts, on how time spent in nature influences mental health and well-being outcomes.

2. Objective 2: To better understand how nature interventions lead to healthier and more sustainable communities.

3. Objective 3: To identify how health care and community development professionals can collaborate to expand ways to improve mental health and well-being within community.

4. Objective 4: To better understand how frameworks and design guidelines can be used to design spaces and policy for better health outcomes.

Questions of Inquiry

In order to contribute to original, constructive thought, the following research questions will be addressed in this paper:

1. What role does natural capital have on mental health and well-being?

2. What is an index of nature-based health solutions?

3. What professional disciplines have a role in this work?

4. What community interventions can be made to improve mental health outcomes for individuals?

5. How does enhancing natural capital, for well-being benefits, lead to a more sustainable community?

Defining Rural

This study will use a variety of definitions to describe "rural". The U.S. Census Bureau does not define "rural" in its list of definitions or as a geography. For the purposes of this paper, I will deploy two methods to define rurality. The first will consider "urban clusters," or those municipalities, "… of at least 2,500 and less than 50,000" according to the Census Bureau (United States Census Bureau). The U.S. Census Bureau identifies urban clusters as a type of urban area. The US Census Bureau defines rural by what is urban, "… after defining individual urban areas, rural is what is left" (Ratcliffe, et al., 1). The second important definition are "micropolitan areas" which, "Contains an urban core of 10,000 to 49,999 residents" (Minnesota Department of Administration, 6).

Another component of this definition comes from the State of Minnesota's Management and Budget Office. The Minnesota Demographer's Office report *Greater Minnesota Refined & Revisited* states, "One common method for identifying rural areas is to group all counties that do not belong to a metropolitan or micropolitan statistical area" (Minnesota Department of Administration). The Office of Management and Budget designates counties across the nation in three categories: metropolitan,

micropolitan, or neither. Figure 1 Minnesota Counties by Metropolitan Statistical Areas illustrates the

Office of Management and Budget's classification of three categories: metro, micro, or neither.

Figure 1 - Minnesota Counties by Metropolitan, Micropolitan Statistical Areas
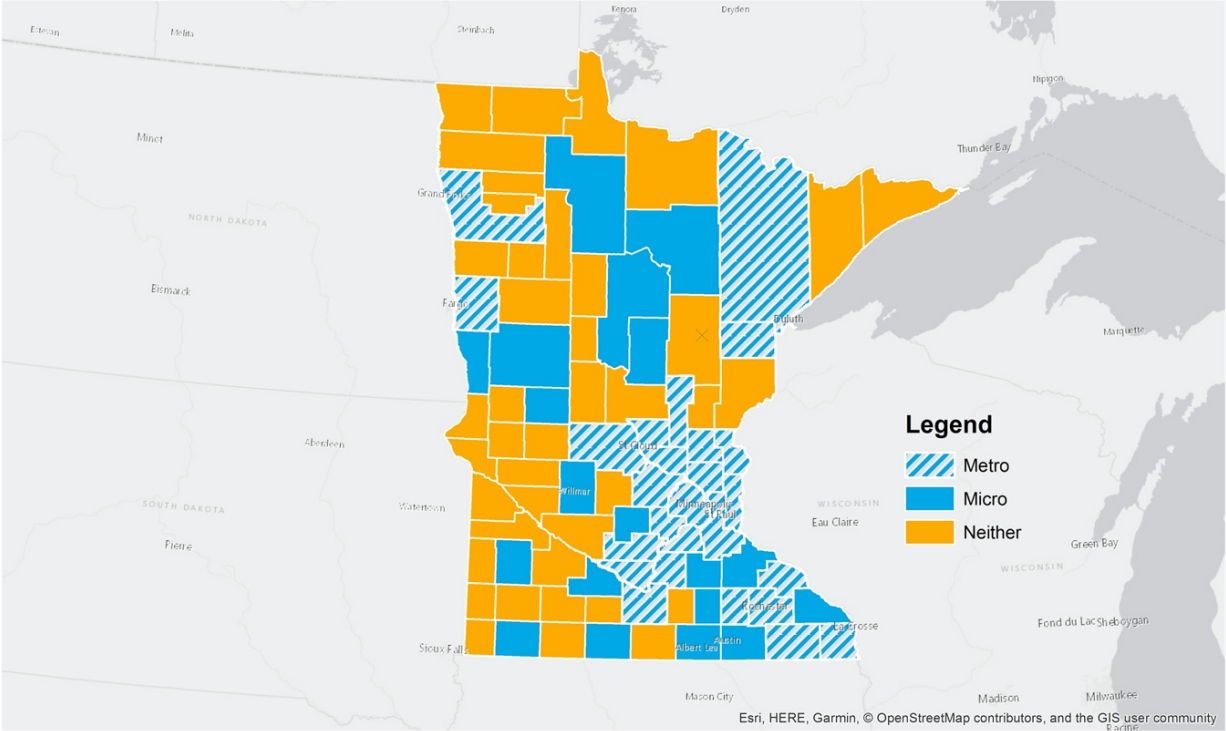
The second method in defining rurality in greater Minnesota is by illustrating the population of the

counties through a different methodology. The United States department of Agriculture's Economic

Research Service seeks to define geography by not solely relying on population alone. The Federal

Office of Rural Health Policy identifies all non-Metropolitan counties as rural. This organization uses an

additional method on identifying metropolitan and non-metropolitan counties called the Rural-Urban

Commuting Area (RUCA) codes. The rural-urban community area codes counter the short-comings of the

Census Bureau's definitions of "urban" and "rural." By utilizing census tracts, RUCA's illustrate, "…that

blanket the entire state based upon population size and density and, importantly, daily commuting"

(Minnesota Department of Administration, 8). There are ten codes which account for, "… population

density, urbanization, and daily commuting to define a geographic area" (Asche, 2019). For easy

consumption and dissemination, the report analyzed and recategorized into four groups. First is "entirely

rural," where every census tract was rural. Second was "town/rural mix," where the county had at least

one census tract that was considered rural, small, or large town tracts. Next was "urban/town/rural mix," where the county had at least one census tract that was rural, small or large town, or urban. Finally, was "entirely urban," where every census tract was urban (Asche, 2019). Figure 2 County Categories for Rural-Urban Commuting Areas illustrates the counties that are considered urban, large town, small town, and rural; One of the methods this study will use to illustrate rurality.

Figure 2 - County Categories for Rural-Urban Commuting Areas
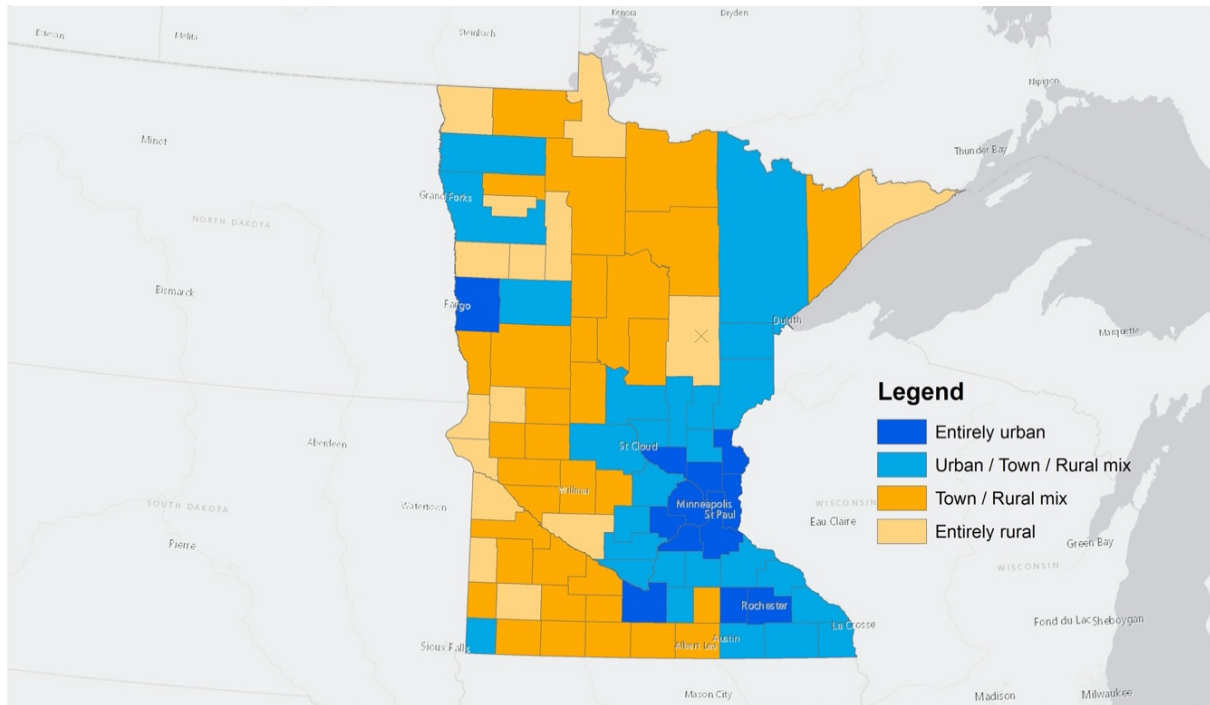
Natural Capital Inventory and Mental Health Landscape in Greater Minnesota

The advancement of this research is important for a variety of reasons, "The roots of mental illness (and wellbeing) are multifactorial, including biological, socioeconomic, and environmental factors" (Rugel et al., p. 1). A study completed in Canada identified that the most common reported illness are mood disorders, this includes major depression, bipolar disorder, followed by substance use disorders and generalized anxiety disorders (Rugel et al., 2019). By carefully studying time spent in nature and identifying if there are positive linkages, community developers and healthcare practitioners can identify interventions to supplement mental health services. Nature will be explored as a possible intervention to improve mental health and well-being.

Defining Mental Health and Well-being

It's important to define health and well-being as each term is sometimes used interchangeably in literature and professional practice. According to the World Health Organization (WHO), "Health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity" (Choi, 2018). Mental health is considered one aspect of health. According to the World Health Organization, mental health is defined as, "… a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (World Health Organization). Holden et al. (2017) further identifies that mental well-being is made of two components, "…the hedonic dimensions, which includes happiness, life satisfaction and pain avoidance; and the eudaimonic dimension, which focuses on self-realization, purpose in life and psychological function" (p. 2). To expand on this definition, it is more holistic and encompassing of a variety of well-being elements such as relaxation, personal relationships, life satisfaction, general happiness, and not just the absence of mental illness (Holden et al., 2017).

Mental Health in Greater Minnesota – County Level

Understanding the landscape of mental health services across the State of Minnesota is a critical step in this work. The Center for Rural Policy and Development of Minnesota collected data that helps to paint an accurate picture of on the ground status reports and situational analysis. Research Director for the Center for Rural Policy and Development Marnie Werner writes, "Unfortunately, community services are inconsistent around the state, ranging from adequate to non-existent" (Werner, 2017). To assess the mental healthcare system, a thirty-thousand-foot view is needed. The system resembles a network, strung together by private providers and a small grouping of state operated facilities. The linkages between are community-based mental health services that include outpatient and intensive treatment programs. Understanding the landscape of mental health needs and current services is important to understand how or if more localized preventative measures can be introduced to fill the gap in existing services. To further describe the reality, Werner writes, "No region is immune from a shortage in at least some services, forcing the people who need them to travel long distances or not access them at all"

(Werner, 2017). Worse, is those who fall through the cracks due to unavailable services or the inability to access care and needs.

To complicate matters, the mental health workforce is experiencing a crunch, "A shortage of doctors, nurses and other staff has been developing in most health care fields for many years now, especially in rural areas" (Asche, 2019). This shortage of providers and their ability to provide care also has a downstream consequence on communities. The needed mental health services are boiling over to police departments, ambulance services, and spilling over to local hospitals who are in the position to manage people with a myriad of untreated and difficult mental health challenges.

The Center for Rural Policy and Development writes, "… about three percent of the population has a 'serious' mental illness and about two percent suffer from a 'serious and persistent' mental illness" (Asche, 2019). The State of Minnesota states, "While much progress has been made in the past few years, most areas of the state do not have the range of services needed to meet the need. As a result, people travel long distances or receive an inappropriate level of care" (Minnesota Department of Human Services). Figure 3 State of Minnesota Mental Health Service Gaps by County (2015) illustrates the gap in mental health services across the state.

Figure 3 - State of Minnesota Mental Health Service Gaps by County (2015)

Beyond the scope of this paper is to describe the holistic picture of Minnesota's mental healthcare system. What is apparent is that creative solutions are needed to connect people to care, "…it's clear that it is a large, complicated issue, and it cannot be put right with quick fixes here and there" (Werner, 2017).

It is impossible to expect that the mental health care system will expand infrastructure fast enough to serve the needs of communities within a short time period. This is why turning to our communities to provide opportunity for built and natural transformation to advance health is a substantive concept that is worth exploring.

Understanding Mental Health

Understanding the existing mental health landscape is important for the purposes of this paper. According to the Minnesota Department of Human Services, "One in five Minnesotans face mental illness each year." Mental health impacts us all to some degree. And according to Miller and Norris (2017), "This breaks down to … one in 25 for serious mental illness." Mental health focuses on the balance of social well-being, emotional, and psychological, which directly affect how we act, feel, and think (Miller and Norris, 2017). This definition highlights the upstream factors such as economic opportunity, social

connections, that play a role in mental health. Mental health is also being studied by professional organizations. The Association of Landscape Architects, a national organization who champions healthy communities through landscape architecture states, "Diagnosed cases of major depressive disorder affects 14.8 million Americans or 6.7 percent of the US population" (American Society of Landscape Architects).

The economic impact that mental health has on workers' health is remarkably impactful. It's estimated that, "… the global costs for mental disorders are greater than the cost of diabetes, respiratory disorders, and cancer combined" (World Economic Forum). This is a staggering statistic that begs the attention of local leaders. Ultimately, mental health, "… is the leading cause [of] disability in the U.S. for ages 15 to 44" (American Society of Landscape Architects). It is clear that a larger systems-thinking is needed to address mental health needs that impact the economic opportunity and social connections. Public health professionals have been advocating for communities that address holistic wellness, not just the healthcare that people receive, but the underlying conditions that create health.

A variety of influences impact a person's mental health, making people differ in "emotional resilience" or "hardiness" (Choi, 2017). Individual attributes, economic and social circumstances, and environmental factors all influence a person's mental health. These attributes in turn mean that a person can experience mental distress and varying levels of stress and trauma (Choi, 2017).

Linkage Between Income and Mental Health

There are a variety of risks to mental health that impact a person's life course, a few of these factors include low socioeconomic status, poor housing and living conditions, job intensity or insecurity, debt and poverty (World Health Organization). Those of low-income face significant barriers to access mental health services, particularly when travel is needed in rural areas. Additional barriers include cost of mental health services and lack of insurance. According to Choi (2017), "In addition, the stigma of mental illness, combined with the stigma of poverty, can also act as a barrier to accessing mental health (p. 8). Poverty and poor mental health are closely linked, "… severe enough to cause moderate-to-serious impairment in social, occupational, or school functioning and to require treatment" (p. 8). This correlation can no longer be viewed as a separate, standalone issue. Rather, community level, system-change as part of community development practices can address these conditions that underlie mental health.

Defining Natural Capital

Now that rurality has been defined, we must identify the forms of natural and green spaces that exist within the scope of this paper. This paper consistency references the natural environment and larger park systems that provides restoration and recreation in a vegetated setting in both rural and urban localities. There are a large variety of definitions that encompass these green spaces and environmentally sensitive areas that could be found throughout a community or county landscape. Surprisingly, nature is difficult to define across various geographic contexts. For this reason, this paper uses the definition by Emery and Flora, (2006), "Natural capital refers to those assets that abide in particular location, including weather geographic isolation, natural resources, amenities, and natural beauty (p. 20). Flora, Flora and Gasteyer speaks to natural capital as the foundational capital that sets the limits for community sustainability (Flora et al., 2016). Natural capital forms the basis and foundation for all the other forms of community capitals within a community.

Particularly in urban environments, green space is referred to as specific open space designed for environmental, recreational, or aesthetic purposes. This includes any area of grass, vegetation, or trees, and much larger features such as parks, streetscape greenery, greenways, and active spaces like baseball fields, soccer fields, and playgrounds (Houlden et al., 2018). Green space is designed into the urban fabric, usually following green space standards, recommendations, and policies set by local governments. These policies are based on walkability distances, park service areas, and distances between homes and green spaces.

Greater Minnesota Natural Capital

Known as the state of 10,000 lakes, the State of Minnesota is home to a variety of recreation and open spaces that can provide value to residents who visit these places. According to the Minnesota Department of Natural Resources, the state has over 1.29 million acres of habitat across the state, located within Wildlife Management Areas (Minnesota Department of Natural Resources). There are a total of 1,440 public wildlife areas scattered across the state, offering people public access to natural areas and wildlife habitat.

Minnesota also has a total of 75 state parks and recreation areas (Minnesota Department of Natural Resources). Scattered throughout the state, these parks highlight the vast geography, rivers,

lakes, forests, and plant communities. The state parks and recreation facilities offer a variety of recreation options that range from camping, biking, and other programming.

In addition to the state parks and wetland management areas, Minnesota has 25 state trails, ranging from four miles to over 100. These trail corridors serve as a critical piece of natural infrastructure, linking people to destinations, but also providing a space to experience nature within immersed within the corridor. The trails are scattered throughout the state and can be seen as clustered within certain regions. County trail networks provide a secondary network for users and expand one's ability to travel larger distances and connect to local destinations.

Networks exist within a local community context. These networks can range from small to complex systems that provide a variety of recreational and programming options. No community park system is the same, all offering various degrees of park types, greenway corridors, trails, environmental areas and connectivity throughout community. Most city parks and trails are free to the public. Yet, not every member of the public has the ability to safely access these spaces or feel comfortable doing so.

This section highlights the vast public lands available to residents across the state, and highlights the magnitude of these resources in greater Minnesota – mostly if not completely free. Yet, we must acknowledge that not all residents have the same access to these spaces and there are a variety of barriers limiting equitable access for Minnesotan's.

Connection to Social Capital

There's a connection between mental health and social networks. Researchers Wilson, Wilson & Usher (2015) speak about how social capital has an important role in affecting the mental and physical health of individuals. This connection goes beyond a person's behavioral and genetic characteristics, "Social capital, a growing area of health discourse, refers to the collection of community or personal assets, trust and cohesiveness that is available in a human social system" (Wilson et al., p. 413). The appearance of social capital in community has an impact on a person's health, "… it is recognized within a community in the extent to which the flexibility of transactions occur that enhance, protect and accommodate social needs for sustainability and development within the community" (Wilson et al., p. 413).

According to Flora et al. (2016), the definition of social capital, "…involves mutual trust, reciprocity, groups, collective identity, working together, and a sense of a shared future" (p. 16). This definition includes two types of social capital, bonding and bridging. Bonding capital encapsulates the interactions among specific groups. Bridging capital consists of the larger connections among social groups (Flora et al. 2016). Social capital is "social glue" that binds a community together.

Pedestrian Safety and Accessibility to Natural Capital

Considering accessibility to natural capital in a community and county context is an essential component when studying accessibility, connectivity, and proximity. Natural capital isn't evenly distributed within our communities, nor is it equally publicly accessible for all to enjoy. This chapter touched on travel distances that some need to take to receive mental health care, and touched on how other circumstances, such as income, can serve as an additional barrier to those needing to travel. What hasn't been shared in the stark reality that not all racial and ethnic groups have the same experience.

The Minnesota Department of Transportation (2016) published a Racial Disparities and Equity brief around racial inequality and transportation. Figure 4 Pedestrian Fatalities by Racial and Ethnic Group (2003-2010) illustrates the number of pedestrian fatalities by racial and ethnic group in the US and Minnesota.

