Project Number: NE1962
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Project Title: Outdoor Recreation, Parks and Other Green Environments: Understanding Human and Community Benefits and Mechanisms

Requested Project Duration:
Start Date: October 1, 2022; End Date: September 30, 2027

Statement of the Issue(s) and Justification:

Need as indicated by stakeholders.
Over the past 10 years, the NE1962 Multistate Research Project has investigated the nexus of nature, health, wellness, and community well-being, generating knowledge and products designed to inform research and practice across multiple disciplines. However, many research and education gaps remain, and there is much work left to accomplish. This need is especially evident in the wake of the COVID-19 pandemic, which highlighted the critical value of parks' and greenspaces' relationship to wellness and public health (Carr, 2021; Kleinschroth & Kowarik, 2020; Labib et al., 2022; Larson et al., 2022; Li et al., 2022), while also underscoring exclusion and segregation from green space and other environmental amenities due to demographic factors such as race, income, or immigration status (Larson et al., 2021; Nay et al., 2022; Pipitone & Jovic, 2021). For this reason, now is the perfect time to sustain and ideally expand this important area of inquiry and collaboration, helping to build a happier and healthier future through parks, greenspace, and nature-based recreation opportunities. Our project seeks to do this through a renewed focus on four key areas: health and well-being, environmental literacy and stewardship, and community resilience and vitality, and equity and inclusion. This comes as a pivotal time, where interest in parks, nature-based recreation has grown during the post-pandemic era amidst a rise of "urgent biophilia" (MacKinnon et al., 2022; Slater et al., 2020), yet governmental funding to support parks and greenspace remains stagnant (Barrett et al., 2017). The purpose of this multistate project is to facilitate collaboration that can stimulate new research, ultimately augmenting our understanding of the extent and means by which outdoor recreation, parks, and greenspaces connect humans and nature. This evidence should inform policy development and practices that lead to healthier people, communities, and natural environments.

Importance of work and consequences if work is not accomplished.
Themes explored in this research can influence the future health and well-being of humans and the environment in multiple ways. For example, promoting active and healthy lifestyles and environmental literacy among youth and adults will improve quality of life across multiple generations and support a more sustainable future. The project will also promote quality of life by supporting vibrant and resilient communities, in which outdoor recreation opportunities and green infrastructure serve to protect and sustain ecosystems and provide ecosystem services upon which human health depends (Bratman et al., 2019). Additionally, the project is progressing at a time when concerns about systemic inequities and social justice are omnipresent and rapidly rising on the policy agenda (Nesbitt et al., 2019; Jennings et al., 2016). This project will provide a chance to explore diversity, equity, and inclusion in the outdoors, highlighting barriers and opportunities

to develop and improve impactful, innovative, and compelling DEI programs and policies that advance health, environmental literacy, and community vitality for all populations.

In addition to these broader benefits, this project also advances multiple U.S. government initiatives. For instance, Executive Order 13266 (2002) mandated that land management agencies promote the use of outdoor recreation areas for improved health. Since then, federal land management agencies have moved forward to address health issues. For example, the National Park Service (NPS) has established a "Health and Wellness Steering Committee" (US Department of Interior, National Park Service, 2010) and developed multiple national initiatives that link parks to public health, such as "Healthy Parks, Healthy People" (HPHP), "Parks Prescriptions" (ParkRx), and "Every Kid in a Park" (O'Dell, 2016; Razani et al., 2019). In addition, the USDA Forest Service has estimated the caloric expenditures of recreation activities on Forest Service lands (Kline, Rosenberger & White, 2011). The role of outdoor recreation for a healthier US is also recognized as an important study area in the Outdoor Recreation Research and Education strategic plan (USDA CSREES, 2007). However, as noted earlier, these benefits and opportunities are often inequitably distributed. Executive Order 13985 (2021) sought to address these disparities by encouraging planning and policy to remove barriers to equal opportunity and deliver resources and benefits equitably to all Americans, a movement that includes expanding underserved communities' access to public parks and greenspace. Ongoing debates regarding legislation such as the No Child Left Inside Act (2022), which would support the development of environmental literacy via environmental education and outdoor learning in public schools, could be informed by this project. The project also aligns with the goals of the USDA's McIntire-Stennis Capacity Grant (2022), which prioritizes land management for outdoor recreation and aims to advance understanding of human behavior and attitudes related to natural resources. Without this multi-state project, many of these goals would be more difficult to achieve.

Technical feasibility of the research.

This multi-state project vision is guided by a cadre of experienced and productive researchers at land-grant institutions, other public and private institutions, federal agencies, state agencies, and non-governmental organizations, all working across diverse disciplines to accomplish project aims and goals. There are few technical limitations in social science research of this nature. The broad scope and approach of this project allows and promotes the recruitment of researchers with a diverse set of skills to practice advanced study designs utilizing such tools and approaches such as GIS, psychometric scaling, multi-level modeling, behavioral and physiological monitoring devices, cognitive concentration tests, experimental designs, photo elicitation, and qualitative and mixed methods techniques. Given this diversity of disciplinary contexts and approaches, coordination can be challenging. This project is specifically designed to facilitate collaboration and information exchange, effectively sharing projects, methods and results to achieve the intended outcomes and impacts. Specifically, evolution and standardization of methods and instruments, assessments of reliability and validity across populations, and strong coordinated leadership will enhance successful project outcomes and advance a shared research agenda, enabling replication and expanding inferential capacity to create synergies not yet realized.

Advantages of a multi-state effort.

A Multi-State effort will allow for exploration of key outcomes across many more diverse geographic settings, scales, and demographic populations, including replication across different

contexts with larger samples. This would enhance researchers' ability to evaluate community-level outcomes, assess the robustness of results, and examine the transferability of observed relationships, hypothesized mechanisms, and experiences. Identification of causal mechanisms driving observed relationships between things such as nature and health, or outdoor recreation and environmental literacy, have been elusive, often because research on these topics tends to be sporadic and opportunistic. A multi-state approach would allow for more strategic and intentional investigation of pathways and mechanisms, potentially identifying optimal dosages of nature required to achieve positive outcomes (Shanahan et al., 2016). A collaborative approach will also facilitate collection of baseline data that improves longitudinal tracking of health, literacy, resilience, and equity outcomes. Another key benefit is the integration of researchers from multiple disciplines (e.g., public health, natural resources, geography, sociology, education, and many more) who are already addressing these issues from multiple angles. A multi-state approach will help to build this community of practice, creating a new space for innovative interdisciplinary solutions to contemporary challenges related to greenspace, health, and sustainability.

To ensure that results of this work reaches practitioners across multiple disciplines, the research will be coupled with extension efforts in each state to disseminate results to recreation, health, education, natural resource, and community professionals through workshops, presentations, and publications. Results will be widely disseminated throughout the multi-state network via synthesis articles, centers and institutes, land grant outlets at colleges and universities, professional organizations (i.e., NRPA, SAF, IASNR), and Cooperative Extension. This will facilitate the practical application of research findings associated with the Multi-State effort.

Expected impacts.

Research that stems from this project will lead to an improved understanding of links between parks and green spaces, outdoor recreation, health, environmental literacy, community vitality, and equitable outcomes across diverse communities. Knowledge from this research will provide the basis for evidence-based practices and policies at the national, state and local levels. For example, with respect to public health, such policies may result in lower healthcare costs by emphasizing upstream health promotion via preventative methods (e.g., physically active lifestyles) and green infrastructure (Becker et al., 2019; Larson & Hipp, 2022). Research results could also enhance quality of life by enabling professionals to design greenspaces and outdoor recreation opportunities where green infrastructure not only retains and sustains ecosystems but also provides ecosystem services that promote human health across generations (Bratman et al., 2019; Smith et al., 2013). Our project will also help to identify attributes of green infrastructure that fuel vibrant and resilient communities by attracting families, tourism, and businesses (DuPuis & Greenberg, 2019), inspiring sustainable development. Our work will advance understanding of environmental literacy, and the factors that promote it, in multiple ways, helping to meet the long-term goal of public participation in pro-environmental behaviors that help combat emerging environmental challenges such as climate change. For all of these reasons, this project will answer calls to increase citizens' and policy makers' ability to make responsible, informed decisions about human-environment interactions (Kellert et al., 2017), creating a healthier and more sustainable future for people and the planet. Finally, by integrating the work of researchers, extension specialists, and graduate and undergraduate students, the project will influence the nature-based focus of the next generation of public health, urban planning, and park and recreation practitioners via targeted courses, trainings, workshops, outreach, and other professional development opportunities.

Related, Current, and Previous Work

The following section explores previous work conducted around our four focal themes related to parks, greenspace, and outdoor recreation: health and well-being, environmental literacy and stewardship, and community resilience and vitality, and equity and inclusion. We also highlight future research gaps and future opportunities.

Health and well-being.

