INCREASING ACCESS TO GREEN SPACE IN UNDERSERVED COMMUNITIES

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APPLIED POLICY PROJECT

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CLIENT OVERVIEW

The Nature Conservancy (TNC) is a 501(c)(3) and the largest conservancy in the world with offices in all 50 states and 79 countries. TNC's mission is "to conserve the lands and waters on which all life depends. Our vision is a world where the diversity of life thrives, and people act to conserve nature for its own sake and its ability to fulfill our needs and enrich our lives." My client within The Nature Conservancy is the North American Policy and Government Relations team, which focuses on Federal policy that furthers conservation, environmental, and climate change policy within the Federal government.

DISCLAIMER

The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other agency.

HONOR PLEDGE

On my honor as a student, I have neither given nor received aid on this assignment.

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EXECUTIVE SUMMARY

Low-income communities and communities of color have less access to green space. Green space encompasses land covered in vegetation and trees as well as any spaces where people can come into contact with nature. Green space is associated with multiple mental, physical, social, economic, and environmental benefits and is essential to the health and well-being of individuals and communities. Lack of green space causes negative health outcomes due to higher rates of exposure to heat, pollution, and hazardous substances. Additionally, communities lacking access are excluded from the economic, environmental, social and mental health benefits provided by nature. Access to green space is unequally distributed across socioeconomic and racial lines due to a long history of racist housing policies in the United States. The movement for environmental justice seeks to rectify this systemic racism and classism in the environmental space. Expanding access to green space so that all individuals can experience the benefits of contact with nature equitably is an important part of the fight for environmental justice.

This report evaluates 4 alternatives that have the potential to meaningfully expand access to green space and its associated benefits to underserved communities. They are:

1. Utilizing Land and Water Conservation Fund state grants,
2. Developing of environmental impact bonds,
3. Converting brownfields, and
4. Creating slow streets.

These alternatives are evaluated on the criteria of political feasibility, cost-effectiveness, and equity and scored on a scale of 1 to 3. This report recommends utilizing Land and Water Conservation Fund state grants to expand access to green space because it is very cost-effective, highly politically feasible, and ensures equity. Guidance for implementation is provided.

INTRODUCTION

Low-income communities and communities of color have less access to green space. Definitions of green space are context specific and vary based on the setting (*Urban Green*, 2016). Generally, green space is defined as land covered with vegetation such a trees, grass, and shrubs. It includes parks and community gardens and is often discussed in the context of greening urban areas (Environmental Protection Agency (EPA), n.d.). More nuanced definitions can incorporate blue space or water, beaches, street trees, recreational centers, natural settings, and more (*Urban Green*, 2016). For the purposes of this analysis, green space will incorporate these nuanced definitions, but only include land that is open to public access. Sufficient access to green space is defined as living less than a 10-minute walk from a natural area.

BENEFITS OF GREEN SPACE

Access to green space is associated with multiple mental, physical, social, economic, and environmental benefits. All of these benefits can be direct or indirect and are all interconnected.

MENTAL HEALTH BENEFITS

Four in five Americans live in urban areas (Frumkin et al., 2017), and the average person spends 90% of their life inside (Evans & McCoy, 1998). Urban settings increase risk of depression and negative mental health outcomes (Tsai et al., 2018). Studies conducted in multiple countries found that access to green space is positively associated with better mental health, reduced symptoms of anxiety and depression, and lower levels of stress across all demographics. For children, access to green space can improve cognitive and behavioral development and reduce rates of ADHD (*Urban Green*, 2016). A study conducted in Denmark with over 1 million participants found that childhood exposure to green space reduces risk of developing psychiatric disorders later in life by as much as 55% (Engemann, 2019). Green spaces provide psychological ecosystem services. For hundreds of years, researchers have concluded that humans have an innate and evolutionary connection to nature, meaning that access to nature is essential to well-being. Two theories explain how green space reduces stress and both are based on the notion that humans need contact with nature (Bratman, Daily & Hamilton, 2012).

The Stress Recovery Theory (SRT) proposes that contact with nature can reduce physiological stress (Frumkin et al., 2017). Nature triggers the parasympathetic nervous system resulting in a more positive emotional state (*Urban Green*, 2016). R.S. Ulrich has conducted multiple studies on SRT. In 1984, he found that patients had shorter post-operative hospital stays when in a room that had a window overlooking a natural scene than in a room with a window overlooking a brick wall (Ulrich, 1984). Additionally, studies have shown that stressed participants' cortisol levels, blood pressure and heart rates were lower when in nature than in urban settings (Bratman, Daily & Hamilton, 2012).

The Attention Restoration Theory developed by Kaplan and Kaplan posits that nature provides relief from direct attention fatigue caused by focused concentration for an extended period of time (Kaplan, R. & Kaplan, S., 1989). Nature provides stimulation that is innately interesting, triggering involuntary attention and allowing for restoration of cognitive functioning. Multiple studies have shown that people do better on cognitively taxing tests when given contact with nature before taking the test (Bratman, Daily & Hamilton, 2012).