Figure 4 - Pedestrian Fatalities by Racial and Ethnic Group (2003-2010)
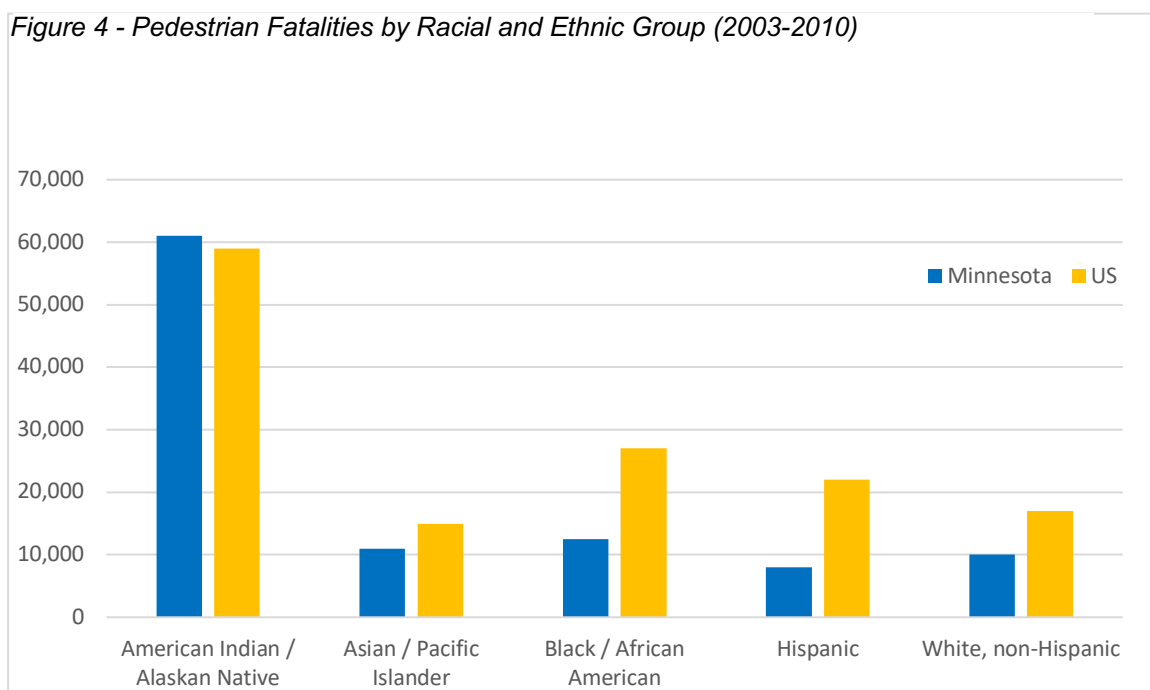
The figure shows that black, indigenous, and people of color are disproportionately killed at a higher rate on state roadways as compared to white pedestrians. Indigenous pedestrians are nearly six times higher to be killed than white pedestrians. Between the years 2003 and 2010, there were nearly 61,000 indigenous pedestrian fatalities highlighting the reality that Minnesota American Indians and Alaskan Native have a higher rate of pedestrian fatalities in Minnesota than the nation; nearly 2 percent higher. This information clearly displays that black, indigenous, and people of color are being killed at higher percentages across the state and brings to focus that walking isn't equally safe for all race and ethnic groups.

Coronavirus (COVID-19) Pandemic

The coronavirus (COVID-19) pandemic has brough to light health inequities that exist across the country. In 2019 and 2020, cities experienced dramatic increases in park and trail usage. According to the National Recreation and Park Association, "Four in five U.S. adults report their physical activity changed in 2020 compared to previous years" (NRPA). Parks, trails, and natural areas provided the public with the necessary and vital natural infrastructure keep themselves, and their communities, both physically and mentally healthy. Park and trail infrastructure largely remained open under guidance from the Centers for Disease Control and Prevention. Yet, the coronavirus pandemic has highlighted that access to parks and recreational opportunities are not equitable. These systems have always existed, only recently uncovered by the coronavirus pandemic. Community of color and historically underserved communities have lacked access to parks and continue to remain disconnected. According to Kimberly Burrowes (2010) at the National Recreation and Park Association (2020), "In many cities across the United States, there are fewer quality parks in close proximity to low-income residents and communities of color, and even when they live close by, they are less likely to frequent these spaces" (Burrowes, 2020). Prioritizing equitable investments in the future will be key to the recovery and resilience of the coronavirus. By applying observations, gathered data, on park inequities community leaders can improve park offerings, future development, and programming.

Conclusion

A cross over between community development practitioners and public health practitioners have the ability to address the underlying conditions that create health. This paper uses a rural context to

deploy a myriad of recommendations to advance mental health and well-being outcomes. Identifying "community of interest" for this paper is within a rural context, partially identified by using the rural-urban commuting areas methodology. This paper defines rural cities as those with a population of less than 50,000 people, and within a county context that are considered "urban, town, rural," "town, rural" and "entirely rural."

This chapter introduced the complex network of mental health services across the state, and the direct correlation between income and mental health. According to Miller and Norris (2018), "it is projected that 2 million lives will be lost over the next decade, a 100 percent increase over the last decade, due to drugs, alcohol, and suicide" (p. 13). Creative, comprehensive solutions must be implemented to change this sad forecast.

This paper proposes using nature as a vehicle for improved health outcomes. This chapter highlighted the vast natural capital within the State of Minnesota, indicating the vast network of natural capital that can be used as a vehicle to improve mental health and well-being outcomes in rural communities across Minnesota. Yet, many local networks are available to be developed and enhanced. Not all park and natural resource systems provide seamless and safe connectivity and access. Pedestrian fatalities numbers highlight the reality and Minnesota Indigenous individuals have a higher rate of pedestrian fatalities than the nation, and significantly higher than any other racial group in Minnesota. Park inequities that impact communities of color and historically underserved communities, systems that have always been there, but uncovered by the coronavirus pandemic.

The following chapters review existing literature around this topic, theory and frameworks that serve as the foundation of recommendations, and propose a series of design, policy, partnership, and programming solutions that center natural capital as critical infrastructure that will aid in positive mental health and well-being outcomes.

CHAPTER 2 - LITERATURE REVIEW

A recent shift has occurred in identifying how natural areas can be sources of community wellness, specifically fostering improved mental health and well-being. Research is proving the positive linkage between time spent in nature and positive mental health results. Yet, much work remains.

A literature review highlights a series of commonalities around the health and well-being benefits of time spent in nature and positive health outcomes. This chapter reviews literature at the intersection of time spent in nature and associated health benefits, gaps in methodology, nature-based interventions and programs, design attributes, and relationship exploration around a set of key mental health variables and concludes with participatory framework.

Gaps in Methodology

A review of studies was conducted by Hartig, de Vries & Frumkin (2014) critique the ways studies assess exposure to nature on the population level: assessment of exposure by how much nature there is within proximity to the individual; survey questions about frequency (time); objective measures via GPS technology (Hartig et al., 2014). This construct analysis identifies how researchers should consider the gaps in research and appropriate measures to holistically capture complete data and identify the various problems associated with each method. These measures do not include visual contact, typically miss finite details of exposure such as the timing, seasonality, quality, and duration of exposure. Hartig et al. (2014) highlight that these measures do not include important details of exposure such as timing, seasonality, quality of nature, and the overall duration of exposure, "we must tackle a litany of specific methodological challenges if we are to develop our understanding of the degree to which, how, and under which circumstances contact with nature affects human health and well-being" (Hartig et al., p. 219). This article highlights five methodological challenges. The first is measuring exposure to nature. Spatial location does not mean that people have the connection to nature in a way that impacts their health. The second methodological challenge is measuring outcomes. A wide range of health measures can be used which complicates developing a clear body of research. The third challenge is understanding mechanisms. Mechanisms through which nature will impact health and multiple, and vary significantly across populations and subgroups and environmental contexts. Demonstrating causality at population level is the fourth challenge. Cross-sectional designs dominate the research landscape, yet longitudinal

observation and experimental designs are better routes to evidence identifying causality among populations. The final challenge is effect size. Hartig et al. (2014) write, "Evidence suggests that contact with nature has a small effect on health and well-being in comparison to structural characteristics such as income, employment or education, and behavioral characteristics such as smoking" (p. 221). By focuses on these methodological challenges, researchers can pinpoint specific affects that nature has on individuals and sub-populations.

Call for Future Research

Houlden, Weich & Jarvis (2017) speaks to the lack of research in identifying the relationship between the multi-dimensional view of mental well-being and green space, and that this relationship remains relatively unknown. It's important to identify the definitions or general meaning of mental well-being and green space. Houlden et al. (2017) describes mental well-being to include two components. First is the hedonic dimension, "Which includes happiness, life satisfaction and pain avoidance" (p. 2). Second is the eudaimonic dimension, "Which focuses on self-realization, purpose in life and psychological function" (p. 2). Mental well-being encompasses aspects of positivity such as relaxation, personal relationships, general life satisfaction and happiness (Houlden et al., 2017). Particularly in urban environments, green space is referred to as specific open space designed for environmental, recreational, or aesthetic purposes. This includes any area of grass, vegetation, or trees, and much larger features such as parks, streetscape greenery, greenways, and active spaces like baseball fields, soccer fields, and playgrounds (Houlden et al., 2017). Green space differs in urban spaces than rural areas. Green space is *designed* into the urban fabric, usually following green space standards, recommendations, and policies set by local governments. These policies are based on walkability distances, park service areas, and distances between homes and green spaces.

A study by Twohig-Bennet & Jones (2018) sought to address a major gap in evidence and looked to identify, "a set of health outcomes that have been investigated as potentially associated with exposure to greenspace" (p. 166). The review suggests that exposure to greenspace is associated with a range of health benefits. The findings of this review propose that accessible greenspace and right of way greenery, "may form part of a multi-faceted approach to improve a wide range of health outcomes" (p. 636). This review calls on future researchers to identify how health providers and policymakers can encourage

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patients to increase exposure to greenspace, specifically targeting those from lower socioeconomic

areas.

Positive Correlation Between Time Spent in Nature and Health Outcomes

Research is indicating that there's a positive relationship between contact with the natural

environment and the well-being and health of residents. However, much work and study need to be done

at the intersection of this work, and understanding, of exposure related relationships.

Time Exposure

A study was conducted by White, Alcock, Grellier, Wheeler, Hartig, Warber, Bone, Depledge &

Fleming (2019) observe how many minutes spent in nature provides the maximum health benefits by

analyzing self-reported health results. Measuring green space in a neighborhood, or the distance to the

nearest park, is only one way to study a person's exposure. A different means of measurement is, "… to

measure the amount of time individuals actually spend outside in natural environments, sometimes

referred to as 'direct' exposure" (White et al., 2019, p. 1). This is a first of its kind study, providing

instrumental data and research in the relationship between time spent outdoors and health results. This

study presents evidence on the relationship between time spent in the outdoors and health results. A

representative sample of adults in England were studied to better understand the relationship between

time spent outdoors and self-reported personal health results. Specifically, the article highlights the time

spent outdoors. White et al. (2019) studied the relationship with direct exposure to natural environments

within the last seven days, rather than proximity, using data from a nationally representative sample in

England. White et al. (2019) speaks to the importance of studying direct exposure as compared to indirect

exposure, "In other words, direct exposures, or more specifically in the current context, recreational time

spent in nature environment per week, cannot accurately be inferred from neighborhood greenspace near

the home" (p. 1). White et al. (2019) sought to, "… better understand the relationship between time spent

in nature per week and self-reported health and subjective well-being" (p. 1). This research effort builds

on a small set of previous work around this topic and responds to the call for more work and research in

this area.

White et al. (2019) relied on self-reporting health outcoming and well-being reports within the last

seven days. The research team conducted three types of sensitivity analysis. First, exposure-response

relationships were explored, utilizing time spent outdoors as a continuous variable and outcomes were measured as binary variables using splines. Second, White et al. (2019) explored exposure-response relationships using time spent in nature as a categorical variable, and health and well-being as an ordinal variable. Finally, modeling time and well-being as continuous variables (p. 3). Key findings of the study found that residents who spent between one and 119 minutes in nature within one week were, "No more likely to report good health or high well-being than those who reported 0 mins" (p. 5). White et al. (2019) write, "Individuals who reported spending greater than 120 mins in nature last week had consistently higher levels of both health and well-being than those who reported no exposure" (p. 5). The analysis identifies that 120-179 minutes compared to zero minutes of time spent in nature per week is associated with a series of benefits. These benefits are associated with a likelihood of reporting good health in areas where one meets, compared to doesn't meet, physical activity guidelines. Another benefit is the likelihood of reporting good health in a high socioeconomic status compared to a low socioeconomic status occupation (p. 3). Sensitivity analysis also illustrates that time beyond 120 minutes yield marginal outcomes and flatten around 200-300 minutes per week. Therefore, a threshold of 120 minutes in nature support significant benefits to well-being and health. Importantly, the study identified that it did not matter how the minutes or "threshold" were achieved.

A study conducted by Jo Barton and Jules Pretty (2009) is centered around mood and self-esteem; both connected to mental health. Barton and Pretty (2009) identify these as short and long-term determinants of mental health. The study analyzed 10,000 United Kingdom studies that involved 1,252 participants. Authors of the study write that achieving good mental health is a balance, "Between self-satisfaction, independence, capability, and competency, achieving potential, and coping well with stress adversity" (Barton & Pretty, 3947).

A series of self-esteem and mood measures were chosen because they can easily be manipulated in the short term. The study focused on assessing the best dose of exposure to green exercise that is needed to improve self-esteem and mood – both indicators of mental health. The study evaluated duration of exercise in a green environment and its impact on a variety of ages, intensities, and exposure. The study resulted in six overall findings:

1. Self-esteem and mood showed the greatest change for the least duration of 5 minutes, showing small but positive improvements for less than one hour and half-day activities, and both increases for whole day activities

2. Self-esteem and mood declined with increased intensity of activity. Mood improvements were the greatest during light and vigorous activity

3. All green space environments improved both mood and self-esteem

4. Men and women reported similar improvements in self-esteem after exercise in green environments

5. The youngest age group showed the greatest change; mood illustrated the least change for the youngest and oldest age category

6. Mentally ill participants had one of the greatest challenges for self-esteem improvements

This study suggests that, "… attention should be given to developing the use of green exercise as a therapeutic intervention" (p. 3953). Findings of the study illustrate that both intensity and duration indicate a large benefit from short participation in exercise in nature, or green exercise. According to Barton & Pretty (2009), the greatest change in responses for duration occur at 5 minutes of activity, and "suggest these psychological measures are immediately increased by green exercise" (p. 3949). With this threshold identified, "Such doses of nature will contribute to immediate mental health benefits" (p. 3951). With these findings, Barton & Pretty (2009) encourage planners and architects to improve access to green space to provide better access for children to learn in outdoor settings.

Range of Health Benefits

A study conducted by Bratman, Hamilton, Hahn, Daily, and Gross (2015) highlights how exposure to nature has on rumination; the self-referential thoughts that are associated with mental illness and heightened risk of depression. This study evaluates the mechanisms that result in a decreased experience in nature and the development of mental illness. Bratman et al. (2015) examined whether mood would change after a walk within nature as compared to an urban environment and what the relationship is between mood and memory effects. This study specifically focuses on urban environments and studies brain patterns post intervention when participants are exposed to a 90-minute walk in a natural setting versus along an urban transportation corridor. The study found, "Both positive and

negative affect benefited after both walks, but only positive affect changed differentially for the nature walk as compared to the urban walk" (p. 6). Bratman et al. (2015) found that interacting with nature it beneficial for people diagnosed with mild depressive disorder.

A study conducted by Rugel, Carpiano, Henderson, and Brauer (2018) utilizes the National Space Index to explore and evaluate the relationship between measures of natural space and the occurrence of mental health outcomes such as major depressive disorder, negative mental health, and psychological distress. This study, "Explores the relationship between exposure to multiple measures of natural space and three distinct mental health outcomes" (p. 366). This work also examined the direct relationships between immersion in the natural environment and its connection to neighborhood social capital.

This research effort utilized data collected from a 2012 Canadian Community Health Survey-Mental Health (CCHS-MH), "A population-based, cross-sectional survey periodically undertaken as a complement to the annual Canadian Community Health Survey" (p. 366). The CCHS-HM was strategically designed to capture both positive and negative mental health outcomes of Canadians. Another measure included the use of the Natural Space Index (NSI), a metric designed to assess the relationship between the natural environment and mental health across Vancouver (Rugel et. al, 2019). The weighted sample of the study was nearly 1.9 million respondents residing in Vancouver metropolitan area.

The study pointed to the importance of publicly accessible nature at the neighborhood scale in an effort to address social isolation and poor mental health in urban environments (Rugel et al. 2019, p. 373). The study did not find, "Evidence for a direct effect of exposure to urban natural space on mental health outcomes in the expected direction" (p. 374). The findings did, however, provide evidence for natural space playing a role in facilitating social connections and indirect mental health benefits by creating a sense of community belonging. The study did not find evidence for a direct association with measurements of natural space with the three mental health outcomes. The study did identify that higher percentages of accessible greenspace and natural space did correlate to higher levels of sense of community. Sense of community is associated with improvements across the three mental health measures.

Nature-Based Interventions

Park Prescriptions include health or social service providers to encourage patients and clients to spend time in nature with the goal of improving health and well-being (Park Rx, n.d.). The U.S. Centers for Disease Control and Prevention in collaboration with the National Recreation and Parks Association developed the park prescription concept. The following literatures builds on like-interventions and responds to the exploration of further study between exposure to parks improving health.

A study was completed by Muller-Riemenschneider, Petrunoff, Sia, Ramiah, Ng, Han, Wong, Choo and Uijtdewilligen (2018), at the Saw Swee Hock School of Public Health in 2018 at the National University of Singapore, to build off a park prescription intervention to study the health benefits around exposure to nature and, "Increased physical activity by recommending park use specifically to increase physical activity in parks" (Muller-Riemenschneider et al., p. 1). The trial also identifies a set of secondary outcomes such as health behaviors, self-reported mental well-being, and physical health (p. 1).

The Park Prescription Trial (PPT) was conducted in Singapore, within a community setting. Participants were recruited at their local screening program or following a health screening. A group exercise component was held in three local parks, near the homes of the participants. A nine-question survey was used to screen and identify conditions for risk facts that, "Require further assessment before engaging in physical activity" (p. 3).

The study found that middle-aged adults exercise the least, while health screening programs are free for residents over the age of forty. Participants were recruited to conduct face-to-face interviews, phone calls, or letters to past screened participants. The subjects in the trial were between the years of 40 and 65, self-reported less than 150 minutes of exercise per week, and met a series of health criteria around blood pressure and fasting glucose levels.

Group one of the trial were given counseling on physical activity and given a prescriptions sheet that, "highlights the importance of engaging in at least 150 min of physical activity per week and the possibility of engaging in physical activity in a park in their neighborhood" (p. 3). Participants were asked to plan their weekly workouts. Group two of the trial continued on their daily routine. Participants were given standard physical activity material and publications from the Health Promotion Board of Singapore.

The participants were not given a park prescription, nor were they invited to the weekly activity program in the park.

The purpose of this trial was to, "Evaluate the effectiveness of a park prescription intervention for increasing time spent in moderate-to-vigorous physical activity" (p. 1). A set of secondary objectives investigate self-reported health behaviors, self-reported mental well-being, objectively measured physical health, among others. This trial evaluates the effectiveness or park prescription interventions to increase vigorous physical activity. It also analyzes impacts on, "health behaviors including park use, whilst incorporating an assessment of mental wellbeing and physical health" (p. 10).

The trial did not yield any definitive outcomes, but rather, lays the framework for a study that can be reproduced. The reproduction can increase the changes of the, "Intervention being appropriate for scaling up to benefit larger segments of the population" (p. 11). This article focused on the intervention as an innovative approach to promoting physical activity and exposure in urban green space.