Quality of life is highly dependent on good health, yet the COVID-19 pandemic has negatively impacted Americans' mental and physical health in various ways (Hasson, et al., 2021). Americans are less physically active today than in the past, a trend impacting multiple health dimensions. Many problems prevalent before the pandemic, such as physical inactivity (Godbey, 2009), are even more prevalent today. The challenge of physical inactivity and obesity is particularly acute among US youth: 20% of children and adolescents are obese, leading to a 2-3 times greater risk of hospitalization (CDC, 2022). Obesity rates and co-morbidities are even higher within low-income communities of color (Kurian & Cardarelli, 2007). Research has revealed positive associations between proximity to parks and trails and physical activity across age groups (Boone-Heinonen et al., 2010; Cohen et al., 2007; Frank et al., 2007; Roemmich, et al., 2006). Physical health benefits for people of all ages are also associated with active use of parks and greenspaces (Cohen et al., 2007; Godbey et al., 1998; Hartig et al., 2014; Ho et al., 2003; Van den Bosch & Sang, 2017). However, reviews have shown inconsistent results across study contexts (Bancroft et al., 2015; Kaczynski & Henderson, 2007). Many park users remain sedentary (Floyd et al., 2008), and more work is needed to identify the specific attributes of parks associated with physical activity. Additional research has shown statistical associations between recreation opportunities and other physical health outcomes such as healthy weight status (Potwarka et al., 2008) and BMI (Witten et al., 2008), but disparities exist across demographic groups. For instance, communities with lower-income and/or high-minority populations often experience degraded built environment infrastructure that limits physically active park use (Dentro et al., 2014; Huang et al., 2020).

Parks and greenspace also affect psychological health. Mental health issues such as stress, anxiety, and depression increased during the pandemic (Vahratian et al., 2021). Contact with nature represents a potential antidote to these problems. Greenspace exposure can bolster mental health and well-being by reducing stress, restoring attention, and increasing subjective well-being (Bratman et al., 2019; Hartig et al., 2014). For example, Larson et al. (2016) used a holistic measure of subjective well-being that included physical, mental, and social components to demonstrate significant associations between parks and health outcomes in over 40 U.S. cities. Other research supports positive links between green space and psychological health (Beyer et al., 2014; Bratman et al., 2012; Cohen-Cline et al., 2015), cognitive functioning (Dadvand et al., 2015), and social development and interactions (Bowers et al., 2020; Holtan et al., 2015; Zelenski et al., 2015), suggesting that benefits associated with green space and time in nature extend well beyond physical activity promotion. Parks also provide various ecosystem services that provide health benefits to diverse populations (Bratman et al., 2019; Jennings et al., 2016; Kuo, 2010).

The majority of outdoor recreation and health research focuses on specific communities or neighborhoods. However, when examined at a larger geographic scale, the connection (Kaczynski & Henderson, 2007) varies by context and type of intervention (Shanahan et al., 2019). Much work

has focused on urban parks, but research suggests that other types of parks (e.g., national forests, state parks) may significantly contribute to physical activity among the American public (Kline et al., 2011; Larson et al., 2014). Regardless of proximity or access, various constraints to outdoor recreation prevent interest, participation, and subsequent achievement of health benefits (Jackson & Scott, 1999; Walker & Virden, 2005). Identifying and understanding these constraints to outdoor recreation impact diverse populations is a critical component of nature-based health promotion. As recognition of the salutogenic value of nature grows (Larson & Hipp, 2022), more research is needed to explore causal mechanisms, identify optimal dosages of nature, and evaluate the impacts of policies and practices designed to leverage the health promotion potential of parks, greenspace, and outdoor recreation.

Environmental literacy and stewardship.

Increased outdoor recreation and contact with nature, often through formal and informal environmental education, can also improve environmental literacy and inspire environmental stewardship (Ardoin, et al., 2020). Early models posited that environmental literacy and stewardship behavior could be enhanced by building environmental knowledge and pro-environmental attitudes (Hines et al., 1986). Later studies have shown that knowledge is one of many components of environmental literacy (Morrone et al., 2001; Szczytko et al., 2019). More comprehensive models have revealed other key correlates of environmental literacy and pro-environmental behavior (PEB) such as demographic factors such as gender, age, and education (Cottrell, 2003; Larson et al., 2011), emotional involvement (Maitney, 2002; Nisbet et al., 2009) or personal experience in the outdoors (Kollmuss & Agyeman, 2002; Siemer & Knuth, 2001; Wells & Lekies, 2006). This latter precursor to literacy and PEB, nature-based recreation, has attracted substantial attention in the literature (Larson et al. 2018), highlighting a unique avenue for conservation action.

However, despite the potential educational and affective benefits linked to time in nature, a widespread assumption is that contact with nature - particularly among youth - is declining, leading to subsequent declines in environmental literacy (Charles & Louv, 2009). While some research supports this supposition, the results are scarce, often contradictory, and mostly correlational (Kellert et al., 2017; Larson, et al., 2019). Furthermore, while some have hypothesized direct links between outdoor recreation and conservation behavior, empirical evidence to support this relationship is limited (Kudryavtsev et al., 2012a; Larson, et al., 2018). More research is needed to examine the cause-effect relationship between outdoor recreation, environmental literacy, and PEB, and to inform the development and assessment of nature-based recreational programs and infrastructure - particularly among youth.

Early childhood experiences with nature may be particularly influential when it comes to environmental awareness and advocacy later in life (Bixler et al., 2002; Chawla & Cushing, 2007; Wells & Leikes, 2006). If contact between youth and nature is on the decline, it is important to know the consequences of this trend with respect to environmental concern and stewardship - especially at a time when global climate change is impacting human systems (Rousell & Cutter, 2020). A rising research area focuses on the interrelationships among environmental education, environmental literacy, and environmental impacts, including strategies for engaging youth, such as citizen science (Ballard, et al., 2017). This research could help address the need for long-term studies that examine the impacts of both unstructured outdoor play and significant nature-based

life experiences on youth and adults from diverse backgrounds (Chawla, 1999; Stevenson et al., 2013; Wells & Lekies, 2006). A better understanding of these relationships and their implications could enhance human capacity to support and engage in pro-environmental policies and behaviors.

Community resilience and vitality.

Parks and outdoor recreation also contribute to community resilience and vitality by creating spaces for positive interaction and fostering civic participation (AIA, 2007; McManus et al., 2012). Today, many urban resilience projects focus on capacity-building by fostering connections between people and place (Berkes & Ross, 2013; Magis, 2010), acknowledging the role that parks and greenspace play in the development of thriving social-ecological systems (Murphy et al., 2019). Natural amenities promote vibrant communities by attracting visitors, new residents and businesses, as natural amenities are correlated with population growth and increased economic prosperity (Crompton, 2000; Crompton, 2007, Trinh & Cicea, 2021; Wainger & Price, 2004). For instance, studies have shown that rural areas rich in recreation amenities and nature-based tourism opportunities often fare better with respect to a variety of socio-economic indicators (Reeder & Brown, 2005) and tend to attract amenity migrants that bolster local economies (Crompton, 2007). Furthermore, urban revitalization via greenspace creation and expansion can generate green jobs, increase property values (Conway et al., 2010; Kovacs, 2012; Voicu & Been, 2008), and improve public health and quality of life (Branas et al., 2011; Kondo et al., 2015; Schilling & Logan, 2008). Thus, the resilience of human communities is intertwined with the health of ecological systems (Braubach, et al., 2017; Reynolds, et al., 2022).

The civic ecology framework (Tidball & Krasny, 2010), which promotes public engagement and social connection with greenspaces via stewardship activities such as tree planting and community gardening, illustrates concrete ways that outdoor recreation and greenspace can foster resilient social-ecological systems (Krasny & Tidball, 2015). Subsequent studies have shown that nature-based recreation activities are directly linked to participation in place-protecting or pro-environmental behavior including policy support, social forms of environmentalism, and land stewardship (Cooper et al., 2015, Larson et al., 2018). Although this evidence suggests outdoor activities can lead to tangible community impacts, more research is needed to understand why these connections exist and how they can be promoted and leveraged to support healthy and sustainable communities. The concept of sense of place, which refers to the group of cognitions and affective sentiments people hold regarding a particular locale (Farnum et al., 2005; Jorgensen & Stedman, 2006), offers potential explanations for the link between nature-based activities and conservation actions. Sense of place is often comprised of place meanings (i.e.., beliefs about what a place represents) and place attachment (i.e., affective bonds that individuals form with a place), and both of these components can interact to inspire place-protecting behavior (Manzo & Devine-Wright, 2014; Larson et al., 2018; Kudryavtsev et al., 2012b). Parks, natural areas, and other types of open space have the potential to create a sense of place that yields psychological and environmental stewardship benefits (Kesebir & Diener, 2008; Peters et al., 2010). Multiple studies have found a positive association between a sense of place and pro-environmental behaviors (Halpenny, 2010; Hernandez et al., 2010; Stedman, 2002; Ryan, 2005; Scannell & Gifford 2010; Vaske & Kobrin, 2001; Walker & Chapman, 2003), and sense of place has been proposed as a centerpiece for a larger model linking recreation and conservation (Larson et al., 2018). More research is needed to explore the hypotheses that nature-based pathways to community resilience run through a sense of place.