These theories work together to explain the benefits that green spaces have on mental health. Access to green space reduces stress, lowers cortisol levels, and alleviates symptoms of depression (*Urban Green*, 2016).

PHYSICAL HEALTH BENEFITS

The World Health Organization (WHO) has identified physical inactivity and obesity as the fourth and fifth greatest global risks of mortality respectively (*Global health*, 2009). In the United States, less than one-third of youth and less than half of adults meet the Federal aerobic physical activity guidelines (Wen et al., 2013). Studies have shown that increased physical activity in children and adults is positively associated with access to green space. Conversely, lack of parks and high traffic decreases physical activity. Exercise in green space has more restorative benefits and can improve mental health. Access to green space can provoke a behavioral change, increasing physical activity over time and at sustained levels (*Urban Green*, 2016).

Contact with green space reduces stress levels and offers opportunities for exercise and recreation, providing an avenue for combatting many chronic illnesses such as, obesity, type II diabetes, cardiovascular disease, respiratory problems, osteoporosis, and cancer, which are often the result of chronic stress and lack of exercise. Twohig-Bennett & Jones conducted a systematic review of studies on the health benefits of green space and found that contact with nature consistently reduces blood pressure, heart rate, concentrations of cortisol, cholesterol, and muscle tension and increases parasympathetic nerve activity. They also found that access to green space reduces instances of stroke, preterm births, hypertension, type II diabetes, all-cause mortality, and asthma (Twohig-Bennett & Jones, 2018). Being active reduces instances of chronic illnesses and mortality and improves the population's health outcomes. This decreases costs of healthcare and increases workforce productivity (*Urban Green*, 2016).

Access to green space can improve immune function through contact with natural microbial and antigens. Additionally, reduced stress improves immune functioning (Frumkin et al., 2017). Studies conducted in Japan found that visiting forests can result in the expression of anti-cancer proteins and increase natural killer cells (Li et al., 2008). Children exposed to nature in their first year of life are less likely to have allergies (*Urban Green*, 2016).

Natural light provided by green spaces has a positive impact on sleep. Sleep deprivation is linked to multiple poor health outcomes, including heart disease and dementia. A study conducted by

Grigsby-Toussaint et al. found that those living near green space reported higher levels of sufficient sleep (Grigsby-Toussaint et al., 2015).

Access to green space has a positive impact on the physical health of individuals and can improve societal health metrics and outcomes.

SOCIAL BENEFITS

Social cohesion and capital refer to the sense of connection and community individuals feel towards each other. Strong social cohesion promotes good health and well-being (Jennings & Bamkole, 2019), while social isolation is a predictor of mortality (Pantell et al., 2013). Green space provides a place for people to interact and forge these bonds. Multiple studies have found that urban green space is perceived to stimulate social interactions and be a place for social gatherings. The greater an individual's perception of social cohesion in his or her community, the more he or she will engage in activities that have positive health benefits, such as walking, biking, recreational sports, community gardening, or letting children engage in outdoor play (Jennings & Bamkole, 2019). A study conducted in the Netherlands found that residents who lived farther from green space reported feelings of loneliness and lack of social support more frequently than those who lived closer to green space (Maas et al., 2009). Green space can have the opposite effect if it is perceived as unsafe. However, generally, with proper maintenance and management, green space provides areas for community members to gather and build social cohesion, exposing them to the associated benefits (*Urban Green*, 2016).

ECONOMIC BENEFITS

The Trust for Public Land found that for every $1 invested in land conservation in the United States, there is a return of $4 to $11. There are a variety of economic benefits associated with increasing or introducing green space. Green space raises property values and attracts developers. Higher taxes on these properties can be used to maintain the park or pay for its acquisition. Green space can be a tool for economic development and create jobs while attracting businesses, residents, and tourists. Green space reduces the annual cost of municipal services, such as waste collection, emergency response services, and utilities (Kastelic, 2014). Introduction of green space in disadvantaged areas often reduces crime (*Urban Green*, 2016). It strengthens the community and improves quality of life and health outcomes. Currently, obesity and related illnesses cost society $147 billion and 300,000 premature deaths (Kastelic, 2014). Every $1 spent on parks returns $3 in health benefits alone (Rowland-Shea, 2020). The ecosystem services that green spaces provide also save cities money. In a tree's lifetime, it saves on average $62,000 in air pollution control, $37,000 in water recycling, $31,000 in oxygen production, and $31,000 in soil erosion control. A case study of the Cleveland Metroparks trails and parks conducted by the Trust for Public Land found that Cleveland's parks provide benefits totaling $855 million annually (Kastelic, 2014). While the initial acquisition and development costs of green space can be high, the cost is easily repaid in the long-term.