Shanahan, Fuller, Bush, Lin and Gaston (2015) investigate how "dose-response modeling," when a dose of nature is modeled against a health response, could provide a method in addressing the knowledge gap and relationships to understanding exposure to nature and physical, psychological and social well-being (Shanahan et al., 2015). This study evaluates how "nature dose" can be prescribed and measured, by simply studying the time people spend in a green space or natural environment. The article provides a qualitative review of dose response modeling and how it can be used as a tool to bridge the knowledge gap. The article provides an overview on how dose-response modeling can be used in the health field and can be a method used to inform nature-based health inventions (Shanahan et al., 2015).

The article provides an overview on the various ways that health response can be measured (intensity, frequency, duration) and meta-analytical approaches to developing dose response curves are impossible. A variety of curve shapes can be assumed: 1) a rapid improvement in health followed by a plateau or decline, 2) a gradual increase in improvement in health followed by a plateau or decline (Shanahan et al., 2015).

A range of challenges exist with definition "nature dose." Mostly because it can be packaged in a social context. Shanahan et al., (2015) writes, "'Exposure' can provide a useful way to create more meaningful measures of nature dose and draw together expertise from the health, social, and ecological

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sciences" (p. 477). The study analyzes exposure, intensity, frequency, and duration. Exposure has been used to create minimum recommendations for daily physical activity.

Intensity, can be measured through qualitative and quantitative means. Quantitative measurements would include the number of street trees in a neighborhood, or pervious calculations and vegetative percentages. Qualitative measures would include bird species richness, number of habitats, and vegetation structure (Shanahan et al., 2015). *Frequency,* can be measured as the number of times an individual in exposed, or immersed, in a natural space. Another example would be the time frame and pattern of exposure, i.e., intermittent, cyclical, or random (Shanahan et al., 2015). *Duration,* is simply measured by the time a person is exposed, or immersed, in the natural environment.

This article points to a range of factors and complexity that will complicate the dose response curve for the nature-health connection. Shanahan et al. 92015) identify three key approaches that can be leverages to bridge this gap in knowledge. First, an epidemiological approach can be used to statistically account for a range of complicating factors. Second, examine the relationship between nature and biophysical change in the environment and use this as an intermediate step. Finally, control for potential uncontrollable factors to demonstrate causality. Shanahan et al. (2019) make a public announcement on the need to take a new approach to develop measures of nature-dose in an effort to better understand how it can be manipulated to produce better health outcomes.

A study conducted by Shanahan, Astell-Burt, Barber, Brymer, Cox, Dean, Depledge, Fuller, Hartig, Jones, Lovell, Mitchell, Niemela, Nieuwenhiujsen, Pretty, Townsend, Heezik, Warber, and Gaston (2019) created a repository of nature-based intervention programs across the world and highlights the importance of such programs to advance mental and social well-being. This article focuses on nature-based interventions and how they can facilitate change through nature-based experiences. Nature-based interventions are programs, or activities that are geared towards engaging people in nature to improve health and well-being (Shanahan et al., 2019). This article highlights the twelve highest performing nature-based interventions and provides an overview of the uniqueness of each program and goals for each.

Shanahan et al., (2019) used the Delphi expert solicitation process to identify a list of nature-based interventions that have received attention and recognition. The Delphi technique is, "An iterative

method for building consensus" (p. 3). This technique was based on three rounds of questionnaires. A literature review was conducted to develop a list of interventions such as programs, activities, and strategies that, "Aim to engage people in nature experiences with the specific intention of improving health and wellbeing outcomes" (p. 3). Next, a team of experts were asked to refine the list of interventions and identify similar programs. Then, comments were compiled to improve accuracy. Finally, the intervention list was revised one last time with expert commentary included.

Nature based interventions were reviewed and collected to form a repository of interventions, "These interventions could provide a useful tool for enabling and encouraging people to engage with nature, and in doing so, potentially receive a multitude of physical, mental and social health benefits" (p. 10). Researchers were able to categorize, or group, the nature-based interventions into a series of methods that will change the environment, "While people live, work, learn, recreate or heal, and those that change people's behavior through programs or other means" (p. 10). A highlight of the nature-based interventions is that a key feature or success of the program is that each intervention can impact people in multiple ways; promoting physical activity which can improve well-being.

Design Attributes

A study was by researchers Francis, Wood, Knuiman, and Giles-Corti, (2012) at the School of Population Health at the University of Western Australia and McCaughey VicHealth Centre for Mental Health and Community Wellbeing at the University of Melbourne Australia. This study sets out to identify the relationship of public open space and mental health independently, meaning outside of other use correlates like demographics, individuals, social and the built environment. The study introduces a unique concept to the literature highlighted in this chapter. Francis et al. (2012) introduces the distinction between quality of space and its impact on activity and range of activities. Francis et al. (2012) find that quality of the space is more important and the amount and quantity of space in the neighborhood.

The study leveraged multiple sources of data such as a survey, a public open space audit, and geographic information systems (GIS). The study leveraged research software packages to test the validity and reliability of the survey data. Logistical regression modelling was then used to examine the relationship between mental health and a variety of factors: social environment, use of public space, physical environment, demographic, and individual Francis et al. (2012).

This study uses a socio-ecological framework to address two core focus areas. First, to investigate the connection between public open space attributes (quality and quantity) and mental health independently. Second, to understand the relationship between quality and quantity of public open space and how this relationship can be explained through psychosocial factors and the frequency of use.

Francis et al. (2012) identified that public open space quality and psychological distress remain largely unchanged after adjustments. Francis et al. write that those who live in neighborhoods with medium or high quality public open spaces report twice the odds of low psychological distress. This is in comparison to those living in neighborhoods with low quality public open space. The research team was unable to explain the relationship between quality and mental health. Low psychological distress was not significantly associated with the sense of place or frequency of use, even when social networks were included (Francis et al, 2012).

Francis et al. (2012) found that, "From a mental health perspective, the quality of POS within a neighborhood appears to be more important than the quantity of POS" (p. 1573). The article states, "High quality space is said to accommodate a range of options (e.g., recreational) and social activities 'because place and situation now invite people to stop, sit, eat, play and so on'" (p. 1571). Residents that live in neighborhoods with high quality open space are more likely to have better mental health than those living in neighborhoods with lower quality spaces. The findings of the study also speak to the elements found within "quality" public open space. Elements such as water features, birdlife, connections and walking paths, "Have a stronger association with mental health thane motive, subjective qualities such as perceived friendliness, comfort and safety" (p. 1574).

Counter Narratives

Policy advocates and city leaders may be faced with a defense narrative when trying to highlight racial inequities in urban green space access. A first of its kind, Rigolon, Yanex, Aboelata and Bennet (2022) highlight two dominant narratives around green space. The first is that green space is "nice to have," but not necessarily required. The second narrative is that green space is "universally good" for economic development efforts. These two narratives have continued to reinforce inequities in green space. The "nice to have" narrative contributes to dis-investment in natural capital, specifically in low-income communities of color where private investment is not available or less existent (Rigolon et al.,

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2022). The "universally good" narrative facilitates green gentrification, muting dissenting public voices to park projects (Rigolon et al., 2022). Researchers highlight the role that structural racism plays in these two narratives and recommend shifting power to people of color to develop counter-narratives. When this shift occurs, people of color start from a position of power.

Rigolon et al. (2012) write, "that counter-narratives to the "nice to have" narrative could frame green space as essential, multifunctional, and resilient infrastructure" (p. 1). This narrative reinforces that when budgets cuts occur, public spending for green space becomes optional or non-existent. The narrative continues to imbed green space inequities by support further disinvestment, particularly in low-income communities of color. Highlighting the important, critical infrastructure that green space plays in community can address primary needs of residents, particularly in low-income communities of color. In addition, combating the "nice to have" narrative with "critical infrastructure" can integrate resilience, positioning a community to respond to "… disasters, pandemics and economic downturns" (p. 7).

The study highlights findings that, "counter-narratives to the 'universally good' narrative could describe green space as a setting for equitable development, cultural representation and inclusiveness, and healing for people of color" (p. 1). This counter-narrative can promote the benefits of green space to everyone when centered in equity and race. Another counter-narrative positions green space as a, "tool for inclusive economic development" (p. 7). This study lays the groundwork for future analysis on policy narratives in the future to advance green space access and equitable communities.

Participatory Framework

Engaging community members in policy work is an essential practice to advance social capital and equity work. Researchers Hoover and Shannon (1995) identify a method for building greenway policy with participatory framework. According to Hoover and Shannon, "The linear nature and length of greenways, and their tendency to follow natural landscape features means that greenway protection efforts require policy coordination across multiple jurisdictional boundaries" (p. 435). When no coordination or attempts to coordination occurs, the possibility of loss or negative impact to the greenway is possible. Other dependent resources may also be impacted. Conservation and coordination of these resources are essential to advance a variety of community environmental goals.

Hoover and Shannon (1995) recommend strengthening organizational linkages or creating new ties. These linkages, new or strengthened, will support, "extensive, cross-boundary citizen administrative deliberation of public issues" (p. 435). Participatory democracy is an important theory that must be deployed to advance this work. The theory proposes a shift from power from vertical, experience driven participation, to horizontal. Horizontal power distribution relies on the community's knowledge. Supporters of participatory democracy, "consider deliberative contributions made by citizens based on informed practice and common sense or local knowledge to be a legitimate, indeed required part of the policy design process" (p. 435).

A qualitative study was conducted using an interpretive social science approach for a greenway policy-making project across Tug Hill Plateau; a rural region in upstate New York. The study examined opportunities for cooperative discourse within three groups of participants, working to develop policy at the regional land use scale. The study found that simple deliberative opportunities occurred during the process between local residents and officials, and other levels of government. The term "simple deliberative" opportunities present themselves in the form of superficial conversations as opposed to deep understanding from each other's perspective. The planning process with a committee found both simple and complex forms of deliberation. The committee members discussed the project informally with residents, building interest and gaining acceptance, through natural resource inventories. This provided an opportunity for citizen to express their opinions on natural resources to committee members and local officials. This case study highlights how the theory of participatory democracy is a learning process, "where complex deliberative opportunities are built upon simpler ones" (p. 457). When advance greenway policy, providing opportunities for both simple and complex deliberation opportunities can form trust and buy-in.

Conclusion

This chapter introduces the broad landscape of research that create a foundation for understanding the role that nature has on well-being and mental health. This chapter suggests a broad, positive correlation between time spent in nature and health outcomes. Time exposure that yields positive health outcomes have been presented by White et al. (2019) and Barton & Pretty (2009). A series of nature-based interventions were introduced and discussed in depth and will be studied to determined how

these programs can be deployed in a rural context. A set of design attributes were identified and have the ability to influence local policy in how to shape the natural and built environment. The chapter concludes with a set of participatory frameworks that supports greenway development and a defense for counter narratives that can be used to position natural capital and essential infrastructure.

The literature review highlighted in this chapter is not all encompassing, but rather, identifies core studies that can drive concepts and practices on positioning nature to be a vehicle for improved mental health outcomes in a rural context. Much of the research at the intersection of exposure to nature and mental health occur at the urban level. These scientific studies provide an opportunity for future research to occur in a rural context and provide case studies to replicate study design and methodology.

CHAPTER 3 – THEORY AND FRAMEWORK

This chapter highlights a range of community development theory which lay the foundation on how to enhance natural capital to yield positive mental health and well-being outcomes. The following paragraphs provide an overview of the community capital framework, themes of community development, community of interest, and appreciative inquiry. A series of livability frameworks are explored to understand how each advance well-being within their respective contexts. Asset-based community development supports the enhancement of existing assets within communities, as a sustainable development model and this chapter provides an overview of this approach. Finally, the chapter concludes with an overview of sustainable communities. Systems-level change requires a robust set of concepts, frameworks, and techniques. This chapter introduces the most appropriate methods for determining a diverse set of recommendations for this paper.

Community Development

Community development is the practice of collectively advanced problem solving towards accomplishing a set of goals. It's a practice as old as the idea of "community" and is a process that focuses on the ability to act. Philips and Pittman (2009) define community development as both a process and an outcome. A *process* where local champions gain the skills to solve problems and collectively work towards a goal. An *outcome* where positive change is made collectively in a community. Green and Haines (2002) define community development as, "A planned effort to produce assets that increase the capacity of residents to improve their quality of life." (p. 11). The power to advance community development (process and outcome) lies within people. Core to the practice of community development, literature refers to this as social capital, "… which describes the abilities of residents to organize and mobile their resources for the accomplishment of consensual defined goals" (Philips & Pittman, p. 7). Social capital is the ability for people to act. It's the ability within a group to form relationships and problem solve. Social capital is a form of "community capital," a framework introduced by Flora et al. (2016).

The ability to act to make positive quality of life improvements is the cornerstone to connecting the role that the practice of community development has on the health of its residents. Written in Mental Health and Community Development, Choi (2018) writes, "Community development has the power to

influence health at the population level by supporting the physical, social, and civic infrastructure that makes health possible" (p. 6). Community development profession can utilize community action and public participation practices to gather public voices and identify a range of community assets. Through this collective process, strategies can be developed to influence mental health and well-being outcomes at a variety of government levels. The community development practice is uniquely suited to lead a range of partnerships and organizing efforts, through collective action, to build on existing assets and tap existing potential on key conditions that impact well-being and mental health.

Community of Interest

Defining "community" can be explained in a variety of ways. According to Philips and Pittman (2009), communities are more than just a conglomeration of structures, yet, "'…community of people facing common problems with untapped capacities for self-improvement" (p. 3). Community can be viewed as place-based, or interest-based (Phillips & Pittman, 2009). This paper defines "community" as a community or interest, one that is defined by social terms, "… such as a group of people sharing common chat rooms on the Internet, a national professional association or a labor union" (p. 3). The beginning stages of community development is defining "community." This community of interest is, "…a collection of individuals with a common interest or tie whether in close proximity or widely separated" (p. 5). Representatives of this community would be public officials, park and recreation staff, community developers, public health leaders, healthcare providers, physicians, and a variety of business advocates who seek to collectively study a new approach to mental health in greater Minnesota.

Community Capitals Framework

A pillar of community development, the community capitals framework identifies seven difference types of capital that exist within a community. According to Flora, Flora and Gasteyer (2016), "Every community, however rural, isolated, or poor, has resources within it" (p. 15). The seven capitals include: natural, cultural, human, social, political, financial, and built capital. By evaluating each of the seven capitals within a community, we can identify linkages between each, and identifies where improvement and growth is needed. Balance is key to the capital framework, "When one capital is emphasized overall others, the other resources are decapitalized, and the economy, environment, or social equity is thus compromised (p. 15). When appropriately balanced, the community capitals framework supports a

healthy ecosystem, economic security, and social inclusion. Figure 5 illustrates the seven forms of capital within the Community Capitals Framework. The figure highlights the four forms of capital that will be the focus of this paper.

Figure 5 - Community Capitals Framework, (Flora et al., 2016)
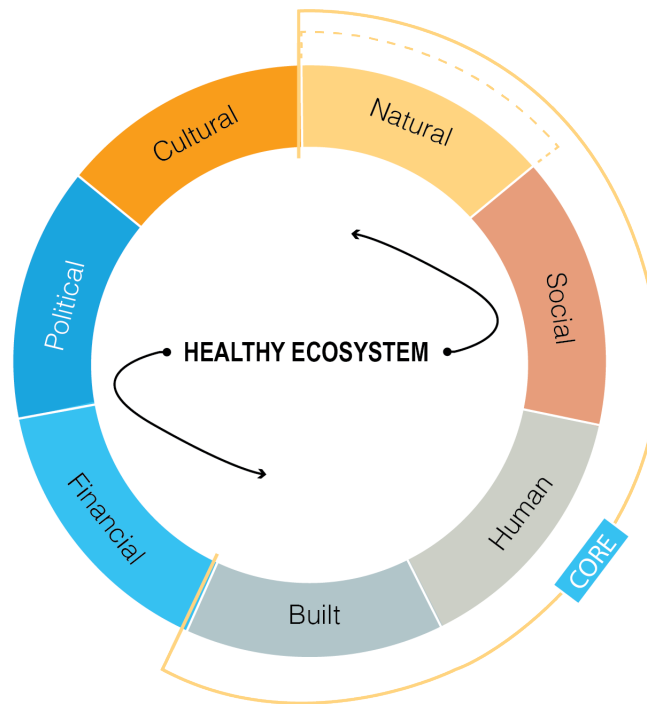
  Natural capital forms the basis of all the other capitals. It includes the landscape, air, water, vegetation, and the environment that surrounds us. Natural capital influences human activity and itself is influenced by human activity. Natural capital is foundation for community sustainability and the opportunities and l limitations that can exist (Flora et al., 2016).

  Cultural capital determines how a group sees the world and enables social groups to impose their worldview on others (Flora et al., 2016).

  Human capital are the capabilities of individuals which include skills, health, education. (Flora et al., 2016).

  Social capital is viewed as the social "glue." Social capital includes to sub-types; bonding and bridging social capital. Bonding social capital includes those interactions within social groups. Bridging capital includes interactions across social groups (Flora et al., 2016).

Political capital is, "… the ability of a community or group to turn its norms and values into standards" (Flora et al., p. 16). These standards are then transformed into regulations, ordinances, rules, and laws that determine who resources are distributed.

Financial capital includes wealth and resources within a community; both at the community level and individual level. Financial capital is the most mobile of all the capitals. This capital is assessed by diversity of businesses, changes in poverty, median household income, and other increased assets over time (Flora et al., 2016).

Built capital includes all human constructed infrastructure. Built capital includes the physical environment above ground, i.e., homes, businesses, roads, sidewalks, trails as well as underground infrastructure which includes sewer, water, stormwater, electric, gas and broadband cable. Built capital, "… is effective only when it contributes to other community capitals" (Flora et al., p. 16).

The focus of this paper is to strengthen four capitals: natural, built, social, and human. Chapter 2, Literature Review, identifies a strong link between natural and social capital. Human capital will be developed through the self-help model of community development which will equip community members with the tools to make change. Finally, built capital plays an important role in physically connecting people to natural systems, but can also serve as a barrier to access and connectivity. Over reliance of a certain capital can have negative impacts to the broader community. Yet, identifying the four capitals that will likely need development can help identify the right tools to build these forms of capital and help to identify if growth is needed in political, financial and cultural capitals.

Themes of Community Development

Community development is centered around the betterment of a community through a variety of methods. There are three major themes of community development: self-help, technical assistance, and conflict. To advance local change, "…people should initiate action to improve their situation in the locality" (Christianson, p. 32). The most successful efforts will incorporate all three themes.

The self-help theme relies on cooperation, "The assumption of the cooperative or self-help theme is that by working together, people can improve their situation" (p. 32). This theme is centered on people, where collectively individuals arrive at group decisions and take action, "… to enhance social and

economic well-being of their community" (p. 33). Self-help assists people in learning new approaches and ways of problem solving to advance initiatives and challenges in their community.

Technical assistance is the second theme. For this theme, people generally work for a community rather than with them. This scenario commonly looks like a local unit of government hiring a consultant to fulfil a request. Technical assistance is facilitated by a technical expert and emphasizes completing a task. For technical assistance to be considered community development, public participation and involvement is a requirement.

The final theme is conflict. The role of the change-maker is to organize, rather than lead. Similar to the self-help theme, the conflict theme looks to gather people to identify them needs and problems, and help organization action groups. Christianson writes, "The advantage of the conflict theme is that it can achieve change in a very short period of time" (p. 37).

Understanding that each method has been deployed within community, this paper recommends the self-help theme of community development to advance natural capital within rural community contexts to advance mental health and well-being outcomes. The ability for people to work together to make community change, will continue to build stewards of this work and support implementation and action work.