Parks and greenspace can also help communities cope with change. Redevelopment and conversion of greyspace into greenspace (e.g., landfill to park development, rails-to-trails conversions) have become increasingly popular (Johnson et al., 2009), simultaneously building nature's resiliency and boosting quality of life (Klenosky et al., 2008; Kondo et al., 2015). The creation of outdoor spaces and sacred places (OSSP), another global trend, is often the result of spontaneous, self-organizing acts that are motivated by stewards' sense of community and need for healing rituals that are expressed through relationships with nature (Roberts, 2002; Svendsen & Campbell, 2010; Tidball et al., 2010). As such, the emergence of OSSPs is part of a socio-ecological process of disturbance and resilience (Berkes & Folke, 1998, 2002; Stedman & Ingalls, 2013). Stewards use their immediate landscape as a mechanism to foster adaptation and collective resilience in the aftermath of a crisis (Tidball 2010; Tidball & Krasny, 2013) and enhance overall ecosystem function (Folke et al., 2003; Gallopin, 2006; Tidball and Krasny, 2007). In this context, stewardship activities help to lessen feelings of isolation and disempowerment and can strengthen neighborhood attachment (Comstock et al., 2010; Townsend, 2006). Similarly, public parks can increase social cohesion and help build social capital (Jennings & Bamkole, 2019; Svendsen, 2009), even in historically marginalized communities (Mullenbach et al., 2022).

Nature is also a crucial resource for communities recovering from disaster (Miller, 2020; Ottosson & Grahn, 2008). For example, links between greenspace and resilience were especially evident during the COVID-19 pandemic, illuminating a "greenprint" for future urban growth and development (Bikomeye et al., 2021). Adverse environmental impacts can affect the attributes (i.e., natural amenities) that attract new residents and businesses, impacting the success of the "green growth machine" (DuPuis & Greenberg, 2019). Yet, despite these connections, collective understanding of the role of outdoor recreation, parks and other green spaces in developing and sustaining vibrant and resilient communities remains in a nascent stage. While some research highlights potential psychophysiological pathways to explain these connections (Hartig et al., 2014; Korpela & Ylen, 2007; Kuo & Sullivan, 2001; Wells, 2021), more research is needed to explore the processes through which change occurs, as well as unintended consequences.

Equity and inclusion.

Although parks and greenspace can provide a variety of benefits, these critical resources - and associated nature-based recreation opportunities - often remain inequitably distributed across the landscape. Neighborhoods with a large proportion of low-income or racial/ethnic minority residents typically experience limited access to parks and greenspaces (Bruton & Floyd, 2014; Nesbitt, et al., 2019; Wolch, et al., 2014). Even when parks are located in low-income communities of color, they tend to be of lower quality (Rigolon, et al., 2018) and are often used less frequently (Larson, Mullenbach et al., 2021; Powers et al., 2020). However, when greenspace - and public parks in particular - are available and accessible within disadvantaged communities (e.g., low-SES, high-minority population), they produce more health benefits than when they exist in affluent communities (Rigolon et la., 2021). Thus, greenspace offers a promising tool for promoting health equity across diverse populations.

Unfortunately, the disparities in access to parks and outdoor recreation have been exacerbated during the COVID-19 pandemic (Larson, Zhang, et al., 2021; Nay et al., 2022). As a result, the benefits that parks provide are rarely accessible and enjoyed by all segments of society (Jennings,

Larson, & Yun, 2016). Research has revealed a variety of constraints that contribute to racial/ethnic and socioeconomic disparities in park use and outdoor recreation, including reasons that are individual, interpersonal, and contextual or structural (Stodolska et al., 2020). Studies have also examined the different motivations that inspire nature-based recreation across demographic groups (Whiting et al., 2017). Additional research focused on the factors that constrain or facilitate outdoor recreation, particularly in the post-pandemic era, could help to address these persistent disparities. When lower levels of park use and outdoor recreation exist in communities of color, many negative consequences arise. For example, studies have shown that park spaces are critical for the health of youth (Reuben et al., 2020) and adults (Larson et al., 2014; Rigolon et al., 2021) from racial/ethnic minority backgrounds, and opportunities for outdoor recreation could also help to build environmental literacy across historically marginalized populations (Stevenson et al., 2013). As evidence regarding these relationships continue to emerge, new research is needed to facilitate synthesis and integration across contexts to identify planning approaches, management strategies, and interventions that could lead to more equitable outcomes.

Many social justice-oriented interventions are already underway to address some of the disparities described above. However, initiatives designed to address inequalities in access to parks and greenspace often inadvertently fuel green gentrification, further displacing and excluding communities who need these resources the most (Anguelovski, et al., 2019; Mullenbach, et al., 2022; Rigolon & Collins, 2022). In other words, while the impact of green spaces is often positive, the process of greening can produce unexpected consequences. Future research should explore strategies that managers and practitioners can employ to achieve more equitable urban greening (Rigolon et al., 2020) and embrace antiracist and anti-colonial forms of urban conservation (Mullenbach et al., 2022). These realities highlight the need to consider equity and environmental justice issues when assessing the positive and negative impacts of parks and green environments across diverse populations.

Objectives

The purpose of extending this multi-state project is to continue to build a network of researchers conducting applied and basic research, as well as outreach, regarding benefits associated with parks and other green environments. Individual research and outreach projects will fall under the following four broad categories.

1. Explore the role that parks and outdoor recreation play in promoting physical activity, psychological well-being, and associated preventative health benefits.
2. Explore the role that park and outdoor recreation play in promoting environmental literacy and stewardship behavior among youth and across the lifespan.
3. Explore the role that parks and outdoor recreation play in promoting community resilience and vitality.
4. Enhance efforts to increase diversity, equity and inclusion (DEI) in public parks, greenspaces, and outdoor recreation activities.

The benefit of this multi-state approach is to exchange research methodology among project participants, moving towards more comparable study findings and cross-state analysis of results allowing for greater insight to problems faced by all states. In addition, successful outreach methods and strategies for successful

collaborations with practitioners can be shared among project participants to generate the outputs, outcomes, and impacts, described below.

Methods

This project is not a typical funded project with a pre-defined research methodology. The goal is to advance the topic areas listed, by 1) allowing researchers to formally participate in a multi-state project (i.e., through their experiment station), and 2) developing new collaborations among researchers. The breadth of methods used to address broader research questions will ideally be as diverse as the different disciplines and fields represented by project collaborators. The methods listed below will serve as a starting point, enabling researchers to identify with this multi-state project and potential analytical approaches yet leaving ample room for methodological adaptation and innovation.

Objective 1: Health and well-being.

A variety of methods have been and will continue to be used to evaluate the impacts of park and outdoor recreation services on physical activity and other health outcomes. For example, surveys, interviews, direct observations and protocols (e.g., SOPARC) have examined the amount and type of physical activity that occurs in parks and how those activity levels vary across demographic groups (Bancroft et al., 2015; Cohen et al., 2007; Huang et al., 2020). Spatial analysis tools (e.g., GIS, remote sensing, Google Street View) have enabled researchers to examine spatial patterns in health outcomes linked to recreation behavior and park proximity (Hunter et al., 2015). All of these conventional tools will be employed in health-related research within this multistate project.

Methods will also expand to integrate innovative strategies that have been successfully utilized across a variety of other disciplines. For instance, concentration performance tests, clinical depression diagnostic tools, GPS trackers and accelerometers, and physiological measures using standard medical instrumentation and protocols (i.e., blood pressure, pulse, nerve and brain wave activity, blood cortisol and glucose levels, immune cells) can help researchers track mental health outcomes associated with time in nature. Experimental designs, clinical trials, and large-scale studies with statistical controls, long absent in the largely cross-sectional park and greenspace literature, have been and are being employed in separate studies across the US and other countries. These designs will help researchers identify elusive causal mechanisms in the relationship between nature and health (Frumkin et al., 2017). The multistate project will incorporate and facilitate more of those approaches, enabling researchers to establish baselines and longitudinally investigate long-term health outcomes. Given the rapidly evolving knowledge based on this topic, meta-analyses of published research can be used to explore patterns and trends across a broader variety of geographic and temporal scales.

Objective 2: Environmental literacy and stewardship.

Despite the lack of long-term experimental evidence examining trends in and precursors to environmental literacy and pro-environmental behavior (PEB), researchers have developed a variety of theoretical frameworks that can be used to test hypothesized relationships. These theoretical frameworks often encourage nested research that studies humans within larger social and environmental systems. Investigation of relationships in these larger systems typically requires mixed methods and a combination of positivist (i.e,. quantitative) and interpretive (i.e., qualitative) approaches (Courtney-Hall & Rogers, 2002). To assess environmental literacy and PEB, the

multistate project will use a variety of research techniques such as interviews and surveys to explore connection to nature, environmental literacy, PEB, and the factors that contribute to each. Concepts and constructs identified in previous studies on environmental literacy (Wells & Lekies, 2006; Lohr & Pearson-Mims, 2005; Szczytko et al., 2019) will be used to refine survey instruments, with a particular emphasis on distinguishing between experiences in different types of natural settings. The project will also utilize instruments that assess the impacts of environmental education efforts on environmental quality (Duffin, Murphy, & Johnson, 2008; Short, 2009). Considering the rapidly expanding literature on these topics, meta-analyses of published research will be used to explore patterns and trends across a broader variety of audience and geographic and temporal scales.

Objective 3: Community resilience and vitality.