ENVIRONMENTAL BENEFITS

Green spaces provide important environmental benefits that offset the negative environmental impact of cities, including noise and air pollution, heat islands, and stormwater runoff.

Vegetation reduces real and perceived noise pollution. Studies conducted in India, Europe, and North America found that vegetation was very effective at reducing noise pollution from high volumes of traffic. However, the greater effect was in residents' perceived reduction in traffic noise pollution due to the presence of vegetation, which affected their emotional processing. The presence of natural sounds, such as fountains or bird song, decrease perceived noise pollution even further (*Urban Green*, 2016). Green space also reduces air pollution by trapping air pollutants (Kabisch, van den Bosch, & Lafortezza, 2017) and sequestering carbon (*Urban Green*, 2016). Carbon sequestration helps mitigate climate change.

Heat is the number one weather-related killer in the United States (Donegan, 2019). Urban areas can be 1-6 degrees hotter than surrounding non-urban areas; an effect known as the Urban Heat Island Effect (Aram et al., 2019). Urban heat islands occur when vegetation is replaced with heat retaining, impervious surfaces, and due to climate change, cities can expect to see more heat waves that last longer. Heat islands increase energy costs and air pollution levels (*Reduce Urban*, 2015). Heat is associated with increased morbidity and mortality rates. Parks can decrease heat by about 1 degree Celsius and sustain this effect for about one kilometer outside of the park boundary. Trees and vegetation provide shade that reduce heat and the need for energy using air conditioning (*Urban Green*, 2016). Surfaces in the shade can be as much as 45 degrees Fahrenheit cooler than surfaces in the sun (*Using Trees*, 2014). The EPA recommends building green infrastructure as the best way to combat urban heat islands (*Reduce Urban*, 2015).

Green space and reduction of impervious surfaces reduces stormwater runoff and flooding. Stormwater runoff occurs when impervious surfaces, such as parking lots or rooftops, do not allow rain water to be absorbed into the ground. The runoff collects pollutants and transports them to natural water systems, hurting ecosystems. Stormwater runoff also increases flooding and erosion, resulting in property damage and destruction of habitats ("Trees and," 2017). Green space helps facilitate the natural rain cycle of infiltration, evaporation, and transpiration (*Soak Up*, 2015). Green space captures stormwater runoff and removes pollutants (Denchak, 2019).

Finally, exposure to green space, especially during childhood, can induce pro-environmental behavior, prompting people to change their behavior in ways that mitigate the effects of climate change (*Urban Green*, 2016).

COSTS OF GREEN SPACE

While the benefits largely outweigh the costs, there are potential risks associated with introducing green space. Green space increases risk of insect-borne diseases and pollen as an allergen (Shanahan

et al., 2015). While exposure to allergens in children helps reduce rates of allergies and asthma, adults already suffering from pollen allergies or asthma may be negatively affected by increased green space. If not designed correctly, urban street trees on busy roads can trap airborne pollutants emitted from vehicles. Green space can increase individuals' exposure to pesticides and herbicides. Excessive exposure to UV radiation without proper protection increases risk of skin cancer. Finally, physical activity encouraged by green space can lead to accidental injuries, especially in children using playground equipment (*Urban Green*, 2016).