Appreciative Inquiry

Appreciative inquiry (AI) uses a process to identify community successes and strengths and can be used to formulate steps to achieve a park and natural resource system that supports community mental health. The approach uses a "four D" method: discovery, dream, design, and destiny (Green & Haines, p. 89). The AI method uses the community capitals framework and, "… attempts to build transformative change by taking into the future what works best in the recent and what has worked for community well-being in the past" (Flora et al., p. 450). The "discovery" phase orients around identifying the range of success stories and accomplishments, collectively studying a range of factors the aid in the success of these elements. This step could identify existing programs, services, aspects of the park and trail network, natural resources, and multimodal systems that support access and connectivity. The "dream" phase centers a future vision or future condition, asking residents what assets could be built upon to improve on to advance a future state. This step can include exploring how the existing and future

park and green space system can be expanded to enhance health. The "design" phase includes a range of stakeholders and residents in designing goals and steps to achieve the vision that was determined in the dream phase. This work could come in the form of specific mental health and well-being goals and actions for the future park system. Finally, the "destiny" phase is centered on "… continuous learning and adjusting to carry out the goals" (p. 89).

By deploying the appreciate inquiry method, community developers can involve a broad range of stakeholders to co-create a vision and steps to achieve this vision. Appreciative inquiry is a research model that, at its heart, is participatory development. This research approach works collectively with people in the community to understand and build a common understanding and identify steps for action and ultimately, sustainable development.

Social Determinants of Health

A variety of factors influence our health. Various conditions such as economic, social, and physical have a profound influence on people. This is directly evident when a zip code can predict a person's quality of your life, preventable illness, and length of life. The Social Determinants of Health (SDOH), "… have a major impact on people's health, well-being, and quality of life" (Office of Disease Prevention and Health Promotion, n.d.). A well-established framework in the public health field, the social determinants are non-medical factors, or conditions, in the environment that will affect a range of health outcomes. There are five social determinants of health: economic stability, education access and quality, health care access and quality, neighborhood and built environment, social and community context (Office of Disease Prevention and Health Promotion, n.d.). These domains directly impact the health and well-being of individuals, and their ability to thrive in their community. Each of the five domains have an impact on advancing mental health and well-being at the community level. According to the Office of Disease Prevention and Health Promotion, "Understanding the relationship between how population groups experience 'place' and the impact of 'place' on health is fundamental to the social determinants of health" (Office of Disease Prevention and Health Promotion, n.d.).

The economic stability domain focuses on the connection between financial resources and their health. Examples could include a variety of socioeconomic conditions such as concentrated poverty, income, cost of living, housing conditions, employment, and others like food access and food insecurity.

Socioeconomic status such as income, profession, occupation and poverty directly impact mental health, "there is clear evidence that poor mental health is associated with reductions in labor force participation and employment" (Choi 2018, p. 11). In addition, poor mental health is a risk factor for unemployment and has been linked to a variety of negative health outcomes, risky behavior, and chronic health conditions (Choi, 2018).

The education access domain focuses on the connection between education and health. This domain is centered on education opportunity, educational attainment, early childhood education and development, graduation rates, language and literacy.

The healthcare access and quality domain would appear to be the most obvious domain that is applicable to this research effort. Yet, access to health services and care are only part of the equation. This domain focuses on the connection between an individuals' access to services and their health. This domain includes issues such as access to care, insurance, and understanding of one's health.

The neighborhood and the built environment domain are centered on the connection between place and health. This domain focuses on where people live and includes issues such as access to transportation, housing options and quality, environmental components such as water and air quality, and food access.

The social and community context domain is dedicated to aspects like public participation, equity, cohesion, norms, and social connection. This domain fixates on the connection within context such as the way in which people live, work, and play.

Community mental health and well-being play a role in each of the five categories. Mental health plays a role in the neighborhood and built environment category by providing access to natural systems such as parks, trails, and environmental areas and other green spaces that impact community well-being and health. Mental health impacts the education domain by educating the community on ways to access care and support systems for holistic health, while also offering research and findings on the ways that spending time in nature can impact health in a variety of ways. The social and community context domain ensures that public participation is a part of natural capital development, equitable systems are created, and social connections are created in natural systems to advance community well-being. Mental health and well-being impact the healthcare domain by offering support system to connect people to reliable,

convenient access to medical treatment and preventative health care. Finally, the economic stability domain identifies the systems that support economic health, poverty, and income and other indicators that negatively impact health. Economic stability also supports green industries and tourism-based economic development frameworks that support employment and job development.

The social determinants of health can be translated into policy at various levels of government, specifically focused on advancing mental health and well-being at the community level. Through a multi-sector approach, a series of actions can be taken to identify and target the higher priority domains. Health is impacted by the very aspects that the community development field looks to improve and enhance. By analyzing each social determinant within the community's context, community developers can begin to develop a broad set of strategies to target well-being and mental health.

Livability Framework

Livability frameworks draw on the various domains and characteristics that improve a population's well-being. These domains address the social, physical, and economic conditions that are needed to influence health outcomes.

THRIVE Framework

The Prevention Institute's approach to addressing challenges and solutions is a framework meant for, "… working alongside community residents and organizations to explore the factors that are impacting their health and wellbeing" (Savannah et al., p. 22). The THRIVE framework, or Tool for Health and Resilience in Vulnerable Communities, helps organizations in exploring a broad range of social, physical and economic factors that impact health and well-being. The THRIVE framework plays an important role in a planning process where, "THRIVE can be instrumental in assisting groups in developing strategies to reduce mental health stressors, improve options for coping, and enhance resilience factors in a community" (p. 22). Figure 6 illustrates the THRIVE framework which includes three structural drivers within community: people, place, and equitable opportunity.

Figure 6 - Tool for Health and Resilience in Vulnerable Communities - THRIVE Framework (Savannah & Estes, 2018)
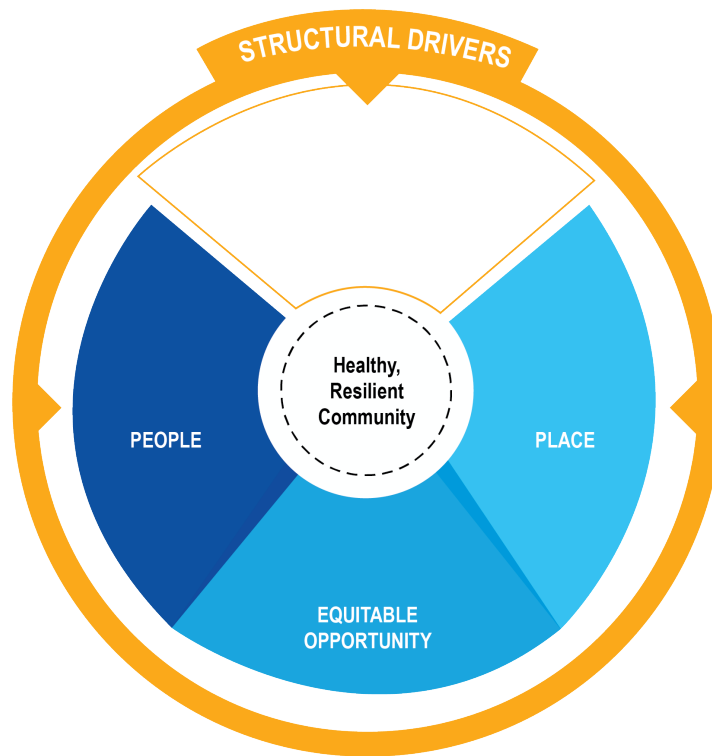
The "people" driver includes social networks and trust, culture and norms and participation. The "place" driver includes elements such as housing, arts and culture, transportation, aesthetic and community design, and environment. The "equitable opportunity" driver includes education, local wealth, income, and living wages. This framework can assist community practitioners in identifying the conditions that directly and indirectly impact mental health outcomes. Figure 6 introduces the tool for health and resilience in vulnerable communities, and it's three elements that make up the thrive framework: people, place, and equitable opportunity.

By understanding the structural drivers, community leaders and stakeholders can see through a lens of well-being and a new perspective on mental health. According to the Prevention Institute, "Assessing and addressing community determinants of health can help reduce mental health stressors and enhance resilience factors across a community" (p. 23). This framework can identify ways to

understand the range of conditions that impact mental health and well-being in communities and for individuals.

American Planning Association – Comprehensive Plan Standards for Sustaining Places

The American Planning Association published Sustaining Places: Best Practices for Comprehensive Plan, written by Godschalk and Rouse (2015), as an effort to address key trends that are impacting the comprehensive planning practice. These trends include: resilience, systems thinking, community engagement, equity, implementation, and adaptation (Godschalk & Rouse, p. 7). The framework is broken into three sections 1) best practices for plan principles, 2) best practices for plan processes, and 3) best practices for plan attributes (p. 42). These three sections make up sustainability best practices in comprehensive planning. Collectively, this framework provides a footprint for comprehensive sustainability. Figure 7 Comprehensive Plan Standards for Sustaining Places identifies the various plan attributes, plan principles, and plan process in the framework (Godschalk & Rouse, 2015).

This framework can inspire a similar set of principles at the intersection of this paper; to be integrated into long-range planning documents such as comprehensive plans, non-motorized transportation plans, small area plans, or park, trail and open space plans. The *Best Practices for Plan Principles* can position a community to incorporate the full breadth of the framework while, "… allowing each community's unique context, environment, and issues" (p. 42). If implemented and incorporated, the practices can chart a community towards a high level of sustainability.

AARP – 8 Domains of Livability

Livability principles can be developed to support certain segments of the population. AARP developed eight domains of livability as a framework to highlight a range of community features that impact older adults. The "8 Domains of Livability" is used by cities, counties, and states to prioritize their work in an effort to become more livable and support older and aging adults, and all ages (AARP). The domains include: outdoor spaces and buildings, transportation, housing, social participation, respect and social inclusion, work and civic engagement, communication and information, community and health

services. The availability of these community features is as important as the quality of these features. The domains help to ensure that older adults have options, tailored to their needs to be able to access a variety of services in their community.

Habitat for Humanity – Quality of Life Framework

Habitat for Humanity is working to provide stable, affordable housing for residents. Their work also encompasses neighborhood revitalization. Developed through an engagement process, the Quality of Life Framework is Habitat for Humanity's, "hypothesis on how systemic and sustainable change happens in a neighborhood (Habitat for Humanity, n.d.). The framework is formed from three foundational outcomes: sense of community, social cohesion, and collective action. Figure 8 illustrates Habitat for Humanity quality of life framework.

Figure 8 - Habitat for Humanity - Quality of Life Framework
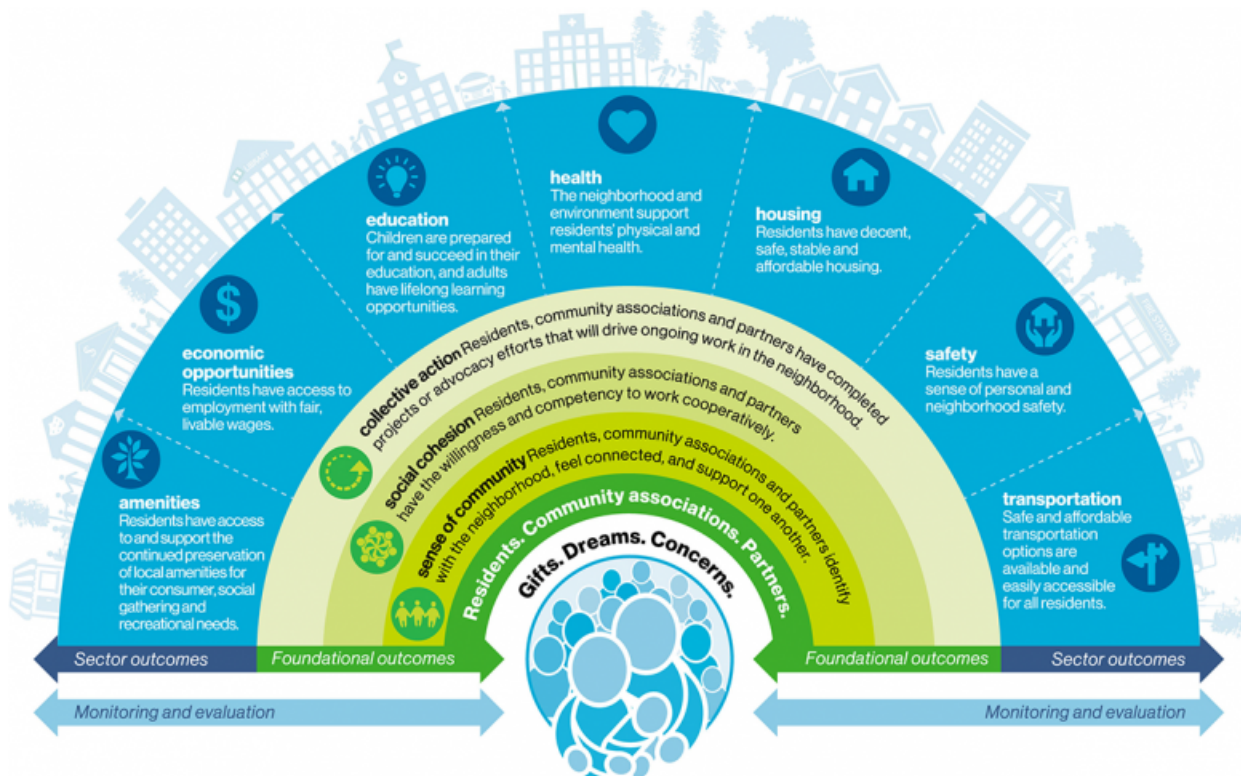
"Sense of community" means to identify with a neighborhood, and centers on people feeling connected through social and support networks. The social cohesion outcome focuses on the willingness to work

together. The collective action foundational outcomes mean to continuously advance on projects and advocacy work. According to Habitat, "Focusing on the three foundational outcomes increases motivation and capacity to overcome barriers to sustainable change" (Habitat for Humanity, n.d.).

The framework highlights seven elements that serve as a comprehensive approach to improving quality of life on the neighborhood level. Those elements include: amenities, economic opportunities, education, health, housing, safety, and transportation.

Asset-Based Community Development

Focusing on systems-change requires different approaches to community development work. Asset-based community development focuses on building assets, as opposed to a needs-based model where communities look to "fix" what isn't working. "By focusing on success and small triumphs instead of looking at what is missing or negative about a place, a positive community outlook and vision for the future can be fostered" (Haines, 2009, p. 38). This practice can also support saving dollars as opposed to spending that would be needed to repair a needs-based approach. Investments can be further targeted towards areas of the network or systems that can advance community goals.

Using this approach can infuse and position equity and social justice into the community development process. In communities and neighborhoods who have suffered inequities and disinvestment, engagement practices that go beyond the question, "What happened?" is essential. Often this question is trauma-informed. According to Savannah and Estes (2018), a more appropriate question to guide this change-process is to ask, "What is the untapped potential here that can be activated?" (p. 22). By identifying a series of assets in a community, these assets can further be developed and strengthened. This work has a cascading effect. Naturally, by further enhancing and developing an asset, will create a domino effect that will impact other areas of the community. This approach doesn't diminish the needs or issues that exist, rather, focuses on building upon the assets first.

Sustainable Communities

Sustainable development is defined as, "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Roseland, 2012). Sustainable development requires practitioners to see the long-term, holistic picture of impacts and potential. Problems cannot be isolated and solved unilaterally on their own. As identified in the community capital framework, all capitals

are interconnected. The practice of sustainability helps community developers understand the interrelationships between the various forms of capital, and discourages communities to emphasize only one form over others.

Sustainable development has three core elements: the environment, the economy, and society (Roseland, 2012). These elements are commonly known as the "pillars of sustainability" or the "triple bottom line." These three elements must work in concert with one another in order for sustainability to be achieved.

A systems-approach is needed to advance sustainable communities to implement a different form of development. Relying on the interconnectedness of the pillars of sustainability as well as the community capital framework must be embraced by the wide range of practitioners at the intersection of this work. Green & Haines (2016) write, "Sustainable community development relies heavily on a systems approach that recognizes the interconnections between the economy, environment, and social basis of the community" (Green & Haines, p. 57). Sustainable development requires a greater call, one that requires a fundamental shift. Social change is a foundational element of advancing sustainable communities, "environmental quality is inextricably linked to, and inseparable from, human equality" (Roseland, 2012). When environmental degradation occurs, people are directly impacted. Sustainable development must require a commitment to social equity. This can be done by ensuring that there are democratic processes in place to, "enable informed decision making, meet the needs of diverse constituencies, and fulfill ideals of fairness and equity" (Wheeler, 2009). Further advancing social equity, rural community contexts must have collaborative decision-making environments, "which participants can agree on positive, proactive strategies, "think outside the box,' and learn to respect each others' points of view" (p. 349). This concept becomes especially true when identifying creative solutions to addressing mental health and well-being on the community level.

A key concept of sustainability is resilience, "the ability of a system to respond to and adapt to disturbance or change (Green & Haines 2016, pg. 59-61). By integrating natural systems into the built environment to address a changing climate, the expansion of natural capital will help advance the health of people who use these systems. Viewing natural capital development through a resiliency lens will support communities to recover more quickly because of the existing capacity and assets in place.

Conclusion

This chapter identifies a wide range of community development theory. Community capitals framework relies on seven forms of capital for sustainable communities. This paper identifies natural, built, social, and human capital that will need to be developed to support the development of green, critical infrastructure that advances rural mental health and well-being. Appreciative inquiry will support communities in developing natural resource systems that support mental health by deploying the "four D" method: discovery, dream, design and destiny. Asset-based community development will enhance existing assets that are already successful within the community, a sustainable model, as opposed to building on the "needs." A series of livability frameworks will be used to envision a framework that is targeted toward mental health and well-being. Finally, this chapter introduced sustainable development and the interconnectedness of systems. This chapter identifies a core set of theory and framework to ideate a series of recommendations in forthcoming chapters.

CHAPTER 4 – FINDINGS AND RECOMMENDATIONS

The previous chapters provide a foundation for how mental health is impacted by a variety of aspects like environmental, social, and physical conditions, and various socioeconomic factors within community. The practice of community development has a direct role in the development of environments and systems that support mental health and well-being. This chapter will focus on a series of recommendations that can yield improved and positive mental health and well-being outcomes in rural communities. This chapter outlines a variety of perspectives, partnerships, practices, programs, policy, and framework that local and county governments can further adopt and deploy. All of these recommendations have a core element in common, all rely on a public engagement process and involvement with a range of stakeholders. The intentional focus of this chapter is to highlight the importance of process change and system thinking, connecting people to nature and removing barriers that prohibit people from doing so, and through individual exposure within nature; either through nature-based intervention or for health outcomes. Through these efforts, city and county governments can effectively play a role in mental health promotion while intentionally investing in critical public infrastructure that support the health people.

Cultural Shift

Natural capital plays an essential role in our communities. Green space and parks are a free, public amenity that is available for a range of recreation and activity. Yet, green space and natural areas play a variety of other important roles. These places provide stormwater management, play a critical role in resiliency planning, carbon sequestration, and environmental health factors such as air quality, climate adaptation, and water quality. In addition, natural capital serves as a place for social connection and a place to socialize and gather; whether that's in a neighborhood context, county, or to simply socialize with other park users. Supporting systems, like transportation and mode choice are not always available or equitably distributed across a community or county. Smaller, more rural communities may lack funding to develop facilities to safely walk, bike and roll or may not be appropriately distributed across a community. This can leave those who seek recreational or physical activity are limited and may be able to rely on free, public green spaces for such activities.

A cultural shift is needed in municipal and county government to prioritize natural capital investment. This paper seeks to emphasize the various social, economic and environmental benefits of natural capital by explicitly highlighting the benefits on mental health and well-being. Community leaders and change-makers can build on these recommendations to transform the notion of "nice to have amenities" into necessary public and social infrastructure to support healthy people – and communities.