In addition to traditional quantitative and qualitative methods, research and engagement methods in this category could include community-based participatory research methods (e.g., Becker et al., 2003) or participatory modeling strategies (e.g., Chase et al., 2010). Researchers could also include economic analyses using input/output and counterfactual models designed to assess the development of tourism-based industry in rural locations. Past examples include assessments of development adjacent to high amenity resources, such as gateway communities to national parks (Krannich & Petrazelka, 2003), and analysis of economic impacts of parks and nature-based tourism (Crompton, 2007), including financial benefits associated with improved health and well-being (Buckley et al., 2019). Additional techniques for measuring community resilience and vitality include photo elicitation documenting the lived experiences of residences (Kuo et al., 1998) as well as spatial analyses that integrate a variety socio-economic variables linked to parks and greenspace, including crime (Kuo & Sullivan, 2001; Shepley et al, 2019). Organizations such as the Trust for Public Land provide a variety of resources and datasets for researchers hoping to explore these connections, some of which will be utilized in this project.

Still needed are research designs that clarify interconnections between outdoor recreation activity and indicators of resilience. Resilience is a multi-dimensional concept, so a range of resilience measures need to be applied in an outdoor recreation context (Rendon et al., 2021). Human contributions to community resilience can be measured at an individual (i.e., psychological) or a collective (i.e., social) level (Berkes & Ross, 2013). New indicators are being developed to address some research questions under the broad umbrella of community resilience (Rendon et al., 2021), and many of these could be incorporated into parks and greenspace research in the future.

Objective 4: Equity and inclusion.

A variety of methods have been employed to assess, understand, and promote diversity, equity, and inclusion in the context of parks, greenspace, and outdoor recreation. This includes many of the conventional methods described above such as surveys and interviews, which can help researchers document and characterize the experiences of diverse individuals (Stodolska et al., 2014). However, additional methodologies may be required to identify the ways in which systemic racism, unfair power structures, and a lack of cultural competence and humility affect DEI and access to quality parks (NRPA, 2021). For example, document and content analysis can help researchers understand how DEI issues manifest in multiple forms of planning and management (Mullenbach, 2022), including health impact assessments (Besser et al., 2022). Spatial analysis can also reveal inequities in access to parks and greenspace, as well as variables correlated with those inequities (Rigolon et al., 2021). Community-engaged research techniques such as

participatory action research and narrative storytelling could illuminate challenges and reveal concrete strategies needed in the push for change (Rigolon et al., 2022). This multistate project will utilize different combinations of these traditional and transformative approaches to tackle social justice issues pertaining to parks, greenspace, and outdoor recreation, helping to ensure that these spaces, and the variety of benefits they provide, are accessible to everyone.

Measurement of Progress and Results:

The following outputs, outcomes, and impacts will be assessed at each annual meeting. The annual meeting will be used to recognize successes, identify opportunities for improvement and/or new avenues of inquiry, and develop a plan for continued success. The outcomes and impacts of the project will be evaluated through the annual report, which is compiled after the annual meeting. Each member of the project is required to submit their outcomes and impacts each year. The annual report will facilitate synthesis of projects outcomes and impacts on our list and identification of shortcomings or strategies for improvement. In addition, project outcomes will be evaluated for evidence of participatory research methods, as appropriate.

Outputs for all project objectives.

-Regular meetings with the multistate group, including annual in-person gathering and virtual interactions throughout the year that are designed to engage existing and recruit new multistate members

-Centralized website that serves as a hub for project activities, including a repository for research studies, instruments, and measures related to focal themes

-Development, implementation, and refinement of reliable and valid instruments and methods for measuring: (a) health outcomes associated with outdoor recreation and parks, (b) connection to nature, environmental literacy, and pro-environmental behavior, (c) components of community resilience and measures of vitality (e.g., sense of place, social cohesion, economic development), and (d) success of efforts to increase diversity, equity and inclusion (DEI) in public parks and greenspaces

-Synthesis papers and presentations for professional associations, such as the Society of Outdoor Recreation Professionals (SORP) & National Recreation and Park Association (NRPA), and for dissemination to practitioners

-Factsheets on study findings to be distributed to recreation program managers at various government agencies (local, state and federal) and nongovernmental organizations.

-Workshops, symposia, or conference sessions/presentations that connect researchers, extension specialists, and practitioners to present the mechanisms by which parks and other green environments support the focal themes

-Increased student participation and engagement in the Multistate Group to enhance networking and professional development opportunities

-Proposals designed to generate external funding from agency, foundation, and/or corporate sponsors to support Multistate research efforts and objectives

-Peer reviewed publications and professional conference presentations related to focal research themes

-Edited book focused on the “Transformative Power of Parks” that synthesizes the current state of knowledge across four themes and includes contributions from authors around the world

Outcomes (short term) for all project objectives.

-Enhanced national coordination and scientific capacity to address contemporary problems in parks and recreation by applying and revising state-of-the-art knowledge
-Creation and cultivation of relationships with potential research funding partners, including federal agencies, non-governmental organizations, and foundations
-Development of forecasts for park use and recreation visitor volume and trends, and plans for appropriate recreation management responses
-Increased understanding of the multifaceted health benefits associated with recreation in parks and other green environments
-Increased understanding of the causal mechanisms through which health benefits occur in parks
-Increased understanding of the relationships between unstructured and structured contact with nature and environmental literacy
-Increased understanding of the role of outdoor recreation in enhancing positive youth development.
-Increased awareness among researchers and providers of methods and instruments to measure concepts of community resilience and vitality related to outdoor recreation, parks and other green environments
-Development of planning documents that emphasize community resilience and vitality via outdoor recreation and nature-based tourism
-Increased understanding of outdoor recreation's beneficial role in larger socio-ecological systems
-Increased understanding of participation in outdoor recreation and access to parks and greenspace across diverse populations
-Development of strategies and interventions to increase diversity, equity, and inclusion in the outdoors

Impacts (long term) for all project objectives.
-Transformative research that positions parks, green spaces and outdoor recreation as key components of a sustainable and healthy future
-Creation and cultivation of relationships among researchers, government agencies, non-governmental organizations, and foundations to help support human well-being through sustainable park and outdoor recreation systems
-Effective education, communication and promotion of the multifaceted value of parks, green spaces and outdoor recreation across diverse populations
-Increased participation in physically active outdoor recreation across generations
-Improved infrastructure that supports healthy and active lifestyle choices, such as increased pedestrian and bicycle transportation coordinators to schools
-Improved health and quality of life across diverse populations
-Integration of nature-based health promotion strategies into preventive health care
-Increased public awareness of ecosystem services and support for environmental conservation, especially among youth
-Increased participation in environmental education and conservation stewardship programs (e.g., citizen science)
-Integration of experiential environmental education into national education curricula
-Enhanced sense of place and public attachment to parks, greenspace, and natural areas

-Increased recognition among community leaders and developers of the critical contributions of park and outdoor recreation services (including economic contributions) to community resilience and vitality
-Improved social networks and community relationships due to increased interactions with parks and green environments
-Increased distribution of parks, greenspace and outdoor recreation opportunities across diverse communities
-Removal of systemic barriers and development of policies and interventions that ensure the positive outcomes associated with parks, greenspace, and outdoor recreation are available to and enjoyed by everyone, regardless of their background.

Milestones:
(2023):

- Publish NE 1962 edited book: "The Transformational Power of Parks."
- Update the NE1962 Multistate Project website that serves multiple functions including categorized inventory of ongoing projects, documentation of contributors/partners, repository for project-related resources, and recruiting tool for new collaborators.
- Increase NE1962 engagement and participation (including the annual meeting and other virtual meetings throughout the year), potentially by identifying a new annual meeting location that better accommodates western states' participation
- Identify collaborative research and funding opportunities

(2024):

- Continue ongoing research collaboration, including development, implementation and refinement of instruments, scales, and methods for assessing key outcome variables.
- Publish ongoing research.
- Coordinate pursuit of research and funding opportunities (i.e., proposal writing).
- Engage in outreach and information dissemination of existing projects, including resources for extension specialists on project website.
- Coordinate conference session and/or panel discussion that highlights NE1962 Multistate Project (or NE1962 book) and outcomes related to at least one project objective.
- Annual meeting (location TBD).

(2025):

- Continue ongoing research collaboration, including development, implementation and refinement of instruments, scales, and methods for assessing key outcome variables.
- Publish ongoing research.
- Coordinate pursuit of research and funding opportunities, with successful acquisition of at least one collaborative, externally-funded grant.
- Engage in outreach and information dissemination of existing projects, including resources for extension specialists on project website.
- Annual meeting (location TBD)

(2026):

- Continue ongoing research collaboration, including development, implementation and refinement of instruments, scales, and methods for assessing key outcome variables.
- Publish ongoing research.
- Coordinate pursuit of research and funding opportunities, with successful acquisition of at least one collaborative, externally-funded grant.