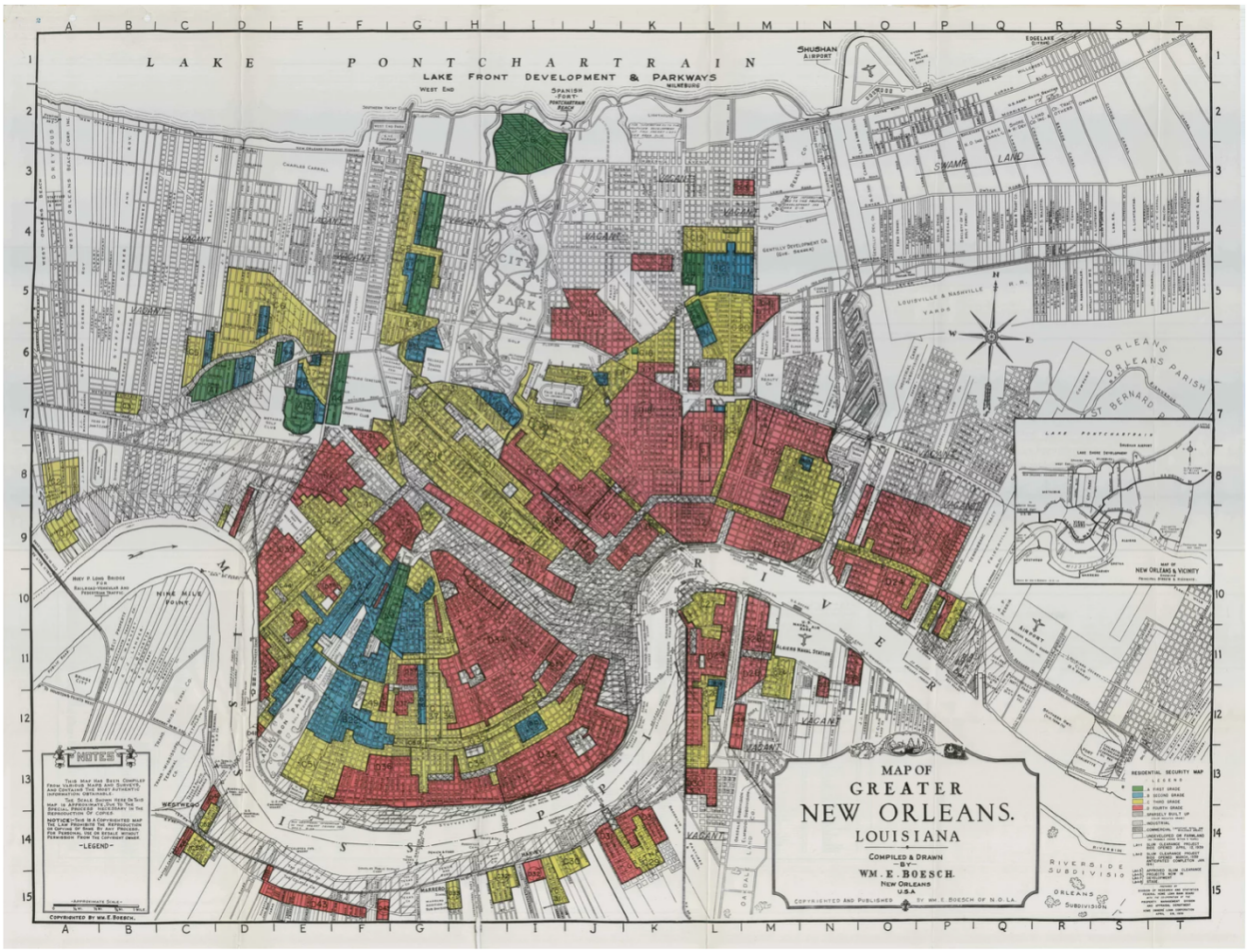
ACCESS TO GREEN SPACE

Although the benefits of green space are many, 1 in 3 Americans or 100 million people do not live within a 10-minute walk of green space and therefore, do not see its benefits (*The Heat*, n.d.). Access to green space is limited and unequally distributed across race and socioeconomic status with communities of color being 3 times more likely to live in nature deprived areas and 70% of low-income communities living in nature deprived areas (Rowland-Shea, 2020).

HISTORICAL ROOTS OF DISPARATE ACCESS

Racist housing and urban planning policies such as redlining and segregation are largely responsible for the racial and socioeconomic disparities in access to green space seen today. Beginning in the early 20th century, soon after enslaved laborers were freed, covenants, or racially-restrictive deeds, were embedded in property deeds ("What are Covenants?," 2020). These covenants specified that sale of desirable property to any non-White person was prohibited. For example, a common deed in Minneapolis reads, "premises shall not at any time be conveyed, mortgaged or leased to any person or persons of Chinese, Japanese, Moorish, Turkish, Negro, Mongolian or African blood or descent." For decades, covenants were used to push non-White individuals to smaller, undesirable areas of cities and communities ("What are Covenants?," 2020). Investments were then focused on the White communities in a process known as redlining. In the 1930's under the New Deal, the Federal government affirmed and reinforced this racial segregation. In an effort to confront the housing shortage, the Federal Housing Administration was established and subsidized the development of subdivisions for Whites, while simultaneously refusing to insure mortgages for African American neighborhoods (Gross, 2017). Areas were classified on a scale of A-D with Grade A areas being desirable, exclusively for Whites, and solid investments and Grade D areas being undesirable, exclusively for communities of color, and risky investments (Borunda, 2020). These areas that were too "risky" to insure were denoted in red on the maps as seen below in Figure 1.

Figure 1: Redlining depicted in the City of New Orleans. (Mapping Inequity, n.d.)



The original HOLC map of New Orleans.

Mapping Inequality

These redlined communities were excluded from investments. Meanwhile, the White neighborhoods received investment in infrastructure such as roads, parks, and electrical grids that raised their property values. In 1968, Congress passed the Fair Housing Act and made redlining and covenants illegal. However, by that time, the property values were so high that the majority of African Americans were unable to purchase homes in the neighborhoods from which they were previously excluded. African Americans and people of color were excluded from the opportunity to build generational wealth. Because homeownership is one of the best and most common ways for American citizens to build wealth, today African American wealth is about 5% of White wealth (Gross, 2017). As a result, the racial and socioeconomic makeup of many communities remains largely unchanged. These neighborhoods, on average, have fewer, smaller, and more crowded parks and green spaces due to lack of early investment and stagnant property values. Additionally, communities of color have been targeted as sites for development of highways, landfills, natural resource extraction, and industrial plants, resulting in further destruction of limited green space and numerous health problems ("What are Covenants?," 2020).