Intentionality behind policy development, program creation, planning, partnership formation and growth are pivotal steps in highlighting the importance for strategically investing in natural capital. By viewing community development practices through a mental health and well-being lens, leaders and stakeholders can take intentional steps to highlighting those conditions that impact mental health for their residents. From there, leaders and stakeholders can purposely use natural capital as a vehicle to enhance mental health and well-being at the community level.

The practice of community development and practitioners who identify with the field can act as a lead stakeholder in this work at the city and county level. Written in *Community Development Innovation Review,* "Community development can tap into resident voices and community assets, extending its reach beyond improving the physical and economic potential of communities…" (p. 22). The goals of improving well-being and mental health outcomes align with the professions overall purpose, "… community development take on the mantle of developing stronger 'communities' of people and the social and psychological ties they share." (Phillips and Pittman, p. 6).

Practice

A fundamental purpose of this paper is to focus on system-level change and encourage collaborative, participatory processes to address solutions; as opposed to project-specific actions where one park enhancement is expected to make a community-level impact on mental health and well-being. The community development process focuses on, "… capacity building (the process of community development) leads to social capital which in turn leads to the outcomes of community development" (Phillips and Pittman, p. 12). The following practices, based on research and theory, can be deployed to assist community leaders, stakeholders, and change-makers to build social capital (the ability to act) and develop a series of locally tailored solutions to develop natural capital.

The practice of process of community development cannot occur without public participation. According to Green and Haines (2016) public participation, "… refers to activities in any public institution of society or the government, which includes organizations and institutions other than government" (p. 21). The purpose of public participation relies on local residents, their local knowledge and wisdom. Through a wide, holistic participation process the activities and outcomes are controlled by citizens; those who were involved in the process, and hope to influence elected officials. Literature outlines a variety of reasons why people engagement. Those reasons can be importance of the issue, social relationships, and interest in activities (Green & Haines, 2016). There are a variety of reasons why people choose to not engage and practitioners, volunteers, and change-leaders must work to develop a strategic approach engage the community. These reasons include, "Lack of communication, particularly with leaders, and infrequent actions are two barriers to long-term participation" (Green & Haines, p 84). Other reasons why people do not engage include time constraints, communication, technology challenges, and supportive services such as transportation, childcare, interpretive services prohibit people from engaging in collaborative processes.

By understanding why people decide to not engage, local change-leaders can develop a public participation process that is tailored to the community and identify appropriate techniques to engage a broad set of the public and stakeholders. A large catalogue of techniques exists to engage people and achieve project goals, "Depending on what a CBO (community-based organization) is trying to accomplish, it will need to choose the appropriate technique for the purpose it is trying to achieve" (Green & Haines, p. 85). Continuously using the International Association for Public Participation's Public Participation Spectrum can help community leaders in using the correct engage technique for the various themes and practices identified in this paper. Table 1 Index of Community Engagement Techniques introduces methods, started at the simplest phase of participation, inform, down to the most complex, empower.

Table 1 - Index of Community Engagement Techniques

Phase	Overview	Method
Inform	Provide stakeholders with objective, clear and balanced content and information to, "assist them in understanding the problem, alternative and solution" (Tamarack, p. 2).	• Project or initiative website • E-mail lists • Project, initiative or program video • Social media and social networking platforms • Advertisement through a variety of channels; print and electronic • Printed material i.e. letters, posters, brochures, reports, postcards, newsletters • Displays and exhibits • Site tours • Public meetings
Consult	Working with stakeholders and individuals to gather and obtain feedback on a range of options or decisions.	• Polling and voting • Online surveys • Interviews • Focus groups • Forums (online and in person) • Workshops • Pop up events
Involve	Working with stakeholders and individuals, "throughout the process to ensure that their concerns and aspirations are consistently understood (Tamarack, p. 2).	• Idea sourcing online events • Community mapping • Design charettes • Mind mapping • Vision sessions (online and in person) • Citizens panel • Participatory budgeting
Collaborate	Seek to partner with stakeholders and individuals on every step and aspect of a project and all decisions made, from development to the solution.	• Work groups • Open space meetings managed by attendees and participants • Co-creation processes
Empower	Working for community-led projects and having shared leadership, "with final decision-making at the community level" (Tamarack, p. 2).	• Citizen committees • Decision-making platforms • Asset-based community development practice

Rural communities must incorporate translated material in Spanish, Hmong and Somali. Project leaders need to consider languages and the appropriate ways to share engagement opportunities. By

understanding the community, or group of people, you are attempting to reach, change leaders can further identify the appropriate methods individuals prefer to receive material and appropriate pathways on how different groups prefer to engage.

Capacity Building

The practice of capacity building is a foundational component of community development and advancing mental health and well-being at the community level. Capacity building ultimately seeks to, "… help communities learn to help themselves" (Green & Haines, p. 8). The practice of community building can be defined as, "… the ability to become active agents (rather than objects) of change" (p. 8). To affect change as the community level, participants in a variety of fields must work together through a collaborative process. A variety of stakeholders, addressed in a later section of this paper, must convene to advance this work. Capacity building has four key elements: sense of community, level of commitment, ability to solve problems, and access to resources (Green & Haines, 2016). When the self-help model of community development is applied, this work will support people to gain the skills to then help themselves. According to Green & Haines (2016), "Capacity building enables communities to identify strategies and organize neighbors to improve local conditions" (p. 10). Mental health and community well-being is a community-level initiative, and by leveraging engagement practices a community can analyze and understand local needs to create places that support well-being.

Through a combination of strategies like leadership development, organizational development, community organizing, and organizational networks, people can first build their capacity, or ability to act, before beginning a development practice. Savannah & Estes (2018) write, "… most impacted communities are capable of leading solutions to restore mental health and well-being" (28). By tapping into individuals, families, organizations, and community members, municipalities and county governments can take true steps into building the ability to act and support people to lead change processes.

Collective Community Action

According to Derek Okubo (2009), "Some communities allow the future to happen to them. Thriving communities recognize that the future is something they can create" (p. 78). Collaborative problem solving allows for consensus-based decision-making and shared power in visioning processes. Although it takes more time, the implementation phase has "community ownership" where projects can be finished

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in a timely fashion. Collaborative problem solving should be used when the issues are complex and need to be negotiated. Community should also use this approach when resources are limited and there are various interests involved. Additionally, stakeholder action is required to address the issues, people are generally interested in the issues and willing to participate, and no sole entity has decision making power over the problem (Okubo, 2009).

Natural capital development to improve mental health and well-being is an excellent fit for collective community action. No single entity or jurisdiction has control over the problem or steps to implementation. This topic is complex, impacted by demographic and socioeconomic factors, and a multifaceted mental healthcare system. There are a number of interests involved in advancing this aspect of health; the range of stakeholders are diverse and can contribute to a range of solutions. Resources are limited in developing the golden solution to this challenge. Through partnerships and collective engagement, a wide variety of individuals, change-leaders, non-profits, community groups, and local and elected officials can help identify a range of solutions.

Collective community action can develop strategies to address various determinants that will impact mental health and well-being in natural capital planning. By leveraging the self-help theory of community development, "… people and communities become increasingly interdependent and independent rather than dependent on outsiders to make and implement decision" (Phillips & Pittman, p. 63). By leveraging the community development process, a set of steps will guide a range of stakeholders towards an actionable plan that meets their ultimate goals around mental health and well-being within greater natural capital development.

Community Visioning

The community visioning process is both a process and an outcome. The general process includes identifying where the community is, where it wants to be, and how it's going to get there. When planning to develop a community-wide plan to enhance natural capital, the first step should be developing a vision statement. Okubo (2009) writes, "By starting the process with the development of vision themes, participants recognize early on that despite the different views, there are many areas on which they all agree" (Okubo, 89). A vision is a future state that the community hopes to reach. The vision statement, "provides the basis from which the community determines priorities and establishes targets for

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performance" (p. 89). There are four steps in the visioning process. The first step is to finalize the vision statement. This process can be arduous, but ultimately participants should agree on the themes of the vision. The second step is to understand the trends, forces, and pressures of that affect the community and the focus of the vision; which in this setting is centered on natural capital development. This step involves studying. Variety of factors such as demographic and socioeconomic, health data, natural resource inventories and future trends. The third step is understanding the community's civic infrastructure. This step assesses, "the formal and informal processes and networks through which communities make decisions and solve problems as 'civic infrastructure'" (p. 93). Through this process, stakeholders can understand how to solve problems and seize opportunities. The final step in developing a natural capital visioning plan is selecting and evaluating key performance areas. Stakeholders develop results-oriented steps to determine how the community is going to reach goals in the future. The community visioning process, when coupled with participatory action research, and advance community goals and form community buy in in order to make meaningful change within the community.

Participatory Action Research

Community based research supports a bottom-up approach to community development, as opposed to a top-down approach. Participatory action research (PAR) intentionally, "… incorporates participation from disenfranchised or marginalized group in society – the poor, minorities, women and children" (Green & Haines, p. 103). The "participation" component of PAR involves a variety of funders, organizations, people and researchers. According to Green and Haines (2016), "In every PAR process, participation must be deeply defined and understood" (p. 104). The "action" component of PAR speaks to the active role that researchers must play alongside community members. The focus of this practice is to have the researcher work hand-in-hand with community members throughout the process. The "research" component of PAR highlights the need for co-creation. The researcher must involve and work with people to develop the questions asked in surveys, as opposed to the professional researcher developing the research questions on their own. Green and Haines (2016) write, "One chief advantages of PAR is that communities own the research" (p. 104). Community members help to craft goals, gather data and information, and are the center of analyzing this data to then understand the results. By intentionally

positioning residents, community developers can elevate community voices who are more likely to use the findings.

Practice – Planning and Design

Investing in natural capital, and positioning it to be considered civic infrastructure, relies on various planning processes and design practices. A community will discuss and ideate the "types" of park and trail facilities that will be needed to complete the network, ultimately providing the vital services and spaces discussed in this paper. This section highlights the high-level planning and design practices that should be used to create networks that will leads to positive health outcomes in rural contexts.

Equitable Distribution

The Trust for Public Land has identified startling disparities in their analysis of the 100 most-populated cities; finding that Black, indigenous and people of color have an average of 43 percent less park access than predominantly white neighborhoods (Foderaro, n.d.). Limited research exists in rural settings on inequitable access to natural capital in underserved communities. Guided by the research in an urban context is an important step and case study in promoting equitable access to parks and natural spaces. Understanding and acknowledging that not all communities and people interact with nature in the same way. Planners and policymakers need to understand the barriers and obstacles that stand before communities that limit diverse communities from engaging in increased nature exposure. Before any planning efforts begin, public participation must start with those who have been traditionally overlooked within a community. There are a variety of techniques that can be deployed to recruit residents and engage, but most importantly it involves going to members of the community and meeting them where they are. Participatory engagement processes can help integrate equity into park planning processes.

During the inventory and analysis phase, socioeconomic data should be studied. Particularly, the distribution of facilities and level of investment, in relation to socioeconomic patterns. Economic and social circumstances, and environmental factors all play a role in a person's mental health. Analyzing industry, occupation, income and poverty races are important for this assessment. Once this data is gathered and analyzed, planners, researchers, and residents should interpret the data and ask a series of questions such as, "Are there areas with higher-than-average concentrations of low-income and [underserved] populations that are lacking parks?" (Rouse 2017, p. 4). As well as, "If these areas have

parks, how large are they and what is the quality of facilities they contain compared to parks in more affluence neighborhoods?" (p. 4). The feedback and information gathered from the engagement process coupled with the data pulled during the assessment phase, a vision and action plan can then be developed. The plan's vision and actions need to center on equitable access to parks and natural areas for all community members at the local or county level.

Resiliency Lens

Natural capital serves as critical, sustainable infrastructure that has great value, "cost-effective investment in infrastructure in the form of biophilic and ecosystem services that, "with maintenance, can persist for the long term" (Brown and Fink, 2022, p. 30). Expanding green spaces and natural capital within a rural context will be the key to climate adaptation and mitigation. Brown and Fink (2022) write, "associated investment in nature-based solutions can contribute to mental, social and emotional health as much-needed components of climate resilience" (p. 27). The replacement of gray infrastructure with green solutions can retire outdated that facilities that serve singular functions. Parks and natural areas are the best line of defense to extreme climate changes. By viewing natural capital development through the lens of resiliency, rural communities can solve a variety of challenges. One way is by mitigating heat island and the negative impacts of extreme heat on people. Investing in vegetation can support cooler air temperature. Parks and natural areas sequester carbon from pollution and have been known to remove other pollutants. Natural systems also have an incredible ability withstand trauma. Another way green networks advance resiliency is the foundational role it played in the coronavirus pandemic. Brown and Fink (2022) write, "the COVID-19 pandemic has confirmed the need for biophilic city planning to provide access to nature as a means to maintaining well-being for urban populations while enabling social distancing" (p. 25). Park systems provided a place for respite, during times of isolation and lock downs, offering people a place to recreate and provide space for a variety of well-being benefits.

Community Mental Health Framework

The social determinants of health identify non-medical factors that influence health. Community mental health and well-being play a role in each of the five categories and have a linkage to natural capital development. Natural capital development is an important factor in determining health. Natural capital directly impacts our social connections and the spaces they can occur within, impacts how people

play, and where people can live. By further investigating how communities can incorporate mental health and well-being considerations into natural resource planning, a system-level lens can make a case for collaborative health integration and natural resource planning. More understanding and connection on how to create positive mental health and well-being should be analyzed. Three pathways are identified between community mental health and well-being using natural capital, and a stronger understanding is needed beyond the social determinants of health. This paper identifies environmental, behavior, and social pathways to strengthen this gap. Figure 9 illustrates the community mental health framework when working to enhance natural capital within community.

Figure 9 - Community Mental Health Framework
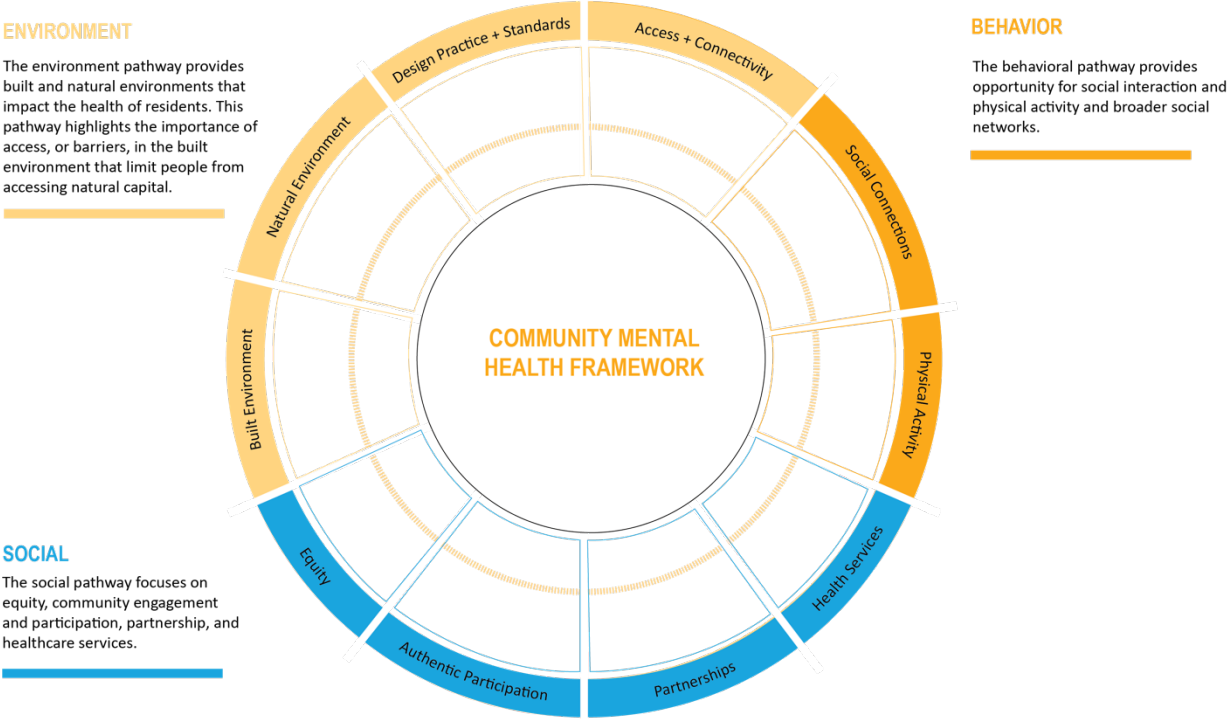
The environment pathway provides built and natural environments that impact the health of residents. This pathway highlights the importance of access, or barriers, in the built environment that limit people from accessing natural capital. Design practices and standards help to create a sense of place, and set standards to design facilities for people. The behavioral pathway provides opportunity for social interaction and physical activity and broader social networks. The social pathway focuses on equity,

community engagement and participation, partnership, and healthcare services. The three pathways help form a holistic approach to addressing community mental health and well-being through natural capital development. This framework allows residents to collectively lead community transformation and health.

Park and Natural Resource Planning

Park planning has become essential in the 21st century to meet the needs of community members and advance health, resiliency, and equity. As communities grow, "… park system planning is critical to ensure an equitable distribution of lands, facilities, and park resources to all, especially underserved communities" (Rouse 2017, p. 1). In applying community development models to park and natural resource planning, planning professionals would use the technical assistance. Rather, the recommendation is for the planning professional to use the self-help model and support the community to develop the park system plan. The following sections outline priority park planning processes, as opposed to site specific design methods. By highlighting the importance of system planning, city and county governments can leverage participatory processes to identify how to strategically invest in natural capital. Park system planning consists of four steps: inventory and analysis; vision; goals, objectives, and actions; approval and adoption (Lewis, 2008).

Park planners need to intentionally engage with people, particularly underserved communities to understand their preferences and how spaces and systems can, "ensure that nature spaces are designed with sufficient proximity, accessibility, and comfort to support their use by existing communities" (Brown & Fink, 2022). As these approaches outline in this paper seek to embed equity in this work, the following paragraph highlights the importance of equitable distribution and access to natural capital.

Park Classification System

In 1996, the National Recreation and Park Association published, *Classifications for Parks, Open Space, and Greenways*. Still applied today, the classification system provides guidelines, descriptions, and various criteria to assist park, recreation, and technical staff when planning for facilities. Any substantive park and open space plan, in a variety of population size, have these guidelines integrated within the broader plan or specific chapter. As the profession and practice of park planning has evolved, these guidelines can be adjusted for a local context and altered to meet larger park facility needs which can be used to aid in county-level planning. These guidelines should be intentionally studied and adjusted

to meet local needs on how park elements can enhance mental health and well-being. Ultimately, level of service standards needs to be determined on the local level. Park agencies need to understand their vision, values, and communities to ensure the park system reflects their future vision. Out is the standard, cookie-cutter guidelines and are replaced with community-tailored standards that integrate additional metrics to address resiliency, sustainability, and a variety of other socioeconomic and environmental factors. Table 2 outlines the classification, general description, location criteria, size criteria, and various site elements that can attribute to advancing mental health.