- Engage in outreach and information dissemination of existing projects, including resources for extension specialists on project website.
- Annual meeting (location TBD)

(2027):

- Continue ongoing research collaboration, including development, implementation and refinement of instruments, scales, and methods for assessing key outcome variables.
- Publish ongoing research.
- Coordinate pursuit of research and funding opportunities, with successful acquisition of at least one collaborative, externally-funded grant.
- Engage in outreach and information dissemination of existing projects, including resources for extension specialists on project website.
- Annual meeting (location TBD)
- Renewal of Multistate Project

Projected Participation:

- Peter Fix - University of Alaska, Fairbanks;
- Taylor Stein - University of Florida;
- Kristi Lekies - The Ohio State University;
- Alia Dietsch - The Ohio State University;
- William Siemer - Cornell University;
- Keith Tidball – Cornell University;
- Sandra De Uriste-Stone – University of Maine;
- Lincoln Larson - North Carolina State University;
- Myron Floyd – North Carolina State University;
- Amy Villamagna – Plymouth State University;
- Brian Eisenhauer – Plymouth State University;
- Sohyun Park - University of Connecticut;
- Laura Brown - University of Connecticut;
- Peter Butler - West Virginia University;
- Cory Gallo - Mississippi State;
- Robert Hougham - University of Wisconsin Madison;
- Dorothy Ibes - William and Mary;
- Shan Jiang - West Virginia University;
- Madison Jones - University of Rhode Island;
- Enette Larson-Meyer - Virginia Tech;
- Stella Liu - South Dakota State University;
- Wayde Morse - Auburn University;
- Donald Rakow - Cornell University;
- Corryn Smith - Northern Arizona University;
- Sonja Wilhelm Stanis - University of Missouri;
- Jennifer Zoller - Texas A&M;
- Kathleen Scholl - University of Northern Iowa

Outreach Plan:
Research results from NE1962 are of interest to academic audiences and many other stakeholder groups, including park and recreation professionals, urban planners, community and youth leaders, formal and non-formal educators, and a variety of policy- and decision-makers. NE1962 members will make research results available through scientific journals, extension publications, fact sheets, popular press news articles, and appropriate websites and social media outlets. In addition, NE1962 members will present at national and international conferences as well as regional and local workshops and meetings. A listing of publications by NE1962 members will be updated annually and posted on the official NE1962 website. Internal communication related to NE1962 will be facilitated by the annual meeting, official website, and google group. Throughout the project, efforts will also be made to invite participation of extension faculty and specialists to integrate formal outreach programming into the project, helping to ensure that key findings are accessible to relevant audiences, including those that have been historically marginalized. Efficacy in disseminating results of research, and other outreach efforts, will be evaluated at the annual meeting and through the annual report.

Organization and Governance:
The organization of project NE1962 was established in accordance with the Manual for Cooperative Regional Research. A Technical Committee will be formed that grants voting membership for elections. One representative from each participating organization, agency or institution can serve on the Technical Committee, with appointments made through appropriate administrative channels of the organization, agency or institution. In the first year, a Chair will be elected to serve a one-year term. Primary duties of the Chair include: scheduling and organizing the annual meeting, managing participant contact information lists, and managing the communication network, including the website. A Chair-Elect will be elected in years 1, 2, 3, and 4, serving a one-year term before serving as the Chair in the subsequent year. Duties of the Chair-Elect include: serving as secretary and drafting and submitting the annual report. All appointments (chair, chair-elect, and technical committee) will be annual, beginning October 1. Each year a 1-2 day annual meeting will be held in a location chosen by the chair, offering a combination of in-person and virtual participation.

Literature Cited

American Institute of Architects (2007). AIA Communities by Design's 10 principles of livable communities. Accessed June 11, 2012 from: http://www.aia.org/about/initiatives/AIAS075369

Anguelovski, I., Connolly, J. J., Garcia-Lamarca, M., Cole, H., & Pearsall, H. (2019). New scholarly pathways on green gentrification: What does the urban 'green turn' mean and where is it going? *Progress in Human Geography*, 43(6), 1064-1086.

Ardoin, N. M., Bowers, A. W., & Gaillard, E. (2020). Environmental education outcomes for conservation: A systematic review. *Biological Conservation*, 241, 108224.

Ballard, H. L., Dixon, C. G., & Harris, E. M. (2017). Youth-focused citizen science: Examining the role of environmental science learning and agency for conservation. *Biological Conservation*, 208, 65-75.

Bancroft, C., Joshi, S., Rundle, A., Hutson, M., Chong, C., Weiss, C. C., ... & Lovasi, G. (2015). Association of proximity and density of parks and objectively measured physical activity in the United States: A systematic review. *Social Science & Medicine*, *138*, 22-30.

Barrett, A. G., Pitas, N. A., & Mowen, A. J. (2017). First In Our Hearts but Not in Our Pocket Books: Trends in Local Governmental Financing for Parks and Recreation from 2004 to 2014. *Journal of Park & Recreation Administration*, *35*(3), 1-19.

Becker, D. R., Harris, C. C., McLaughlin, W. J., & Nielsen, E. A. (2003). A participatory approach to social impact assessment: The interactive community forum. *Environmental Impact Assessment Review*, 23(3), 367-382.

Berkes, F., & Folke, C. (Eds.). (1998). Linking social and ecological systems. Cambridge, Cambridge University Press. Cambridge: Cambridge University Press.

Berkes, F., & Folke, C. (2002). Back to the future: ecosystem dynamics and local knowledge. In Gunderson, L. H., & Holling, C. S. (Eds.), Panarchy: Understanding transformation in systems of humans and nature (pp. 121-146). Washington, D.C.: Island Press.

Berkes, F. & Ross, H. (2013). Community Resilience: Toward an Integrated Approach. *Society & Natural Resources*, 26:1, 5-20.

Besser, L. M., Bean, C., Foor, A., Hoermann, S., & Renne, J. (2022). Evaluating Racial/Ethnic Equity in Planning-Related US Health Impact Assessments Involving Parks and Greenspaces: A Review. *Journal of the American Planning Association*, 1-15.

Beyer, K. M., Kaltenbach, A., Szabo, A., Bogar, S., Nieto, F. J., & Malecki, K. M. (2014). Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. *International Journal of Environmental Research and Public Health*, *11*(3), 3453-3472.

Bikomeye, J. C., Namin, S., Anyanwu, C., Rublee, C. S., Ferschinger, J., Leinbach, K., ... & Beyer, K. M. (2021). Resilience and equity in a time of crises: investing in public urban greenspace is now more essential than ever in the US and beyond. *International Journal of Environmental Research and Public Health*, *18*(16), 8420.

Bixler, R. D., Floyd, M. F., & Hammitt, W. E. (2002). Environmental socialization: Quantitative tests of the childhood play hypothesis. *Environment and Behavior*, 34(6), 795-818.

Boone-Heinonen, J., Casanova, K., Richardson, A. S., & Gordon-Larsen, P. (2010). Where can they play? Outdoor spaces and physical activity among adolescents in US urbanized areas. *Preventive Medicine*, 51(3-4), 295-298.

Bowers, E. P., Larson, L. R., & Parry, B. J. (2021). Nature as an ecological asset for positive youth development: empirical evidence from rural communities. *Frontiers in Psychology*, *12*, 2159.

Branas, C. C., Cheney, R. A., MacDonald, J. M., Tam, V. W., Jackson, T. D., & Ten Have, T. R. (2011). A difference-in-differences analysis of health, safety, and greening vacant urban space. *American Journal of Epidemiology*, 174, 1296-1306.

Bratman, G. N., Hamilton, J. P., & Daily, G. C. (2012). The impacts of nature experience on human cognitive function and mental health. *Annals of the New York Academy of Sciences*, *1249*(1), 118-136.

Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., De Vries, S., Flanders, J., ... & Daily, G. C. (2019). Nature and mental health: An ecosystem service perspective. *Science Advances*, *5*(7), eaax0903.

Braubach, M., Egorov, A., Mudu, P., Wolf, T., Ward Thompson, C., & Martuzzi, M. (2017). Effects of urban green space on environmental health, equity and resilience. In Nature-based solutions to climate change adaptation in urban areas (pp. 187-205). Springer, Cham.

Bruton, C. M., & Floyd, M. F. (2014). Disparities in built and natural features of urban parks: Comparisons by neighborhood level race/ethnicity and income. *Journal of Urban Health*, *91*(5), 894-907.

Buckley, R., Brough, P., Hague, L., Chauvenet, A., Fleming, C., Roche, E., ... & Harris, N. (2019). Economic value of protected areas via visitor mental health. *Nature Communications*, *10*(1), 1-10.

Carr, S. J. (2021). The Topography of Wellness: How Health and Disease Shaped the American Landscape. University of Virginia Press.

Centers for Disease Control and Prevention (CDC). (2022). *Childhood obesity facts*. Accessed July 14, 2022, from: https://www.cdc.gov/obesity/data/childhood.htmlhttp://prevention.nih.gov/healthtopic_obesity.aspx)

Chase, L., Boumans, R., & Morse, S. (2010). Participatory modeling as a tool for community development planning: Tourism in the northern forest. *Community Development*, 41(3), 385-397.

Charles, C., & Louv, R. (2009). Children's nature deficit: What we know and don't know. *Children and Nature Network*, 32.

Chawla, L. (1999). Life paths into effective environmental action. Journal of Environmental Education, 31(1), 15-26.

Chawla, L., & Cushing, D. (2007). Education for strategic environmental behaviour. *Environmental Education Research*, 13(4), 437-452.