DISPARITIES IN ACCESS TODAY

On average, Black, Indigenous, and people of color (BIPOC) and low-income individuals have less access to green space, are exposed to higher levels of pollution and heat, and are more likely to be excluded from the conservation space than their White counterparts. This restriction of access in low-income and minority communities, resulting in exclusion from the many benefits of green space and overexposure to the health risks and harms associated with lack of green space, has been named environmental injustice.

The COVID-19 pandemic has made the racial and socioeconomic inequality in access to green space especially apparent as citizens are encouraged to engage in outdoor activities because indoor activities are not safe (Shukla, 2020). On average in the United States, parks that serve majority White neighborhoods are twice as large and five times less crowded than parks serving non-White majority neighborhoods. Findings are similar across socioeconomic lines. Parks in low-income communities are four times smaller and four times more crowded than parks in high-income neighborhoods (*The Heat*, n.d.). Access to green space is positively associated with high income and education (Nesbitt et al., 2019). New York provides a good case study of these racial and socioeconomic disparities in access to green space. In New York, the average park size for poor and wealthy neighborhoods is 6.4 acres and 14 acres respectively. The average park size in predominantly Black neighborhoods is 7.9 acres as opposed to 29.8 acres in predominantly White neighborhoods (Shukla, 2020).

Figure 2: Access to Green Space by Race (Rowland-Shea et al., 2020)

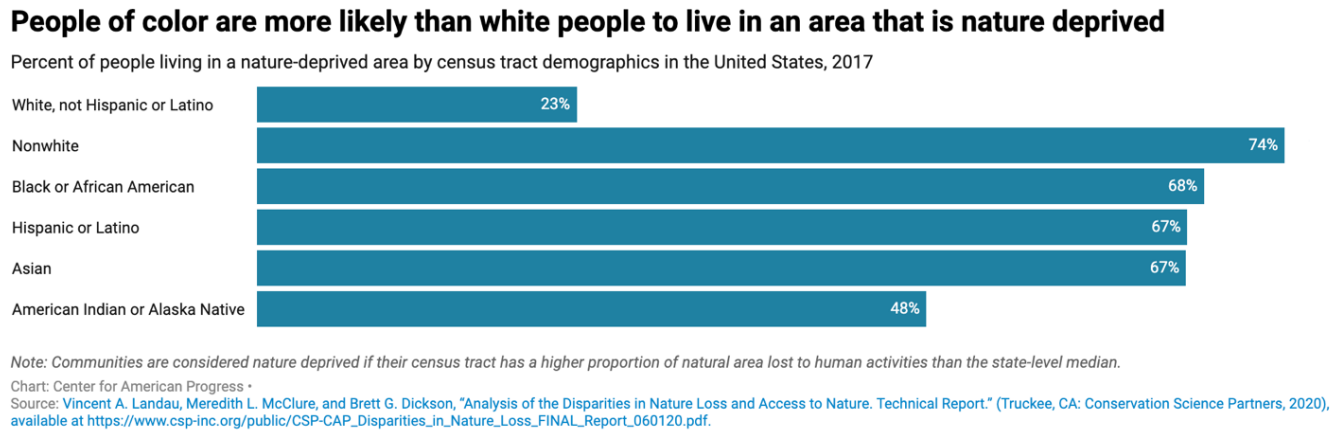
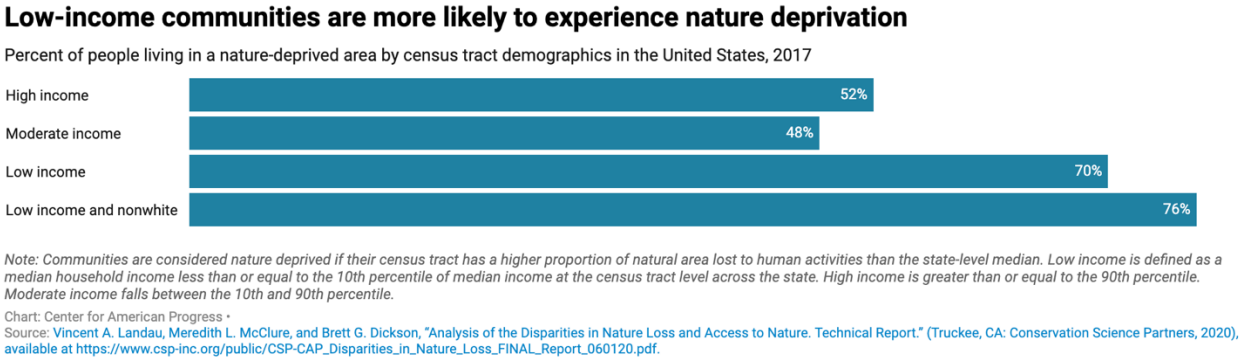