Table 2 – Park Classification System

Classification & General Description	Location Criteria	Size Criteria
Mini-park Used to address limited, isolated or unique recreational needs	< ¼ distance from residential setting	2500 square feet and one acre in size
Neighborhood Park The basic unit of park system and serves as the recreational and social focus of the neighborhood. Focus is on informal active and passive recreation	¼ to ½ mile distance and uninterrupted by non-residential roads and other physical barriers	Minimum 5 acres. Preferably 5-10 acres
School Park *Depending on circumstances, combining parks with school sites can fulfill the space requirements for other classes or parks, such as neighborhood, community, sports complex and special use.*	*Determined by location of school district property*	*Variable. Depends on function*
Community Park *Serves broader purpose than neighborhood park. Focus is on meeting community-based recreation needs, and preserving unique landscapes and open spaces*	*Usually serves two or more neighborhoods and ½ to 3 mile distance. Determined by quality and suitability of site.*	*Between 20 and 50 acres*
Natural Resource Area *Lands set aside for preservation of significant natural resources, remnant landscapes, open space, and visual aesthetics and buffering*	*Resource availability and opportunity*	*Varies*
Greenway *Effectively tie park system components together to form a continuous park environment*	*Resource availability and opportunity*	*Varies*

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Table 2. Park Classification System (Continued)

Classification & General Description	Location Criteria	Size Criteria
Special Use Covers a broad range of parks and recreation facilities oriented towards single-purpose use such as nature centers, historic sites, campgrounds, and golf courses	Variable. Dependent on specific use	Varies
Regional Park/Reserve Large scale, regionally based parks and open spaces that focus on natural resource preservation and stewardship	Serves regional needs; encompassing several cities	Minimum 500 acres up to several thousand

Enhanced guidelines from table 2 will support the development of a larger system plan but committee members need to understand that these guidelines require flexibility in responding to community needs. Flexibility is also needed to ensure that over investment doesn't occur in one park classes over others. Flexible-use policies can be developed to allow a given park type to be used under certain circumstances. For example, neighborhood parks can include more diverse planting palettes, buffers, trail types, and natural areas as opposed to athletic facilities if the community determines there is a shortage of passive spaces. Figure 10 illustrates an example of how the regional park classification can leverage its unique landscape features, in this instance a prairie, to integrate walking opportunities and seating areas that offer opportunities for reflection.

Figure 10 - Regional Park and Reserve Classification Rendering
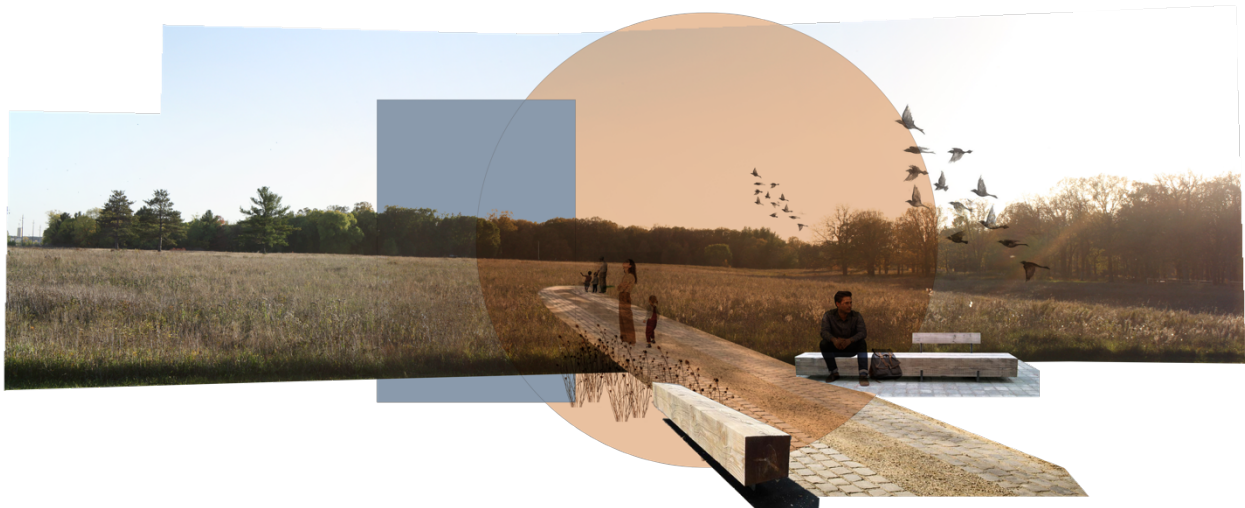
Park acreage standards must be determined by the community, as opposed to past guidelines that allocated an optimal number of acres per 1,000 population thresholds. Through this assessment, community leaders can ensure that the park and open space network meets the desired level of service. To assess if a community or county meets an appropriate level of service, analyzing peer communities and counties is acceptable to understand similar circumstances and regional scale. Studying public land area, park and service distribution is an important planning assessment to identify gaps and build on existing assets.

When planning for a connected park network, using a concept based on patches, corridors, edges and matrix will provide a useful methodology when planning for natural capital investment. Parks that connect to other parks through greenways and a regional trail system will provide more opportunities

for recreation and access, as opposed to a singular park located within a development with no trail connections. According to Rouse (2017), "The concept of patches, corridors, edges, and matrix provides a useful construct for planning green infrastructure, including parks and trails as a physically connected network." (p. 3). Patches and corridors, or in built-form would be considered hubs and links, are the foundation of green network design. A "patch" includes a landscape that is different than the surroundings, such as a park located within a development. A "corridor" is a linear facility that connects two or more patches. An "edge" is a transition space between two differing landscape features. This can look like the boundary of a park against a development. Last, a "matrix" is the overall landscape pattern that encompasses an edge, patch, and corridor. By using this construct for park planning, a set of design elements can be developed to further foster community well-being and improved mental health.

Trail Classifications

Interconnectivity is essential to a successful system. Connections and access to a range of parks through trail and sidewalk systems is particularly important. Equally important, are the type of parks that people can access via the sidewalk and trail network. Strategically located parks and classifications can provide destinations for trail users.

The National Recreation and Park Association included pathway classification in their publication, *Classifications for Parks, Open Space, and Greenways* (1996). The table 2 highlights various trail types.

Table 3 - Classifications for Trail Types

Trail Classification and General Description	Overview
Park Trail Multipurpose trails located within greenways, parks, and natural resource areas. Focus on recreational value and harmony with natural environment	Type I: Separate/single-purpose hard-surfaced trails for pedestrians, bicyclists, and in-line skaters. Type II: Multipurpose hard-surfaced trails for pedestrians, bicyclists, and in-line skaters. Type III: Nature trails for pedestrians. May be hard- or soft-surface.
Connector Trails Multipurpose trails that emphasize safe travel for pedestrians to and from parks and around the community. Focus is as much on transportation as it is on recreation	Type I: Separate/single-purpose hard-surfaced trails for pedestrians, bicyclists, or in-line skaters located in independent right-of-way. Type II: Separate/single-purpose hard-surfaced trails for pedestrians, bicyclists, and in-line skaters. Typically located with the road right-of-way.
On-street Bikeways Paved segments of roadways that serve as a means to safely separate bicyclists from vehicular traffic	Bike Route: Designated portions of the roadway for the preferential or exclusive us of bicyclists Bike Lane: Shared portions of the roadway that provide separation between motor vehicles and bicyclists, such as paved shoulders.
All-Terrain Bike Trail Off-road trail for all-terrain (mountain) bikes	Single-purpose. Loop trails usually located in larger parks and natural resource areas.
Cross-Country Ski Trail Trails developed for traditional and skate-style cross-country skiing	Loop trails usually located in larger parks and natural resource areas.

The Minnesota Department of Natural Resource's developed the *Trail Planning, Design, and Development Guidelines* (2007)*.* In addition to the above trail classifications, local park and trail advocates must consider the following additional classifications identified in table 3, additional elements of trail classification systems.

Table 4 - Additional Elements of Trail Classification Systems

Trail Classification	*Description*
Destination Trails	Destination trails are paved trails for walking, jogging, bicycling, and in-line skating located within a greenway, open space, park, parkway, or designated trail corridor
Linking Trails	Linking trails emphasize safe travel for walking, jogging, bicycling, and in-line skating to and from parks and around the community. Linking trails are most often located with road rights-of-way or utility easements.
Sidewalks	Sidewalks emphasize safe travel for walking and jogging within residential areas and business districts and to and from parks and around the community. Although biking and in-line skating are allowed on sidewalks, the narrower width and concrete surface limit their use for this purpose. Sidewalks are most often located within road rights-of-way of a local street.
Natural Trails	Nature trails are commonly used in areas where natural tread is desired and harmony with the natural environment is emphasized. Often the use is limited to hikers and joggers
On-road Bikeways	Bike routes and lanes are on-road facilities that primarily serve fitness and transportation bicyclists and in-line skaters, as well as recreationalists with a higher skill and comfort level being around automobiles.

Interconnectivity is essential to a successful system. Connections and access to a range of parks through trail and sidewalk systems is particularly important. Equally important, are the type of parks that people can access via the sidewalk and trail network. Figure 11 illustrates an example of a separated trail. This trail type separates trail users from the roadway and provides a buffer from vehicular traffic, creating an environment that will encourage positive thoughts, as suggested by Bratman et al. (2015).

Figure 11 - Separated Trail Rendering

Leveraging linking and destination trail development in rural contexts are investments that can advance mental health and well-being in communities. The main difference between linking and destination trails are their location. Destination trails are designed to provide a recreational experience for trail users. These trails provide a park-like environment and greenway, emphasizing safe travel for all users. Linking trails are often located within the road right-of-way. These trails do provide recreational value, however, these trails compete with vehicular traffic and are within a less attractive setting. Their purpose is important in connection users to destinations and other natural spaces. Nature trails are a third trail typology that should be considered when looking to advance mental health and well-being in rural communities. Most commonly nature trails are soft-surface trails that meander through natural settings.

Policy

Community mental health and well-being can be improved in both a city and county context through policy development. Green and Haines (2016) write, "Place-based approaches have been at the core of community development efforts for more than 50 years" (p. 7). Place-based policies are successful for three reasons. First, is that politicians are elected in geographic areas. These elected

officials understand the benefits and therefore promote the success of their region. Second, foundations fund place-based projects and development because these places have a greater impact at a smaller scale. Third, local businesses support place-based policy, location specific, as opposed to government approaches (Green & Haines, 2018). Through a participatory process, "… place-based approaches recognize the contribution and value of community sentiment and support to residents" (Green & Haines, p. 8). The following sections outline specific policy that can be implemented to advance mental health and well-being at the local and county level.

The time has come to explicitly and clearly develop mental health policy within community plans. Long-range plans of all types such as statewide policy plans; regional, county, local comprehensive plans; land resource management plans, and economic strategies, all contain policy framework that identifies a series of objectives meant to advance a broader vision. These plans include the underlying elements that create health; environment, education, healthy foods, affordable housing, economic opportunity, and social connections (Savannah & Estes, 2018). Plan chapters consists of a variety of topics that ultimately transform environmental, social, and economic conditions that improve quality of life. Mental health and community wellness should be represented in these policy documents, explicitly listing a broad set of attributes that will yield positive results.

Community health needs assessments (CHNA) can be merged with local comprehensive plans, and ultimately spiral down into park master plans. Community health needs assessments are a participatory process that identify community needs, priorities, and a plan to address unmet needs. The CHNA's include a holistic health assessment of the community; sometimes completed at the county level. Park master plans, or similar vision documents like park system plans, should include specific objective or policy language around mental health.

Regulatory Tools

A series of zoning regulations guide development and preservation efforts in local and county contexts. A common method to develop parkland during the development process is to require the dedication of park space. This policy will allow parkland to be developed in three ways: land dedication, payment-in-lieu of dedication, and partial dedication and partial payment. Through dedication, the developer is required to provide a public space at the minimum percentage mandated by the municipality

or county. Percentages range from five percent to ten percent of total proposed development size. Payment-in-lieu of dedication provides the option of requiring a cash contribution instead of dedicating land. Partial dedication and partial payment are a mixed method of the previous methods, used at the discretion of the community or county. By requiring developers to adhere to a community's park master plan, in addition to mental health and well-being policies, the community can apply standards to shape the outcome of the park. It's important that park board members analyze their current park dedication ordinance to ensure that the total percentage aligns with the community vision for future park space allocation and identification. Through a participatory process, the language can be analyzed as to whether it meets the current level of service and development expectations for natural capital.

Greenway Policies

Greenway policies can be adopted to further enhance the park and recreation system in municipal and county environments. Recreation-based greenways help to form urban-rural linkages. Greenways can also come in the form of wildlife corridors. Researchers are concerned with habitat fragmentation, or the loss of contiguous habitats from human development (Hoover & Shannon, 1995). Researchers say that, "forest fragmentation not only destroys critical habitat elements for many wildlife species … but may also present significant barriers to traditional patterns of movement during annual migrations and dispersals" (Hoover & Shannon, p. 434). For planners and policy makers, integrating wildlife corridor concepts into long-range planning and local policy can meet wildlife protection and economic pressure. Codifying development guidelines can set rules and standards for habitat protection, connectivity, recreation, and size. By developing greenway policies, communities can address a myriad of priorities around recreation, habitat protection, cultural resources, and critical linkages between habitat fragment and wildlife connectivity. These linear corridors can link rural communities to one another and connect people to much needed natural capital systems. Greenways can also search as a "gap filler" within existing park, trail, and open space systems both within a municipality context and in a county setting.

Design Guidelines

Design guidelines can help visualize the elements in the built and natural environment that contribute to advancing the mental health and well-being of communities. Through community

engagement processes, community-tailored design guidelines can be developed to integrate mental health and well-being into the natural environment. A variety of engagement techniques can be deployed to gather feedback and understand natural resources preferences and types, using local knowledge to enhance natural systems within a community or county-level context.

Statewide design guidelines exist at a variety of scales. One example is the Minnesota Department of Natural Resources *Trail Planning, Design and Development Guidelines* (2007). The guidelines provide a variety of principles that, "if thoughtfully applied, will result in rich, high quality, and rewarding experiences" (p. 1.17). Those principles include deploying design elements such as gateways, landscape anchors, edges, and terminus points. Another principle includes understanding user values and why people would use a trail such as safety, convenience, recreation, fitness and transportation. Finally, integrating design character and style for trail structures (Minnesota Department of Natural Resources, 2007).

Design practices can improve equity in access to nature. Brown and Fink (2022) introduce two design elements: accessibility and comfort. Accessibility, "seeks to address the differences in ability and awareness of availability" (p. 35). Integrating accessibility into park designs is required by the Americans with Disabilities Act, but it also supports those with less mobility and can provide a variety of facilities to support their needs such as benches and places to rest. Park planners need to also development successful wayfinding and programs that can reach a large audience. Through wayfinding and educational programming, people can better converse and navigate within these systems. Comfort, "speaks to both personal physical and mental well-being" (p. 35) Increasing tree canopies can provide relief from extreme heat and heat islands. Creating spaces that feel inclusive is a way to provide mental comfort. Co-design practices can develop a sense of belonging in these spaces, and help people feel welcome with these natural areas.

Principles like the ones identified in this guide can be studied by committee members or stakeholders involved in the development of locally-tailored guidelines. Involving community in the development of such documents can enhance human capital and individual knowledge about this work.

Collaboration and Partnerships

The community development profession is uniquely positioned to leverage its wide range of partnerships to advance mental health and well-being in rural communities. Community developers can use fundamental techniques such as community organizing, collaboration practices, and robust engagement to guide existing partnerships and form new. By leveraging these skills, change leaders can form a strategic effort to improve those determinants of health that are associated with well-being and mental health. Advancing this work cannot be done alone and alignment across various sectors will be the key to success. Multisector partnerships with healthcare institutions, natural resource partners, and community-based organizations will collectively impact the community environment.

Partnering with Healthcare

Working directly with healthcare institutions is essential to advance this healthy communities. Establishing a successful partnership takes investment and focus from both players. Through intentional partnership and collaboration, the community development field and healthcare institutions can work to develop a range community prevention strategy. According to Savannah and Estes (2018), "One of the challenges in promoting mental health and well-being is moving the collective mindset form solely individual treatment to upstream prevention anchored in community health" (p. 27). Together, this partnership can address structural inequities, apply a well-being lens, acknowledge the greater system that impacts health, and foster collaboration. Existing and new partnerships can leverage each other's strengths. This can look like developing new intervention, promoting mental health through community design, increasing social connection, identifying new partnership, and raising awareness of mental health issues (Choi, p. 12). An intentional shift in practice and thought is needed to embrace a system-lens around health, not just limiting this work to the traditional "bounds" of health. A wide field is needed to advance a vision, "… the fields of community development, public health, and community mental health have moved in parallel patterns, sometimes overlapping but most often without intentional shared outcomes" (Savannah & Estes, p. 29). Through collaboration, leaders and community change-makers can target health and disparities at the population level. Robust participatory processes can further uncover local conditions and develop a vision to tackle the root causes.

Land management and park agencies at the local, county, states and federal level are key stakeholders in advancing natural capital. Parks and public lands are often the only free place for physical activity, and are perfectly positioned to expand nature exposure opportunities. Park advocates, coalitions, and agencies have an opportunity to partner with mental health and public health professionals to connect people (patients) to places. Civic groups like bicycle coalitions and park advocates can be leaders in forming partnerships with healthcare board members and developing initiatives with institutional grant giving programs. And collectively, all groups can engage with legislators to align public policies.

Building capacity and partnership with State and Federal agencies will help to fill gaps in the park and trail system. The Minnesota Department of Natural Resources serves as an important land management and park agency. The department has a wide variety of wildlife management areas, manages boat and kayak launches, pollinator habitats, and state parks within non-urban counties. Federal agencies like the Bureau of Land Management and the National Park Service also manage federal lands and national parks within the State of Minnesota. Intentional efforts to engage with these partners can fill additional gaps in the system and offer a diverse set of park-like experiences for residents and visitors.

Local Government

Governance places an essential role in rural areas, where staff are small, budgets are tight, and capacity for new work other than essential duties is near impossible. According to Green & Haines, "Yet even in light of their huge burdens, elected officials often do not seek collaboration with local market or civil society organizations – and vice versa" (p. 404). To tackle a system problem such as mental health and well-being on the community level, government leaders must move beyond the traditional model. Elected leaders need to rise to the challenge on a different way to do things and tear down silos that discourage collaboration. The profession and practice of community development should be encouraged to lead this work. Savannah and Estes (2018) write in Community Development Innovation Review, "If intentionally leveraged, community development approaches, coupled with resident community action, can reach across multiple sectors to measurably influence mental well-being at a community level" (p.

22). Community development deploys various frameworks and practices that will meaningfully engage residents to enhance natural capital and transform natural and built environments that can promote quality of life and health.

Local and county governments are well positioned to enhance and encourage public participation processes. Leveraging regional resources and social capital, rural governments can be a primary stakeholder in advancing local change.

Programs

The development of formal programs can help direct dollars, technical assistance, and serve as a vehicle to implement broader goals into practice. One case study to implement greater park metrics into local planning efforts is the Trust for Public Lands' ParkScore. ParkScore identifies park access levels, "for nearly every city and town in the United States" (Trust for Public Land, n.d.). The ParkScore data and methodology identifies park access levels and serves as a tool for communities, and equips them, "with the information they need help close the park equity gap" (Trust for Public Land, n.d.). The database does not include ratings for many counties within Morrison County. Park professionals could use the data methodology to deploy ratings for rural communities, not listed through this source, within Greater Minnesota.

Nature-Based Interventions

Exposure to natural capital has proven mental health and well-being benefits for people. Park prescriptions, or nature dosing, are programs where providers prescribe nature to their patients or clients. These programs are designed for social service and health providers to encourage patient participation and exposure with a goal to improve health and well-being.

Nature prescriptions, park prescriptions or "nature pill" based programs can be developed to serve a unique range of communities and individuals. These programs have a level of collaboration, "between park and public land agencies, healthcare providers, and community partners" (Park Rx). These programs have three critical components. First is it includes a health or social service provider. Second this provider encourages their patient to spend time in nature. Finally, the goal is to improve their health and well-being (Park Rx). An example of a tailored program is the Gallatin Valley Trails Rx program in

Bozeman, Montana. This program if offered to local family practice, mental health providers, and physical therapy clinics to help get patients to use the trail system.

The 10-minute walk campaign is the Trust for Public Lands nature-based program that works to ensure a park within 10 minutes of every home in urban communities. This program, "is one way we work – in collaboration with cities and partners – to address the most pressing questions and challenges to park equity" (Trust for Public Land, n.d.). The program looks to advance policies and a myriad of solutions that create system-level change on how green spaces are planned for, funded, and managed. The 10-minute-walk concept can be applied on the local level with rural contexts. As a park planning, funding, and management framework, partners, government staff and boards, and philanthropists can identify areas where policies can be advanced or solutions can be tailored to ensure all people have access to parks.