Cohen, D. A., McKenzie, T. L., Sehgal, A., Williamson, S., Golinelli, D., & Lurie, N. (2007). Contribution of public parks to physical activity. *American Journal of Public Health*, 97(3), 509-514. doi:10.2105/AJPH.2005.072447

Cohen-Cline, H., Turkheimer, E., & Duncan, G. E. (2015). Access to green space, physical activity and mental health: a twin study. *Journal of Epidemiology and Community Health*, *69*(6), 523-529.

Comstock, N., Dickinson, L. M., Marshall, J. A., Soobader, M. J., Turbin, M. S., Buchenau, M., & Lilt, J. S. (2010). Neighborhood attachment and its correlates: exploring neighborhood conditions, collective efficacy, and gardening. *Journal of Environmental Psychology*, 30(4), 435-442.

Conway, D., Li, C. Q., Wolch, J., Kahle, C., & Jerrett, M. (2010). A spatial autocorrelation approach for examining the effects of urban greenspace on residential property values. *The Journal of Real Estate Finance and Economics*, *41*(2), 150-169.

Cooper, C., L. Larson, A. Dayer, R. Stedman, and D. Decker. (2015). Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *The Journal of Wildlife Management*, 79(3), 446-457.

Cottrell, S. P. (2003). Influence of sociodemographics and environmental attitudes on general responsible environmental behavior among recreational boaters. *Environment and Behavior*, 35(3), 347-375.

Courtney-Hall, P. & Rogers, L. (2002). Gaps in mind: Problems in environmental knowledge-behaviour modeling research. *Environmental Education Research*, 8(3): 285-297.

Crompton, J. L. (2000). The impact of parks and open space on property values and the property tax base. Ashburn, VA: National Recreation and Parks Association.

Crompton, J. W. (2007). Community benefits and repositioning: The keys to park and recreations future viability. Ashburn, VA: National Recreation and Parks Association.

Dadvand, P., Nieuwenhuijsen, M.J., Esnaola, M., and Sunyer, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences*, *112*(26), 7937-7942.

Dentro, K. N., Beals, K., Crouter, S. E., Eisenmann, J. C., McKenzie, T. L., Pate, R. R., ... & Katzmarzyk, P. T. (2014). Results from the United States' 2014 report card on physical activity for children and youth. *Journal of Physical Activity and Health*, *11*(Suppl 1), S105-12.

Duffin, M., Murphy, M., & Johnson, B. (2008). Quantifying a relationship between place-based learning and environmental quality: Final report. Woodstock, VT: NPS Conservation Study Institute in cooperation with the Environmental Protection Agency and Shelburne Farms.

DuPuis, E. M., & Greenberg, M. (2019). The right to the resilient city: Progressive politics and the green growth machine in New York City. *Journal of Environmental Studies and Sciences*, 9(3), 352-363.

Farnum, J., Hall, T., & Kruger, L. E. (2005). Sense of place in natural resource recreation and tourism: An evaluation and assessment of research findings (Gen. Tech. Rep. PNW-GTR-660). Portland, OR: U.S.D.A. Forest Service, Pacific Northwest Research Station.

Floyd, M. F., Spengler, J. O., Maddock, J. E., Gobster, P. H., & Suau, L. J. (2008). Park-based physical activity in diverse communities of two U.S. cities. An observational study. *American Journal of Preventive Medicine*, 34(4), 299-305.

Frank, L. D., Kerr, J., Chapman, J., & Sallis, J. (2007). Urban form relationships with walk trip frequency and distance among youth. *American Journal of Health Promotion*, 21, 305-311.

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn Jr, P. H., Lawler, J. J., ... & Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives*, *125*(7), 075001.

Godbey, G. (2009). Outdoor recreation, health, and wellness: Understanding and enhancing the relationship. Washington, D. C.: Resources for the Future.

Godbey, G., Roy, M. Payne, L., & Orsega-Smith, E. (1998). The relation between health and use of local parks. National Recreation Foundation.

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology*, 30, 409-421.

Hasson, R., Sallis, J. F., Coleman, N., Kaushal, N., Nocera, V. G., & Keith, N. (2021). COVID-19: Implications for physical activity, health disparities, and health equity. American *Journal of Lifestyle Medicine*, 15598276211029222.

Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*, 207-228.

Henderson, K.A. (2014). Introduction to recreation services: Sustainability for a changing world. State College, PA: Venture Publishing, Inc.

Hernández, B., Martin, A. M., Ruiz, C., & Hidalgo, M. C. (2010). The role of place identity and place attachment in breaking environmental protection laws. *Journal of Environmental Psychology*, 30, 281–288.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1986-87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, 21(3): 1-8.

Ho, C. H., Payne, L., Orsega-Smith, E., Godbey, G. (2003). Parks, recreation and public health. Parks & Recreation, 38(4), 18-27.

Holtan, M. T., Dieterlen, S. L., & Sullivan, W. C. (2015). Social life under cover: tree canopy and social capital in Baltimore, Maryland. *Environment and Behavior*, *47*(5), 502-525.

Huang, J. H., Hipp, J. A., Marquet, O., Alberico, C., Fry, D., Mazak, E., ... & Floyd, M. F. (2020). Neighborhood characteristics associated with park use and park-based physical activity among children in low-income diverse neighborhoods in New York City. *Preventive Medicine*, *131*, 105948.

Jackson, E. L., & Scott, D. (1999). Constraints to leisure. In E. L. Jackson & T. L. Burton. (Eds.), Leisure studies: Prospects for the twenty-first century (pp. 299-322). State College, PA: Venture Publishing.

Jennings, V., & Bamkole, O. (2019). The relationship between social cohesion and urban green space: An avenue for health promotion. *International Journal of Environmental Research and Public Health*, *16*(3), 452.

Jennings, V., Larson, L., & Yun, J. (2016). Advancing sustainability through urban green space: cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health, 13:* 196. doi: 10.3390/ijerph13020196

Johnson, A., Glover, T. D., and Stewart, W. P. (2009). One person's trash in another person's treasure: The public place-making of Mount Trashmore. *Journal of Park and Recreation Administration*, 27(1), 85-103.

Jorgensen, B. S., & Stedman, R. C. (2006). A comparative analysis of predictors of sense of place dimensions: Attachment to, dependence on, and identification with lakeshore properties. *Journal of Environmental Management*, 79, 316-327.

Kaczynski, A. T., & Henderson, K. A. (2007). Environmental correlates of physical activity: A review of evidence about parks and recreation. *Leisure Sciences*, 29, 315-354.

Kellert, S. R., Case, D. J., Escher, D., Witter, D. J., Mikels-Carrasco, J., & Seng, P. T. (2017). The nature of Americans: Disconnection and recommendation for reconnection. Mishawaka, IN: DJ Case. Available from https://natureofamericans.org/

Kesebir, P., & Diener, E. (2008). In pursuit of happiness: Empirical answers to philosophical questions. *Perspectives on Psychological Science*, 3(2), 117-125.

Kleinschroth, F., & Kowarik, I. (2020). COVID-19 crisis demonstrates the urgent need for urban greenspaces. *Frontiers in Ecology and the Environment*, 18(6), 318.

Klenosky, D., LeBlanc, C., Vogt, C., & Schroeder, H. (2008). Factors that attract and repel visitation to urban recreation sites: A framework for research. In C. LeBlanc & C. Vogt (comps.), Proceedings of the 2007 Northeastern Recreation Research Symposium (pp. 39-47). April 15-17, 2007, Bolton Landing, NY. GTR NRS-P-23, Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

Kline, J.D., Rosenberger, R. S., & White, E. M. (2011). A national assessment of physical activity in U.S. National Forests. *Journal of Forestry*, 109(6), 343-351.

Kollmuss, A. & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239-260.

Kondo, M. C., Fluehr, J. M., McKeon, T., & Branas, C. C. (2018). Urban green space and its impact on human health. *International Journal of Environmental Research and Public Health*, *15*(3), 445.

Kondo, M. C., South, E. C., & Branas, C. C. (2015). Nature-based strategies for improving urban health and safety. *Journal of Urban Health*, *92*(5), 800-814.

Korpela, K. M., & Ylen, M. (2007). Perceived health is associated with visiting natural favourite places in the vicinity. *Health & Place*, 13(1), 138-151.

Kovacs, K. F. (2012). Integrating property value and local recreation models to value ecosystem services from regional parks. *Landscape and Urban Planning*, *108*(2), 79-90.

Krannich, R. S., & Petrzelka, P. (2003). Tourism and natural amenity development: Real opportunities? In D. L. Brown & L. E. Swanson (Eds.), Challenges for rural America in the twenty-first century (pp. 190-199). University Park, PA: The Pennsylvania State University Press.

Krasny, M. E., & Tidball, K. G. (2015). *Civic ecology: adaptation and transformation from the ground up*. Cambridge, Massachussetts. MIT Press.

Kudryavtsev, A., Krasny, M. E., & Stedman, R. C. (2012a). The impact of environmental education on sense of place among urban youth. *Ecosphere* 3(4), 29, https://dx.doi.org/10.1890/ES11-00318.1

Kudryavtsev, A., Stedman, R. C., & Krasny, M. E. (2012b). Sense of place in environmental education. *Environmental Education Research, 18*(2), 229-250.