Figure 3: Access to Green Space by Income (Rowland-Shea et al., 2020)



Not only do wealthier neighborhoods have better access to green space, they also have greater diversity of green space available to them (Park & Guldmann, 2020). Meanwhile, poor communities and communities of color are more likely to be located near highways, landfills, and toxic waste sites, resulting in higher pollution and heat exposure. Researchers at the University of Minnesota found that on average, minorities are exposed to 38% higher levels of nitrogen dioxide, a pollutant linked to asthma and heart attacks. This exposure causes approximately 7,000 deaths a year (Badger, 2014). Fine particulate matter pollution is the top environmental health risk factor in the United States and exposure is unequal. White people have a pollution advantage as they are exposed to 17% less fine particulate matter pollution than they produce through their consumption. Black and Hispanic people experience a pollution burden. Black people are exposed to 56% more fine particulate matter pollution than they produce and Hispanic people are exposed to 63% more (Tessum et al., 2019). These communities are also more likely to have higher heat exposure. In 94% of cities, historically redlined areas are the hottest region, with surface temperatures reaching levels as much as 7 degrees Celsius higher than non-redlined areas largely due to greater instances of impervious surfaces and less tree and vegetation cover (Hoffman, et al. 2020). One study found that Black people were 52% more likely, Asian people were 32% more likely, and Hispanic people were 21% more likely to live in heat-risk related areas than their White counterparts (Jesdale et al., 2013). Environmental injustice is pervasive and its effects are large; however, countering environmental injustice is made difficult due to the historic exclusion of people of color from the environmental space.

BIPOC individuals have been excluded from environmental and conservation conversations and many have been made to feel unsafe while taking advantage of public green spaces. The majority of employees at environmental organizations are White. Only 3% of environmental science degrees in 2017 went to Black individuals (Bortfeld, 2020). In a comprehensive study examining conservation and preservation organizations, government environmental agencies, and environmental grantmaking foundations, Dr. Taylor found that minority presence on boards or in the workforce of all three environmental institutions does not exceed 16%, and minorities make up only 12% of leadership positions in environmental organizations. Members and volunteers of the organizations are primarily White (Taylor, 2014). Additionally, when attempting to use public green space, BIPOC individuals often feel unsafe as they experience discrimination and threats. In February 2020,

Ahmaud Arbery, a black man, was murdered while running on a tree-lined street in Georgia (McLaughlin, 2020). In May of 2020, Amy Cooper, a White woman, called the police and falsely reported that Christian Cooper, a Black birdwatcher, had threatened her after he asked her to put her dog on a leash (Booker, 2021). Instances like these are common, leading many BIPOC individuals to disengage with green space. Lack of diversity in environmental organizations inhibits the ability of these organizations to fight for environmental justice and make green spaces accessible and safe for all.

Access to green space is necessary for the health, well-being, and prosperity of all communities and individuals in the United States. Policy must be created to ensure that the multiple benefits that green space offers are equitably distributed across racial and socioeconomic lines. This analysis explores four policy alternatives and evaluates them on the criteria of cost-effectiveness, political feasibility, and equity.

CRITERIA

Criteria will be ranked on a scale of 1 to 3 with 3 being the best and 1 being the worst performance in that category.

POLITICAL FEASIBILITY

The Nature Conservancy is a non-partisan nongovernmental organization. It is very important to TNC that the alternatives be politically feasible while also enabling them to maintain their non-partisan stance.

In order to evaluate political feasibility, states or localities where the alternative has been enacted will be examined to judge how easily the alternative passed and what the political ideology of the community was upon passage. While the political ideology and therefore political feasibility of each alternative will vary by state and municipality, communities should be able to extrapolate the likelihood of passage in their community. If the alternative has passed in multiple municipalities of differing political ideologies, it will be considered to have high political feasibility (3). If the alternative has only been enacted in municipalities of the same political ideology, then it will have low political feasibility (1).

COST-EFFECTIVENESS

Cost-effectiveness is measured as the cost per acquisition of one acre of green space under the alternative. This measure was calculated by finding data on the costs of completion and acres conserved across projects completed using the different alternatives. For each alternative, the average cost of projects over time was divided by the average number of acres conserved to find the cost per acre. The cost of each project varies depending on scale and target, which is why the cost is averaged across multiple projects in multiple municipalities. The benefits of expanding access by one

acre of land remain stable. Therefore, the cost of expanding access by one acre is a good measure of how well the alternative is able effectively expand access nationwide.