Nature-based interventions are important programs to advance mental health and well-being. City and county managers should work with their park agencies, community hospitals, and mental health providers to expand nature-based programming in their communities, specifically tailored to the natural capital that exists.

Conclusion

Inaction continues to negatively impact individuals and further harm communities of color and vulnerable communities through park inequities. Policy makers need to consider the wide landscape of techniques and practices that can help implement this critical infrastructure. The practice of community development. This chapter builds on community change practices such as self-help model and appreciate inquiry. Throughout the chapter, I identify a variety of possible practices to develop and enhance natural capital to yield community mental health and well-being outcomes, yet do not explicitly list the solution. That solution must be determined by the local community through elaborate and intentional engagement processes. Systems-level change is the bedrock of this work, an avenue to connect people to nature and increase nature exposure for a variety of mental health and well-being outcomes. Through a series of structured steps, a community vision will be identified which will inform a variety of practices, policies, programs, and partnerships that will aid in natural capital development, transforming it into critical infrastructure in the rural context.

CHAPTER 5 – FUTURE RESEARCH

This chapter highlights future research areas that will help advance mental health and well-being in rural communities through strategic natural capital development. Through research, engagement, policy, and programming, rural communities in Minnesota can create critical infrastructure that directly impacts health outcomes. The literature landscape explicitly makes an invitation for more research at the intersection of mental health and natural capital but particularly lacks depth in rural settings. This paper set out to recommend quantifiable nature-based health recommendations that will guide policy-making decisions. This chapter highlights a series of recommendations to advance this work and includes implications for future research, research methodology, data collection and analysis, program development, and funding. Intentional shifts in how we practice community development, invest in natural systems, and engage the community can center nature as a vehicle to improved mental health and well-being in rural communities.

Implications for Future Research

International research has pointed to the interrelationship between time spent outdoors and the positive impact it has on well-being. Turning to natural systems, within community and across jurisdictions, can be one way that cities and counties can contribute to the current mental health crisis and support their residents. By intentionally using the natural system, and more broadly natural capital, these greater networks can be viewed and transformed as critical infrastructure. Yet, many research questions still remain.

The connection between mental health and green space remains relatively unexplored, as identified by a series of researchers. Focused research can empower community leaders to break down traditional narratives that have been placed on this critical infrastructure such as "nice to have amenities" and "universally good." These narratives have held back community potential and have reinforced systemic racism; squeezing access and disinvestment. Research can provide the foundation for care directive and well-being standards that are integrating into broader health recommendations.

Research Methodology

This paper sought out to advance the call for research and add to the small body of research at the intersection of open space and mental health in rural settings. Researchers highlight gaps in research

methodology and the breadth and depth of research in rural areas are largely present in the literature. Community development practitioners and researchers should support qualitative and quantitative research.

Hartig et al., (2014) conducted a constructive review of research methodologies. This article did not highlight a scientific study, but did however, identify gaps in the methodology of how researchers study nature and health. The purpose of the study was to provide the public health audience a high-level overview on the research that has been conducted as it related to nature and health, specifically in urban settings. Researchers identified a series of issues that call for further research. Four core areas of research were identified.

First, researchers should "seek, create, and take opportunities for population-level experimental studies when they arise, within an understanding of their limits" (221). Second, the qualities of nature and their role in particular outcomes, would be more impactful when guided by theoretical ideas about why a specific type or quality will contribute to the pathway to health. Third, the stress pathway should rather study the theoretical claims of the experience that yields stress recovery. Finally, if we call out and acknowledging the competing priorities for funding and investment, the intersection of nature and health could benefit from a health economics standpoint (221).

The research analysis points to need for further study, particularly around subgroups and their access to nature, their use, and responses. Researchers write, "Spatial, social, economic, racial, cultural, and demographic differences in relationships between nature and health seem highly probable" (222). This article points to the vast work that has been done at the intersection of nature and health, yet points out the complexity, "Of the many challenges faced in characterizing those contacts and benefits" (222). Researchers can further explore how to measure exposure to nature, measuring outcomes, and understanding mechanisms to develop interventions that could yield possible benefits.

Two study designs should be explored to add meaningful results to the field: observational and quasi-experimental. Both experimental and observational design are pathways, "to better evidence for a casual relationship among free-living population" (Hartig et al. 2014, p. 220). Cross-sectional research designs are the most common study type to identify long-term health outcomes. Hartig et al., (2014), identifies that concern with these designs, "The likelihood of contact with nature is strongly patterned by

socioeconomic, ethnic, age, and cultural characteristics, which are, themselves, linked to health" (220). Quasi-experimental study designs, before and after, have the potential to use elements of true experiments. Time is a concern with these study designs. To understand the population level, and intergenerational change, may take decades.

Call for Research

      Measuring exposure to nature has its challenges, and each type of measure has its problems. In Nature and Health, Hartig et al., (2014) specifically identify the contrast between the amount of literature focused on urban environments as compared to rural environments. Researchers write, "Two categories of environments were conspicuously underrepresented or absent; rural areas had just one review" (pg. 211). This paper calls for a specific initiative to research the connection between mental health, well-being, and natural capital in rural settings. Rural settings in this paper are identified as those geographies located outside of Metropolitan Planning Organization areas, or those areas with a population of 50,000 plus populations. Research that specifically studies various subgroups will advance the literature in this focus area. These subgroups can include socioeconomic status such as income, gender, various age cohorts or ethnicity (Hartig et al., 2014). Additional research should be conducted around outcomes from various types of natural environments, the type of involvement with nature, how effects may be different among population subgroups.

      Identifying who will benefit from exposure can lead to interventions and data driven solutions. Understanding mechanisms is a space for further exploration. According to Hartig et al. (2014), "They likely vary in significance within a single contact with nature, between contacts, across the life course, between population subgroups, between environment types and across cultures" (220). By understanding these mechanisms within the range of control environments can help produce more robust studies and hypothesis and what they expect at the population level.

      This section highlighted a variety of methodological challenges that need to be overcome. Future priorities for the field should be focused on longitudinal studies to understand what nature type and correlating health outcomes there are across population sub-groups and general population health. A second priority for future research should focus on the types of nature and their unique qualities that contribute to a health pathway. Not all natural elements are created the same. Identifying the types of

nature that affect particular health outcomes can further advance quantitative nature-based solutions. The final recommendation for future research in this paper is to understand nature dosing and the time spent in nature needed to benefit from the health outcomes. This study area is difficult to navigate based on the complexity of health economics and impacted by other perspectives such as secondary environmental benefits.

Data Collection

An important element of advancing research is using data derived by local communities and rural contexts. Local knowledge and study are essential to an accurate assessment. Building social capital to advance this work, completed by community members and leaders, can help build stewards of this work and create momentum. The importance of both qualitative and quantitative research and robust methodologies can collectively advance this work.

Geographic Information Systems (GIS) can be used to spatially analyze socioeconomics within community. The connection between mental health and socioeconomic conditions are inextricably linked. Spatial analysis can also be used to study the built environment and identify vulnerabilities that exist inside communities such as flood prone areas, heat vulnerability or tree canopy coverage. Through mapping and data analysis, researchers, non-profits, and government staff can assess various characteristics and their relationships to one another. This research can look like a series of overlapping datasets and spatial analysis. Community leaders can study areas within a community or county context and further build on the socioeconomic analysis to identify how the open space network can be expanded to support this population. Data can be developed to capture the change in development and the natural capital system over time.

Data will also be used to inform better policy. The relationship between park access and the health of people are important to policy makers and need to be available. Understanding how park inequities are disproportionately impacting low-income communities, and communities of color and other vulnerable populations within a rural context can help to advance park equity. Governments can explore the number of people that are currently within proximity of natural systems. This should be studied through various demographic and socioeconomic datasets: race, age, income, poverty, industry, and occupation. Agencies can also study park inequities, those without access to open space, access to

transportation options, or the barriers that exist for active transportation choices such as biking, walking or taking transit.

The reality is that data collection and creation is time consuming and expensive. However, municipalities and county government can be key partners in data stewards. Becoming data stewards can come in many forms. One way this can come to fruition is by tracking and gathering data is through committees or volunteers. These groups and individuals can conduct trail counts, types of users, and user counts at park facilities. Partners can conduct interviews of park and trail users and complete qualitative reports highlighting the findings. Partnering with state agencies, such as the Departments of Transportation and Natural Resources, can also be sources of data.

Grant applications, to a limited landscape of programs in this focus area, often require robust justification and metrics. Applying for funding that addresses the required metrics relies on quantifiable data that is sometimes unreliable. By creating robust databases, community groups or government entities can have informed grant applications to advance planning or project work.

Program Development and Implementation

Mental health has been put on center stage during the pandemic, giving it the air time that it has always deserved. Non-profits serve a vital role in this work: advancing social causes and advocacy. Program development should have a focus on developing social capital development; those relationships that build expectations and reciprocity (Green & Haines, 2016). According to Phillips and Pittman (2009), "[Community Development] is a process through which people learn how they can help themselves. Self-help is the cornerstone of [community development]" (p. 63). Through the self-help model, people become independent and rely less on outsiders to make decisions and implement solutions. Participation in program development can also promote a sense of ownership and a personal draw to the actions that have been determined. Program creation provides an opportunity for social entrepreneurs and social innovators to do what they do best: innovate. This period in time should create space for innovation and collaboration to develop solutions. A variety of community development strategies and engagement approaches can be further deployed to bring people in a community to the table to determine a collective approach forward.

Funding

Identifying innovative funding models to fund natural capital expansion will require a collaborative approach. Through community engagement practices, all partners invested in this work can identify innovative funding models that can advance this work. Creative funding mechanisms should be developed to support this work from state and federal entities but will take legislative action to set aside dollars for this work. Funding natural capital investment, particularly for mental health outcomes, can come from many agency or mission-focused organizations beyond the Department of Natural Resources. Partner agencies that focus on climate action, resiliency, sustainability, health, and economic development have a role in advancing this work, to improve the lives of rural residents in greater Minnesota.

Funding research work also takes significant resources that may not be available at the local level. According to Hartig et al. (2014), "Manipulating the environments or people is difficult and expensive" (p. 220). Acknowledging the recurring cycle is important. Existing facilities or natural capital needs to be available for research studies, "Scientists often must rely on public agencies or authorities to fund and deliver environmental changes, such as the creation of a new park or trail" (Hartig et al., p. 220). Natural environments or built capital that supports access or opportunities are then able to be studied, which can lead to quantitative nature solutions or health impacts.

Non-profit agencies within the State of Minnesota have an opportunity to lead during this time, post pandemic. Mission based non-profits can set funding portfolios and many are called to solve complex solutions through a variety of implementation means.

Park dedication fees are one way to fund park, development but this can begin to take a different form in communities. Development impact fees can be used as a set aside pot of money to be used for local park improvements. Development impact fees are a one-time payment made to municipalities by developers during the development process. These dollars can be directed to where gaps exist and where these spaces will be used the most. By prioritizing investments in these areas where park access is insufficient, communities who have been intentionally overlooked, can now been connected to systems.

CONCLUSION

Nature is fundamental to the health, quality of life, and well-being of people. Rural communities can begin to take proactive steps and build initiatives to expand and enhance natural capital systems, prioritizing this critical infrastructure. This paper sought to identify four objectives. The first was to understand current research and how time spent in nature influences mental health and well-being outcomes. Second, was to better understand how interventions lead to healthier and more sustainable communities. Next, was to identify how healthcare and community development professionals can collaborate to improve health outcomes. Finally, this paper sought to understand how a variety of frameworks can be used to design natural places and create policies. Positioning nature as a vehicle to improve mental health and well-being of residents in a rural context requires system change and elevating natural capital to be understood as critical infrastructure.

A robust set of research studies generally agree that exposure to nature impacts well-being, yet, limited studies exist in a rural setting. Yet, much work remains to identify the types of exposure that positively impact the well-being and mental health outcomes of sub-groups of a population.

A set of community development frameworks should be used to support the work of practitioners and lead a cultural shift. Expanding natural capital at the community level relies on community development framework that leads to system change. A pillar of community development, the community capitals framework identifies seven difference types of capital that exist within a community. By evaluating each of the seven capitals within a community, we can identify linkages between each, and identifies where improvement and growth is needed. Asset-based community development focuses on building assets, as opposed to a needs-based model where communities look to "fix" what isn't working. By focusing on these successes, a vision for the future can be developed. Appreciative inquiry uses a process the community capital frameworks and builds transformative change by building on what has worked in the past. Appreciative inquiry uses a four-step process: discovery, dream, design and destiny (Green & Haines, 2016). Resilience theory broadly encompasses uses natural systems to address change. Interrelated are the benefits of these systems and the impact they have on population health, while interweaving community engagement practices to advance democratic processes.

A series of policies, programs, and planning practices should be implemented and embraced to identify how to implement this work on the ground, executing the idea of "critical infrastructure" and addressing the co-narratives for this work. These practices are deployed through a sustainability and equity lens. A cultural shift is needed in municipal and county government to prioritize natural capital investment. The recommended practices outlined in Chapter 4 centers natural capital into the greater conversation of health and how partnerships, policy, and decision-making have in creating critical infrastructure. All recommendations provided within this section rely on a public engagement process.

Future research is needed to study the relationship between time spent outside and mental health outcomes. Researchers agree that the association between public open space and mental health remain relatively unexplored. Numerous researchers make a call for additional research. Longitudinal studies can help understand the impact that exposure to nature has on sub-populations over generations. It's possible for government staff and non-profits to advance data at the local level to support future research work, seeking to draw a connection between elements of nature and its impact on well-being and mental health.

By leveraging community development practices, local and county governments can leverage natural capital to advance the mental health and well-being residents. To expand these systems and connect people to these resources, a system-level change is needed to elevate these systems as critical infrastructure. By advancing this work through a sustainability and equity lens, policy makers and change-leaders can work to ensure that all people, no matter their race or socioeconomic background have access to natural systems. Through community practice, expanded research, innovative funding methods, and community engagement, it's possible to rely on existing park systems and enhance natural capital to address mental health in a rural context across Minnesota.

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APPENDIX

Socioeconomics of Greater Minnesota – County Level Industry, Occupation and Income

This section gives an overall demographic highlight industry and income data of three of the geography types: large town, small town, and rural to further explore the socioeconomic circumstances tied to mental health. According to the, *Greater Minnesota: Refined and Revisited* (2017) report, workers in rural areas are significantly more likely to be employed in the *agriculture, forestry, fishing and hunting, and mining* industry. Ten percent of rural workers are employed in this field, five percent of workers in small towns, and four percent in large towns. Although agriculture has a large role in greater Minnesota, it does not rank as the highest industry. The *educational services, and health care and social assistance* industry is the leading industry, employing 23 percent of all rural residents, 25 percent of small town, and 27 percent of large town workers.

According to the report, "Rural residents have the highest representation in the construction industry (8% of workers)" (p. 25). Additional industry differences are identified among the small and large town geographies as compared to their urban counterparts. Small and large town workers have the highest employment in the manufacturing industry; 14 percent for rural residents (p. 25). Figure A 1 illustrates the share of employment by industry within a set of geographic types and median earnings.
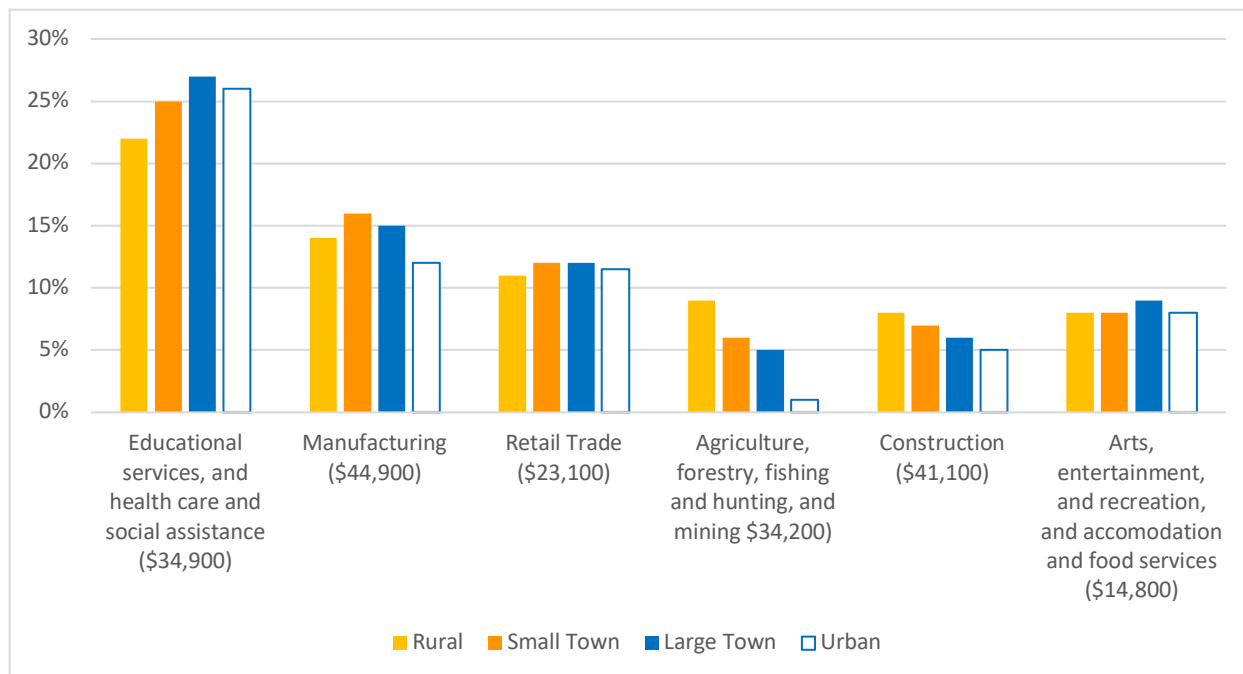
The *Greater Minnesota: Refined and Revisited* (2017) report offers insights into income characteristics of full-time workers in the three geographies. The report indicates that nearly 50 percent of all working men earn less than $45,000 per year. Just over half of women earn less than $35,000 per year (Department of Administration, 2017). There is a $10,000 income jump to their urban counterparts, due higher paying industries in urban counties. Workers in all four regions experience a different range of jobs and median incomes that come along with the jobs. Yet, earnings can paint a picture on workers' likelihood of experiencing poverty, regardless of work effort. According to the report, "We found that rural, small town, and large town residents who work full-time schedule are two or more times more likely to live in poverty than urban residents who do so" (p. 28). Rural residents are most likely to live in poverty, with 1 in 20 workers, or five percent of workers and their families. Small and large towns report only slightly better, with 1 in 25 workers living below the poverty line, or four percent of workers and their families (Department of Administration, 2017). Figure A.2 illustrates the median earning by geography.