Kuo, F. E. (2010). Parks and other green environments: Essential components of a healthy human habitat. Research Series. Ashburn, VA: National Recreation and Park Association.

Kuo, F. E., Bacaicoa, M., & Sullivan, W. C. (1998). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behavior*, 30(1), 28-59.

Kuo, F E., & Sullivan, W. C. (2001). Aggression and violence in the inner city: effects of environment via mental fatigue. *Environment and Behavior,* 33(4), 543-571.

Kurian, A. K., & Cardarelli, K. M. (2007). Racial and ethnic differences in cardiovascular disease risk factors: a systematic review. *Ethnicity and Disease, 17*(1), 143.

Labib, S. M., Browning, M. H., Rigolon, A., Helbich, M., & James, P. (2022). Nature's contributions in coping with a pandemic in the 21st century: A narrative review of evidence during COVID-19. *Science of The Total Environment*, 155095.

Larson, L. R., Cooper, C. B., Stedman, R. C., Decker, D. J., & Gagnon, R. J. (2018). Place-based pathways to proenvironmental behavior: Empirical evidence for a conservation–recreation model. *Society & Natural Resources*, 31(8), 871-891.

Larson, L. R., & Hipp, J. A. (2022). Nature-based pathways to health promotion: the value of parks and greenspace. *North Carolina Medical Journal*, *83*(2), 99-102.

Larson, L. R., Jennings, V., & Cloutier, S. A. (2016). Public parks and wellbeing in urban areas of the United States. *PloS ONE, 11*(4), e0153211.

Larson, L. R., Mullenbach, L. E., Browning, M. H., Rigolon, A., Thomsen, W. J., Covelli, M. W. E., ... & Labib, S. M. (2022). Greenspace and park use associated with less emotional distress among college students in the United States during the COVID-19 pandemic. *Environmental Research*, 204(Part D), 112367.

Larson, L. R., Stedman, R. C., Cooper, C. B. & Decker, D. J. (2015). Understanding the multi-dimensional structure of pro-environmental behavior. *Journal of Environmental Psychology* 43, 112-124.

Larson, L. R., Szczytko, R., Bowers, E. P., Stephens, L. E., Stevenson, K. T., & Floyd, M. F. (2019). Outdoor time, screen time, and connection to nature: Troubling trends among rural youth? *Environment and Behavior*, 51(8), 966-991.

Larson, L. R., Whiting, J. W., Green, G. T. (2011). Exploring the influence of outdoor recreation participation on pro-environmental behaviour in a demographically diverse population. Local Environment, 16(1), 67-86.

Larson, L. R., Whiting, J. W., Green, G. T., & Bowker, J. M. (2014). Physical activity locations in Georgia: Frequency of use by socio-demographic group. *Journal of Outdoor Recreation and Tourism*, *5*, 68-72.

Larson, L. R., Zhang, Z., Oh, J. I., Beam, W., Ogletree, S. S., Bocarro, J. N., ... & Wells, M. (2021). Urban park use during the COVID-19 pandemic: Are socially vulnerable communities disproportionately impacted? *Frontiers in Sustainable Cities*, 3, 710243.Li, H., Browning, M. H., Dzhambov, A. M., Zhang, G., & Cao, Y. (2022). Green Space for Mental Health in the COVID-19 Era: A Pathway Analysis in Residential Green Space Users. *Land*, *11*(8), 1128.

Lohr, V. I. & Pearson-Mims, C. H. (2005). Children's active and passive interactions with plants influence their attitudes and actions toward trees and gardening as adults. HortTechnology, 15(3), 472-476.

MacKinnon, M., MacKinnon, R., Pedersen Zari, M., Glensor, K., & Park, T. (2022). Urgent Biophilia: Green Space Visits in Wellington, New Zealand, during the COVID-19 Lockdowns. *Land*, *11*(6), 793.

Magis, K. (2010). Community Resilience: An Indicator of Social Sustainability, Society & Natural Resources: An International Journal, 23(5), 401-416.

Maiteny, P. T. (2002). Mind in the gap: Summary of research exploring 'inner' influences on pro-sustainability learning and behavior. *Environmental Education Research*, 8(3), 300-306.

Manzo, L. C., & Devine-Wright, P (editors). (2014). *Place attachment: Advances in theory, methods and applications*. New York, NY: Routledge.

McManus, P., Walmsley, J., Argent, N., Baum, S., Bourke, L., Martin, J., Pritchard, B. & Sorensen, T. (2012). Rural community and rural resilience: What is important to framers in keeping their country towns alive? Journal of Rural Studies, 28, 20-29.

Miller, S. (2020). Greenspace after a disaster: The need to close the gap with recovery for greater resilience. *Journal of the American Planning Association*, *86*(3), 339-348.

Morrone, M., Mancl, K., & Carr, K. (2001). Development of a metric to test group differences in ecological knowledge as one component of environmental literacy. *Journal of Environmental Education*, 32(4): 33-42.

Mullenbach, L. E. (2022). Critical discourse analysis of urban park and public space development. *Cities*, *120*, 103458.

Mullenbach, L. E., Larson, L. R., Floyd, M. F., Marquet, O., Huang, J. H., Alberico, C., ... & Hipp, J. A. (2022). Cultivating social capital in diverse, low-income neighborhoods: the value of parks for parents with young children. *Landscape and Urban Planning*, *219*, 104313.

Mullenbach, L. E., Breyer, B., Cutts, B. B., Rivers III, L., & Larson, L. R. (2022). An antiracist, anticolonial agenda for urban greening and conservation. *Conservation Letters*, e12889.

Murphy, A., Enqvist, J. P., & Tengö, M. (2019). Place-making to transform urban social–ecological systems: insights from the stewardship of urban lakes in Bangalore, India. *Sustainability Science*, *14*(3), 607-623.

National Association of University Forest Resources Programs (NAUFRP). (2010). Sustaining healthy and forests: An investment in America's competitive position in the global marketplace. Falls Church, VA: National Association of University Forest Resources Programs.

Nay, A., Kahn Jr, P. H., Lawler, J. J., & Bratman, G. N. (2022). Inequitable Changes to Time Spent in Urban Nature during COVID-19: A Case Study of Seattle, WA with Asian, Black, Latino, and White Residents. *Land*, *11*(8), 1277.

Nesbitt, L., Meitner, M. J., Girling, C., Sheppard, S. R., & Lu, Y. (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning*, 181, 51-79.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. Environment and Behavior, 41(5), 715-740.

O'Dell, P. (2016). Redefining the National Park Service Role in Urban Areas: Bringing the Parks to the People. *Journal of Leisure Research*, *48*(1), 5-11.

Ottosson, J., & Grahn, P. (2008). The role of natural settings in crisis rehabilitation: How does the level of crisis influence the response to experiences of nature with regard to measures of rehabilitation? *Landscape Research*, 33, 1-51.

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

Nay, A., Kahn Jr, P. H., Lawler, J. J., & Bratman, G. N. (2022). Inequitable Changes to Time Spent in Urban Nature during COVID-19: A Case Study of Seattle, WA with Asian, Black, Latino, and White Residents. *Land*, *11*(8), 1277.

Potwarka, L., Kaczynski, A., & Flack, A. (2008). Places to play: Association of park space and facilities with health weight status among children. Journal of Community Health, 33(5), 344-350.

Powers, S. L., Lee, K. J., Pitas, N. A., Graefe, A. R., & Mowen, A. J. (2020). Understanding access and use of municipal parks and recreation through an intersectionality perspective. *Journal of Leisure Research*, *51*(4), 377-396.

Razani, N., Niknam, K., Wells, N. M., Thompson, D., Hills, N. K., Kennedy, G., ... & Rutherford, G. W. (2019). Clinic and park partnerships for childhood resilience: A prospective study of park prescriptions. *Health & Place*, *57*, 179-185.

Reeder, R. J. & Brown, D. M. (2005). Recreation, tourism and rural well-being. USDA, Economic Research Report #7. Washington, D.C.: Economic Research Service.

Rendon, C., Osman, K. K., & Faust, K. M. (2021). Path towards community resilience: Examining stakeholders' coordination at the intersection of the built, natural, and social systems. *Sustainable Cities and Society*, *68*, 102774.

Reuben, A., Rutherford, G. W., James, J., & Razani, N. (2020). Association of neighborhood parks with child health in the United States. *Preventive Medicine*, *141*, 106265.

Reynolds, H. L., Mincey, S. K., Montoya, R. D., Hamlin, S., Sullivan, A., Thapa, B., ... & Grove, J. M. (2022). Green infrastructure for urban resilience: a trait-based framework. *Frontiers in Ecology and the Environment*, 20(4), 231-239.

Rigolon, A., Browning, M., & Jennings, V. (2018). Inequities in the quality of urban park systems: An environmental justice investigation of cities in the United States. *Landscape and Urban Planning*, 178, 156-169.

Rigolon, A., Browning, M. H., McAnirlin, O., & Yoon, H. (2021). Green space and health equity: a systematic review on the potential of green space to reduce health disparities. *International Journal of Environmental Research and Public Health*, *18*(5), 2563.