Cost will be a huge determinant of whether the project is passed and completed. The Nature Conservancy is accustomed to working with budget constrained governments and is always looking for creative ways to fund projects. The cost of a given alternative is especially important now during the COVID-19 pandemic that has sapped local and state budgets.

The alternative must effectively expand access to green space in low-income and minority communities and positively affect their quality of life. It is important to The Nature Conservancy that the effectiveness of the alternative is evaluated before they spend time, money, and resources passing and implementing the alternative. Because all of the alternatives have been implemented in at least one municipality, quantitative data from municipalities and qualitative data from community members is available on how well green space was expanded, its impact on the community, and what criticisms and commendations individuals have about the alternative.

EQUITY

Ensuring that the expansion of green space is equitable is essential. The Nature Conservancy is committed to environmental justice, making the environmental field more diverse, and ensuring that their work benefits underserved communities.

I will evaluate equity based on how well the alternatives expand access to minority and low-income communities. Alternatives will receive a lower equity score if they have the potential to gentrify areas. They will receive a higher score if they meaningfully involve community members in the planning and management process.

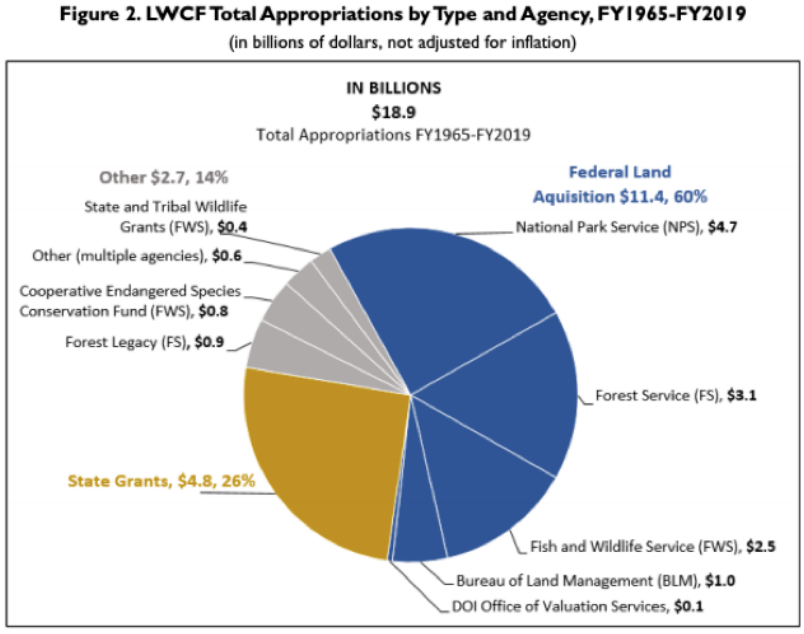
ALTERNATIVES

ALTERNATIVE 1: USE LAND AND WATER CONSERVATION FUND STATE GRANTS MORE EFFECTIVELY

"The Land and Water Conservation Fund was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard our natural areas, water resources and cultural heritage, and to provide recreation opportunities to all Americans" (Department of the Interior (DOI), 2015). The LWCF Act set up a trust fund in the U.S. Treasury that accumulated revenue primarily from oil and gas leasing in the Outer Continental Shelf (OCS) (Vincent, 2019). The John D. Dingell Jr. Conservation, Management, and Recreation Act of 2019 permanently authorized funding of $900 million annually to LWCF (P.L. 116-9, 2019). From 1964-2019, the $900 million was distributed through discretionary appropriations. The Great American Outdoors Act passed in August 2020 made appropriations mandatory (P.L. 116-152, 2020). Since 1965, the fund has contributed $18.9 billion dollars to projects that strengthen outdoor recreation (Vincent, 2019).