Figure A.2 - Median Earning of Workers by Geography Type
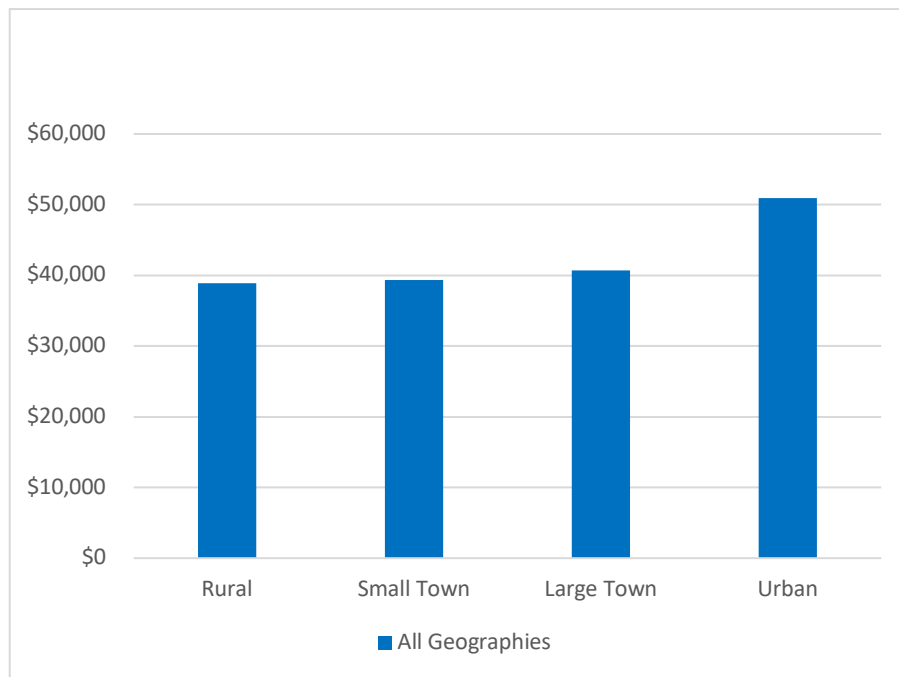
Assessing the health of Morrison County provides further justification for the recommendations for the expansion of natural capital to address mental health needs.

County Health Rankings publishes yearly state level data and rankings based on health outcomes and factors. The rankings include detailed datasets at the county level, and allows users to compare the data against other counties. A variety of measures are quantified as part of the methodology used to generate the county rankings. The health factor methodology includes four health factors: health behavior, clinical care, social and economic factors, and physical environment. Health factors, "represent those things that we can modify to improve the length and quality of life for residents" (County Health Rankings).

According to 2022 data, Morrison County is ranked among the least healthy counties in Minnesota. Morrison County ranks 52 of 89 counties on health outcomes. This assessment analyzes historical patterns of select socioeconomic data and health data provided in the rankings data. Additional census data is analyzed to help further understand demographic and socioeconomic conditions, and how they may impact a person's health and well-being. Morrison County ranks 64 out of 89 in health factors.

The following section provides a select analysis of specific factors such as health behavior, clinical care, social and economic factors, and physical environment that impact mental health in Morrison County.

Health Factors

Mental Health Providers

Data on the ratio of county population to mental health providers was published between the years 2022 and 2011. Figure A.3 illustrates the number of individuals served by a single mental health provider within the county. This assumes that the population would be equally distributed across providers.

Figure A.3 - Mental Health Providers (2011-2022)
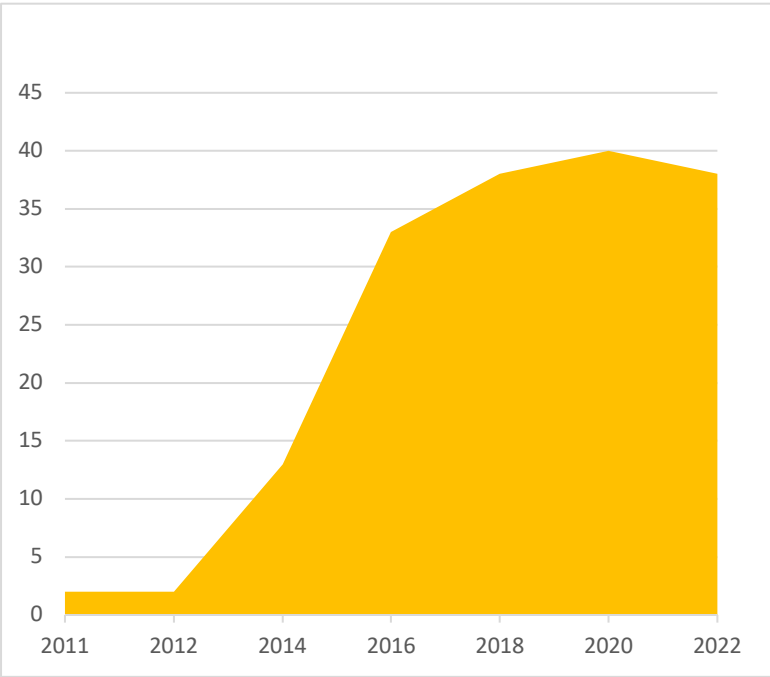
In 2011 and 2012, there were 16,487 individuals to one mental health provider in the county. There was a significant increase in providers between the years 2012 and 2014 (11 providers), transitioning the ratio to 2,542 people to one provider. Between years 2016 and 2022, the service landscape continued with generally incremental increases (7 providers) in services and more providers to accommodate a smaller population of the county. According to County Health Rankings, "Nationally, many counties lack sufficient providers to meet patient needs."

The total number of mental health providers in the county have been increasing since 2011, where data became available through County Health Rankings. Figure A.4 illustrates the number of healthcare providers in Morrison County. There was a 550% increase in providers between the years 2011 and 2014. Providers more than doubled between the years 2014 and 2016 with a change of nearly 61 percent. This is a 1550% change in providers from 2011 to 2016. A general increase in providers continued between the years 2016 and 2022.

*Figure A.4 - Population per Single Provider (2011-2022)*
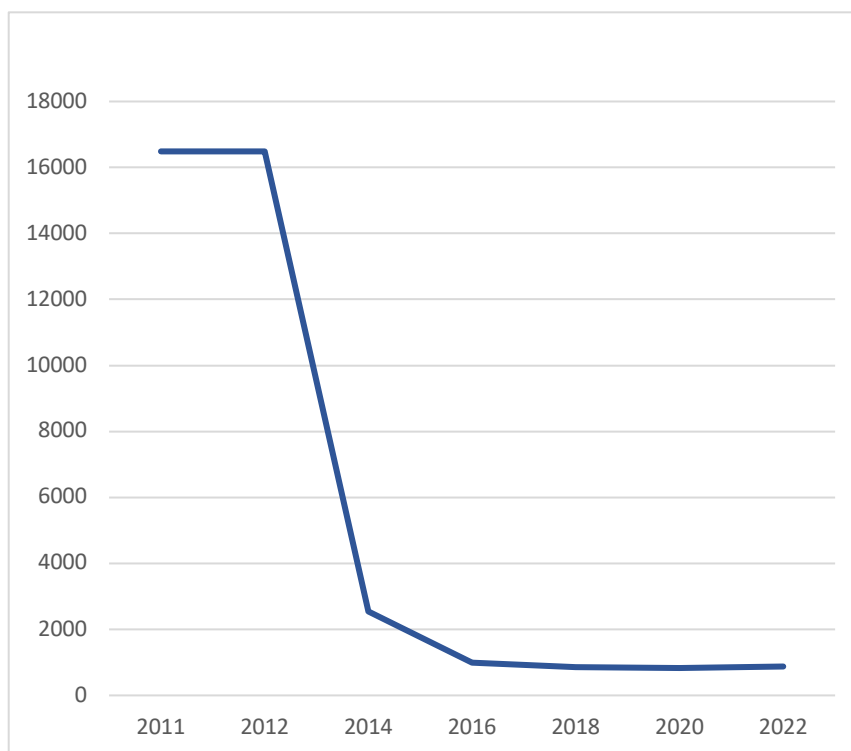
Health Behaviors

Access to Exercise Opportunities

The role of the built environment has a significant impact on whether people can engage in physical activity, or provides barriers to do so. The environments where we live and play impact opportunities to physical activity, which shape our health. In 2014, County Health Rankings began tracking access to exercise opportunities, or the percentage of the population with adequate access to locations for physical activity. Morrison County has seen a general increase in opportunities between the years 2014 and 2018, with a change of nearly 22 percent. Between the years of 2018 and 2022, a

change in the trend has occurred, where the opportunities have decreased, at a rate of 24 percent. The

pandemic could account for this decrease in opportunity. Yet, it's unlikely that large infrastructure change

caused increase barriers to access, such as park or facility reconstruction or street improvements. Figure

A.5 illustrates access to exercise opportunities in Morrison County between the years 2011 and 2018.

*Figure A.5 - Access to Exercise Opportunities (2011-2018)*
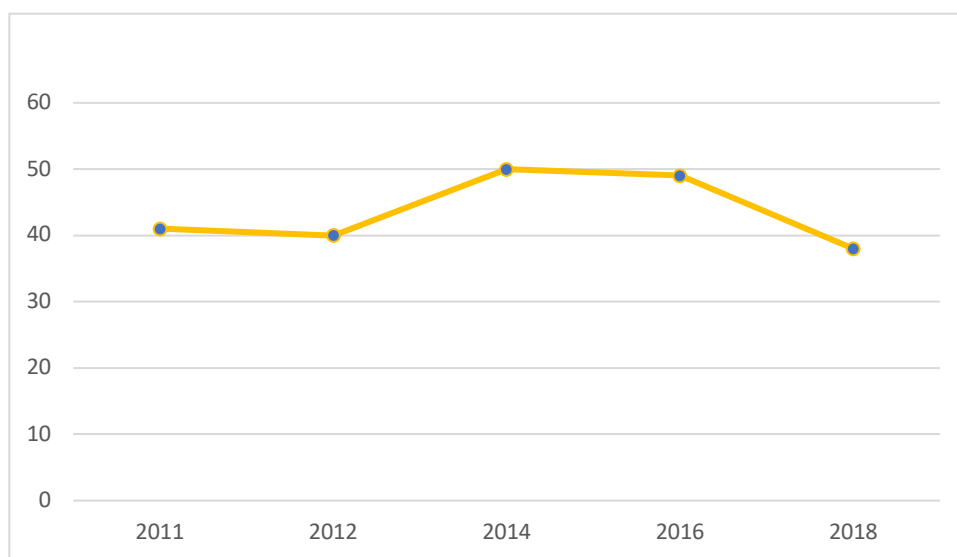
Tracking progress with this metric is not ideal. Metric methodology continues to evolve and

definitions and data sources regularly advance. Relying on local data sources is more appropriate

Social and Economic Factors

Children in Poverty

This measure captures an "upstream measure" of poverty. The measure assesses both the

current and future health risk that exists. Low-income children in poverty have an increased risk of more

severe and frequent conditions and their complications like behavior disorders, asthma, diabetes, ADHD,

obesity, cavities and anxiety that those children living in higher income households (McCarty et. al. 2016;

Hair et al. 2015; Dreyer 2013). Morrison County has seen a general decrease in child poverty rates

between the years 2011 and 2020. The greatest decrease occurred between the years 2016 and 2022,

with a decrease of 25 percent. Figure A.6 illustrates children in poverty within Morrison County between

the years 2011 and 2022.

*Figure A.6 - Children in Poverty (2011-2022)*
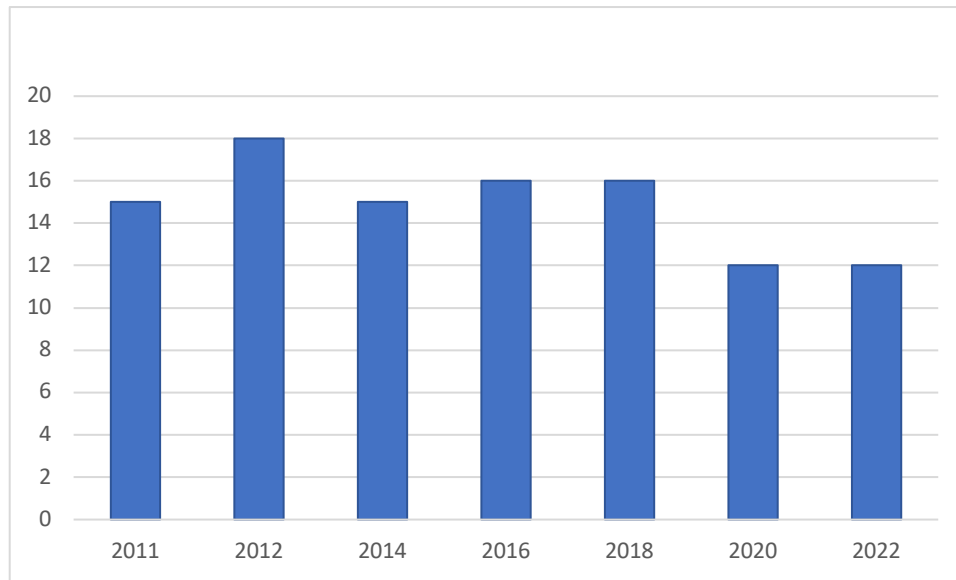
<u>Unemployment</u>

According to researchers, unemployed individuals experience worse health conditions and higher mortality rates than those who are employed (Egerter et. al, 2009; Bartley & Strully 2002; Crabtree 2014.). Unemployment can lead to increased unhealthy behaviors which in turn can lead to increased risks for disease and mortality, including suicide (Dooley et. al, 1996).

Since the publishing on unemployment by County Health Rankings in 2011, Morrison County has experienced a general decrease in unemployment between the years 2011 and 2012. Recently, an increase in unemployment rates have occurred between the years 2020 and 2022, with a change of nearly 45 percent. This change could reflect changes in employment during the pandemic. This dataset uses data from the Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics. Figure A.7 illustrate Morrison County's unemployment rates between the years 2011 and 2022.

Figure A.7 - Morrison County Unemployment
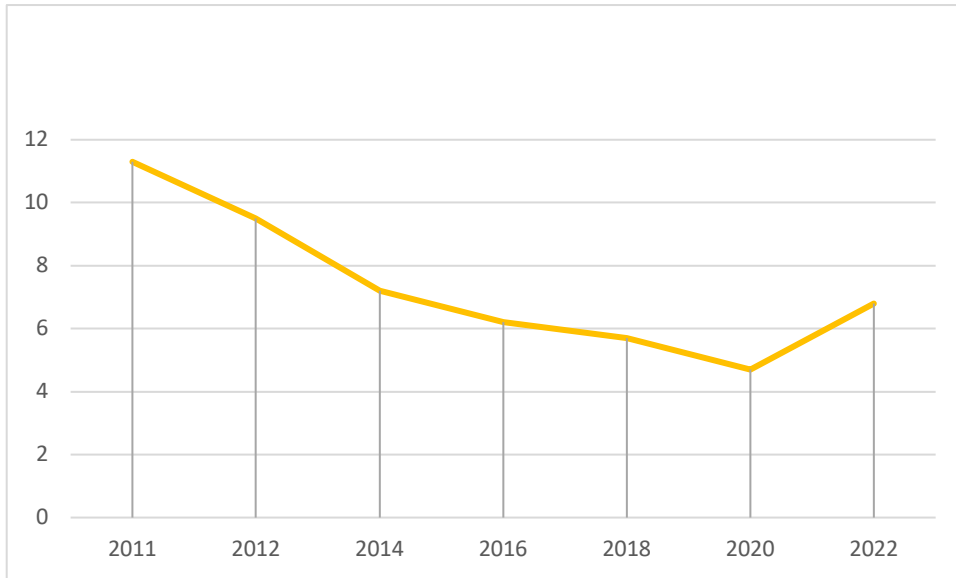
Social Associations

Evaluating social associations is an important social support measure for health. Research has shown that limited involvement in community and minimal contact with others are associated with increased morbidity and early mortality (House et al. 1988; Berkman & Syme 1979).

Figure A.8 illustrates social associations per 10,000 people between the years 2015 and 2022. There was a decrease in social associations between the years 2015 and 2017 (5 percent). Social associations were the highest and most consistent with 65 memberships between the years 2018 and 2019. A second notable decline in memberships occurred between 2019 and 2022 (12 percent).

*Figure A.8 - Morrison County Social Associations (2015-2022)*
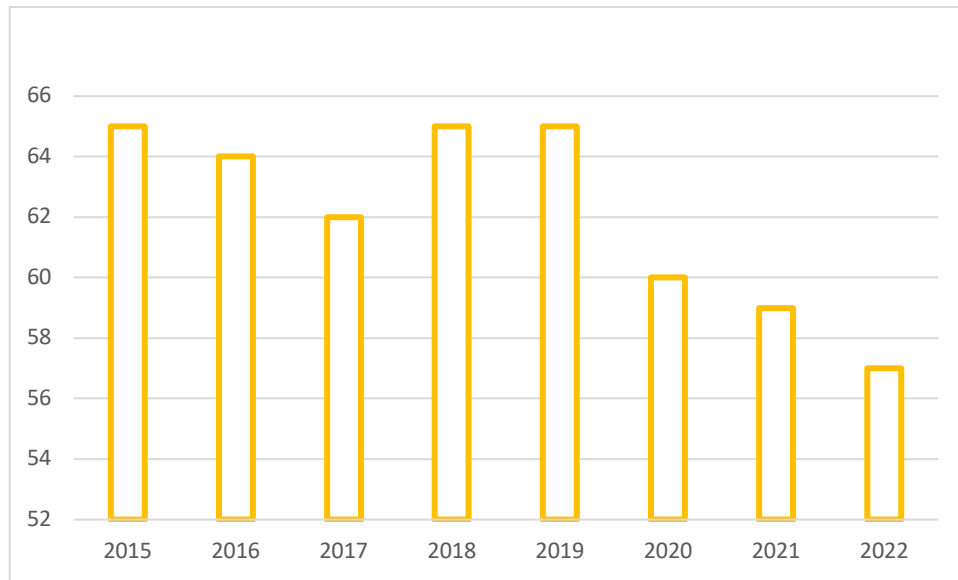
<u>Median Household Income</u>

      Median Household Income (MHI) is an important income measure that can affect physical and mental health. Median household income is defined as half of household in the county earning more and half of the households earning less.

      Figure A.9 illustrates the median household income in Morrison County between the years 2011 and 2022. There has been a general increase in income within the county since 2011 (37 percent). A slight decrease was experienced between the years 2011 and 2012 (6 percent). The largest increase in MHI occurred between the years 2018 and 2022, which a change of $6,100 or nearly 12 percent.

Figure A.9 - Morrison County Median Household Income (2011-2022)
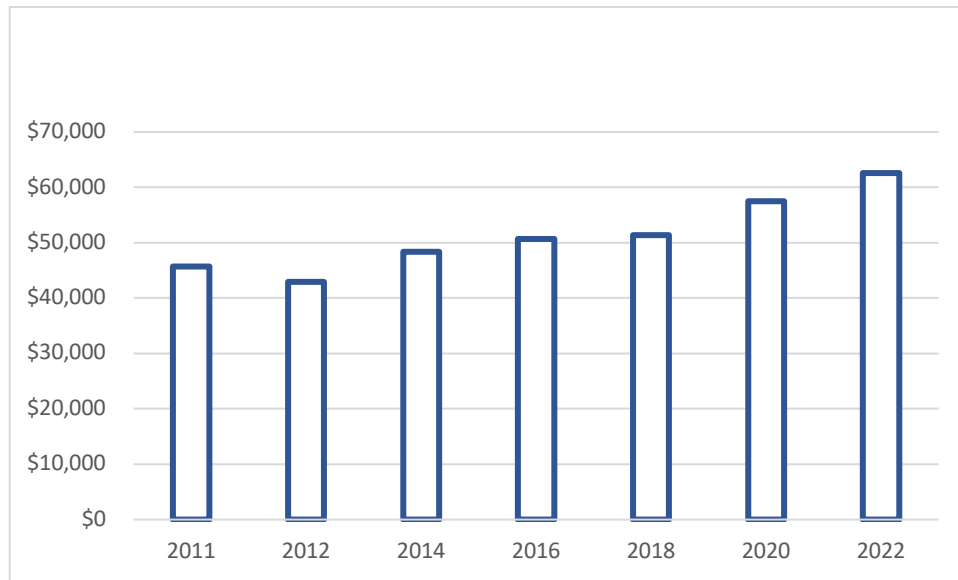
       Understanding the underlying factors that impact health outcomes for residents in Morrison County will help policy makers understand the variety of individual factors, economic conditions and environmental facts involved. Currently, Morrison County's rankings are less than ideal. By identifying those factors that influence mental health and well-being outcomes, policy makers can understand those range of factors that need robust strategies to focus on prevention efforts on the community level. This appendix analyzed a variety of socioeconomic conditions and explored new datasets available through County Health Rankings.

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