Rigolon, A., & Collins, T. (2022). The green gentrification cycle. *Urban Studies*. DOI:10.1177/00420980221114952.

Rigolon, A., Keith, S. J., Harris, B., Mullenbach, L. E., Larson, L. R., & Rushing, J. (2020). More than" Just Green Enough": Helping Park Professionals Achieve Equitable Greening and Limit Environmental Gentrification. *Journal of Park & Recreation Administration*, *38*(3).

Rigolon, A., Yañez, E., Aboelata, M. J., & Bennett, R. (2022). “A park is not just a park”: Toward counter-narratives to advance equitable green space policy in the United States. *Cities*, *128*, 103792.

Roberts, P. (2002). Spontaneous memorialization. In R. Kastenhaum (Ed.), Macmillan encyclopedia of death and dying (569-570). New York: Macmillan Reference USA.

Roemmich, J. N., Epstein, L. H., Raja, S., Yin, L., Robinson, J., & Winiewicz, D. (2006). Association of access to parks and recreational facilities with the physical activity of young children. *Preventive Medicine*, 43(6), 437-441. doi:10.1016/j.ypmed.2006.07.007

Rousell, D., & Cutter-Mackenzie-Knowles, A. (2020). A systematic review of climate change education: Giving children and young people a ‘voice’and a ‘hand’in redressing climate change. *Children's Geographies*, 18(2), 191-208.

Ryan, R. L. (2005). Exploring the effects of environmental experience on attachment to urban natural areas. *Environment and Behavior*, 37, 3-42.

Scannell, L., & Gifford, R. (2010). The relations between natural and civic place attachment and pro-environmental behavior. *Journal of Environmental Psychology*, 30, 289-297.

Schilling, J., & Logan, J. (2008). Greening the rust belt: A green infrastructure model for right sizing America's shrinking cities. *Journal of the American Planning Association*, *74*(4), 451-466.

Shanahan, D. F., Astell–Burt, T., Barber, E. A., Brymer, E., Cox, D. T., Dean, J., ... & Gaston, K. J. (2019). Nature–based interventions for improving health and wellbeing: The purpose, the people and the outcomes. *Sports*, *7*(6), 141.

Shanahan, D. F., Bush, R., Gaston, K. J., Lin, B. B., Dean, J., Barber, E., & Fuller, R. A. (2016). Health benefits from nature experiences depend on dose. *Scientific Reports*, *6*(1), 1-10.

Shepley, M., Sachs, N., Sadatsafavi, H., Fournier, C., & Peditto, K. (2019). The impact of green space on violent crime in urban environments: an evidence synthesis. *International Journal of Environmental Research and Public Health*, *16*(24), 5119.

Short, P. C. (2009). Responsible environmental action: Its role and status in environmental education and environmental quality. *Journal of Environmental Education*, 41(1), 7-21.

Siemer, W. F., & Knuth, B. A. (2001). Effects of fishing education programs on antecedents of responsible environmental behavior. *Journal of Environmental Education*, 32(4), 23-29.

Slater, S. J., Christiana, R. W., & Gustat, J. (2020). Peer Reviewed: Recommendations for keeping parks and green space accessible for mental and physical health during COVID-19 and other pandemics. Preventing Chronic Disease, 17.

Smith, L. M., Case, J. L., Smith, H. M., Harwell, L. C., & Summers, J. K. (2013). Relating ecoystem services to domains of human well-being: Foundation for a US index. *Ecological Indicators*, *28*, 79-90.

Stedman, R. C. (2002). Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34, 561-581.

Stedman, R. C. & Ingalls, M. (2014). Topophilia, biophilia and greening in the red zone. n K. G. Tidball & M. E.

Krasny (Eds.), Greening in the red zone: Disaster, resilience, and community greening (pp. 129-144). New York: Springer-Verlag.

Stevenson, K. T., Peterson, M. N., Bondell, H. D., Mertig, A. G., & Moore, S. E. (2013). Environmental, institutional, and demographic predictors of environmental literacy among middle school children. *PloS ONE*, *8*(3), e59519.

Stodolska, M. E., Shinew, K. J., Floyd, M. F., & Walker, G. J. (2014). *Race, ethnicity, and leisure: Perspectives on research, theory, and practice*. Human Kinetics.

Stodolska, M., Shinew, K. J., & Camarillo, L. N. (2020). Constraints on recreation among people of color: Toward a new constraints model. *Leisure Sciences*, *42*(5-6), 533-551.

Svendsen, E. (2009). Cultivating resilience: Urban stewardship as a means to improving health and well-being. In L. Campbell & A. Wiesen (Eds.), Restorative commons: Creating health and well-being through urban landscapes (pp. 58-87). General Technical Report. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

Svendsen, F., & Campbell, F. (2010). Living memorials: Understanding the social meanings of community-based memorials to September 11, 2001. Environment and Behavior, 42(3), 318-334.

Szczytko, R., Stevenson, K., Peterson, M. N., Nietfeld, J., & Strnad, R. L. (2019). Development and validation of the environmental literacy instrument for adolescents. *Environmental Education Research*, *25*(2), 193-210.

Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), Social learning towards a more sustainable world (pp. 149-164). Wagengingen, The Netherlands: Wagengingen Academic Press.

Tidball, K. G., & Krasny, M. E. (2010). Urban environmental education from a social-ecological perspective: conceptual framework for civic ecology education. *Cities and the Environment*, 3(1), 11. http://escholarship.bc.edu/cate/vol3/iss1/11.

Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere*, 2(2), 21-17.

Tidball, K. G. (2010). Greening in the red zone: Green space and disaster resistance, recovery and resilience. *Anthropology News*, 5(1), 7.

Tidball, K. G. and Krasny, M. E. (Eds.). (2013). Greening in the red zone: Disaster, resilience, and community greening. New York: Springer-Verlag.

Townsend, M. (2006). Feel blue? Touch green! Participation in forest/woodland management as a treatment for depression. *Urban Forestry & Urban Greening*, 5(3), 111-120.

Trinh, N. T. H., & Cicea, C. (2021). Green Space and Its Role to Improve Social and Economic Development for a Better Quality of Life. *Management and Economics Review*, 1, 49-60.

US Department of Agriculture, Cooperative State Research, Education, and Extension Service. (2007). Outdoor recreation research and education for the 21st Century: Defining national direction and building capacity. Washington, DC: U.S. Department of Agriculture.

US Department of Interior, National Park Service. (2010). Public Health Program. Retr. 04/15/12 from http://www.nps.gov/public_health/hp/hp.htm.

Vahratian, A., Blumberg, S. J., Terlizzi, E. P., & Schiller, J. S. (2021). Symptoms of anxiety or depressive disorder and use of mental health care among adults during the COVID-19 pandemic—United States, August 2020–February 2021. *Morbidity and Mortality Weekly Report*, *70*(13), 490.

Van den Bosch, M., & Sang, Å. O. (2017). Urban natural environments as nature-based solutions for improved public health–A systematic review of reviews. *Environmental Research*, *158*, 373-384.

Vaske, J. J., & Kobrin, K. C. (2001). Place attachment and environmentally responsible behavior. *Journal of Environmental Education*, *32*(4), 16-21.

Voicu, I., & Been, V. (2008). The effect of community gardens on neighboring property values. *Real Estate Economics*, *36*(2), 241-283.

Wainger, L. A., & Price, E. W. (2004). Evaluating quality of life, economic vulnerabilities, and drivers of ecosystem change. *Environmental Monitoring and Assessment*, 94, 69-84.

Walker, G. J., & Chapman, R. (2003). Thinking like a park: The effects of sense of place, perspective-taking, and empathy on pro-environmental intentions. *Journal of Park and Recreation Administration*, 21, 71-86.

Walker, G., & Virden, R. (2005). Constraints on outdoor recreation. In E. L. Jackson (Ed.), Constraints to leisure (pp. 201-219). State College, PA: Venture Publishing.

Wells, N. M. (2021). The natural environment as a resilience factor: Nature's role as a buffer of the effects of risk and adversity. In *Nature and Psychology* (pp. 195-233). Springer, Cham.

Wells, N. M. & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16(1), 1-24.

Whiting, J. W., Larson, L. R., Green, G. T., & Kralowec, C. (2017). Outdoor recreation motivation and site preferences across diverse racial/ethnic groups: A case study of Georgia state parks. *Journal of Outdoor Recreation and Tourism*, *18*, 10-21.

Witten, K., Hiscock, R., Pearce, J., & Blakely, T. (2008). Neighbourhood access to open spaces and the physical activity of residents: a national study. *Preventive Medicine*, 47(3), 299-303. doi:10.1016/j.ypmed.2008.04.010

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

Zelenski, J. M., Dopko, R. L., & Capaldi, C. A. (2015). Cooperation is in our nature: Nature exposure may promote cooperative and environmentally sustainable behavior. *Journal of Environmental Psychology*, *42*, 24-31.

Land Grand Participating States/Institutions

- University of Alaska, Fairbanks
- North Carolina State University
- University of Florida
- The Ohio State University
- Cornell University
- University of Connecticut

- University of Maine

Non-Land Grant Participating States/Institutions

- Plymouth State University
- University of South Carolina,
- University of Northern Iowa