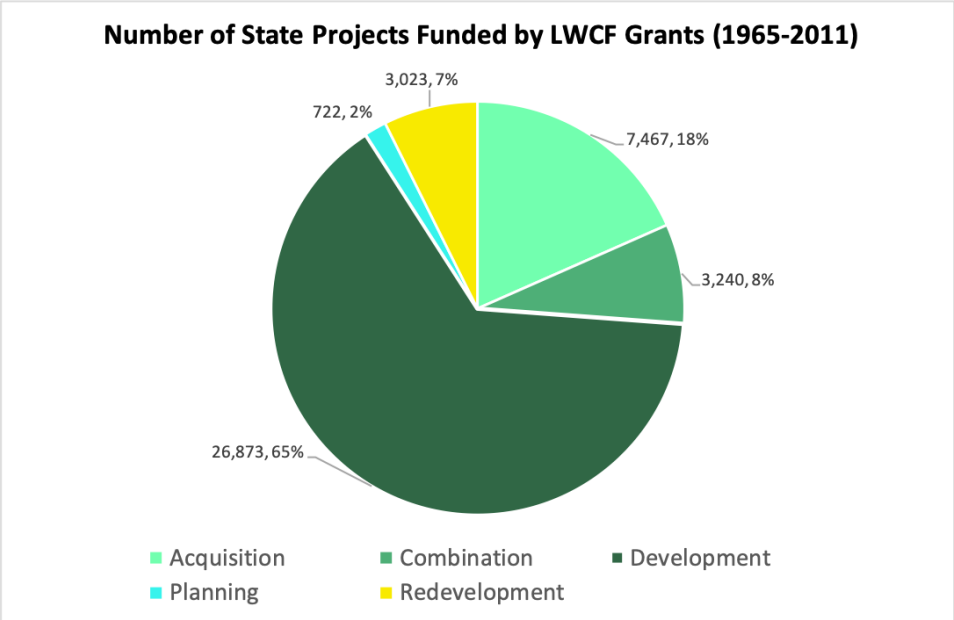
The fund was supposed to be divided so that 40% of the annual funding went to federal land acquisition, 40% went to state grant programs, and 20% was left for other purposes (P.L. 116-9, 2019). However, in reality, $11.4 billion (60%) has gone to federal land acquisition, $4.8 billion (26%) has gone to state grants, and $2.7 billion (14%) has gone to other purposes for a total of $18.9 billion LWCF funds appropriated. This is less than half of the $40.9 billion in total that has gone into the fund since 1965 (Vincent, 2019).

Figure 4: Distribution of LWCF Appropriations (Vincent, 2019)



98% of counties in the United States have a LWCF assisted project (DOI, 2015). States are eligible to receive traditional and competitive 50% matching grants after completing a Statewide Comprehensive Outdoor Recreation Plan (SCORP) that is a collaboration with the public and includes evaluations of the state's demand and supply of outdoor recreation and a program for implementation of their plan to expand outdoor recreation (National Parks Service (NPS), 2008). LWCF state grants are matching grants and the state must provide 50% of the project funding. Because states must come up with 50% of the funding for any project, the majority of projects develop or maintain outdoor recreation centers. It is difficult for states to come up with the funding required to accomplish large projects, so the 40% allocated to states often goes unused. From 2000-2019, on average less that 20% of appropriations went to states with total appropriations never reaching 40% in any year (Vincent, 2019).

Figure 5: Distribution of Projects Completed Using LWCF Funds (Alcorn, 2011)



In 2014, the National Parks Service established the Outdoor Recreation Legacy Partnership Program which provides grants for outdoor recreation in urban areas with populations of 50,000 people or more (Olson, 2016). NPS determines priority by assessing the economic disadvantage and restricted access to green space present in the communities. A good project aims to increase jobs and access to outdoor recreation through public-private partnership (LWCF Coalition, n.d.). The federal government has matched $70 million for a total of $140 million invested in ORLP projects (Eldridge, Burrowes, & Spauster, 2019). Since its inception in 2014, ORLP has grown exponentially. In 2015, ORLP awarded $2.9 million to 8 projects (Lindholm, 2019). In 2020, it awarded $40 million to 50 projects (DOI, 2020). LWCF offers large sums of money with an explicit focus on expanding access to outdoor recreation and green space.

POLITICAL FEASIBILITY = 3

LWCF is a traditionally bipartisan Act and has been since its inception in 1965. The Great American Outdoors Act passed the House with 74% of the vote in July of 2020 (*H.R. 1957,* n.d.). On February 11, 2021, the Department of the Interior released Secretary's Order No. 3396, rescinding S.O. 3388, which inhibited availability of LWCF funds to state assistance programs and Federal land acquisition. S.O. 3396 promises to revise guidance for LWCF expenditures and the National Parks LWCF Manual as well as implement ORLP and State assistance programs (S.O. 3396, 2021). The Biden-Harris administration has been vocally supportive of environmental policy plans, including LWCF. Additionally, 98% of counties in the United States have completed an LWCF assisted projects, encompassing all political ideologies. Strong, bipartisan support at the Federal, State, and Local level gives this alternative a 3 for political feasibility.

COST-EFFECTIVENESS = 2

Every dollar state or local governments spend on an LWCF project, the Federal Government matches. In other words, for every dollar state or local governments spend, the effectiveness is doubled. Narrowing the focus to ORLP, the current ceiling for a project is $1 million and the project must expand access to underserved communities. All of the direct costs should be included in the $1 million (that will be doubled to $2 million). This cost could be lower if the project cost is lower. Additionally, ORLP encourages public-private partnership so there is potential that a private entity could assist with costs. For the purpose of this analysis, costs will be measured at the ceiling of $1 million.

Calculations were completed using previous ORLP project awards and plan. It costs roughly $10,600 to acquire 1 acre of urban green space under this program (NPS, 2019). $2,000,000/10,600 = 188.68 acres. Cost-effectiveness = $1 million (cost to city/state)/188.68 acres = $5,299.98 per acre.

EQUITY = 3

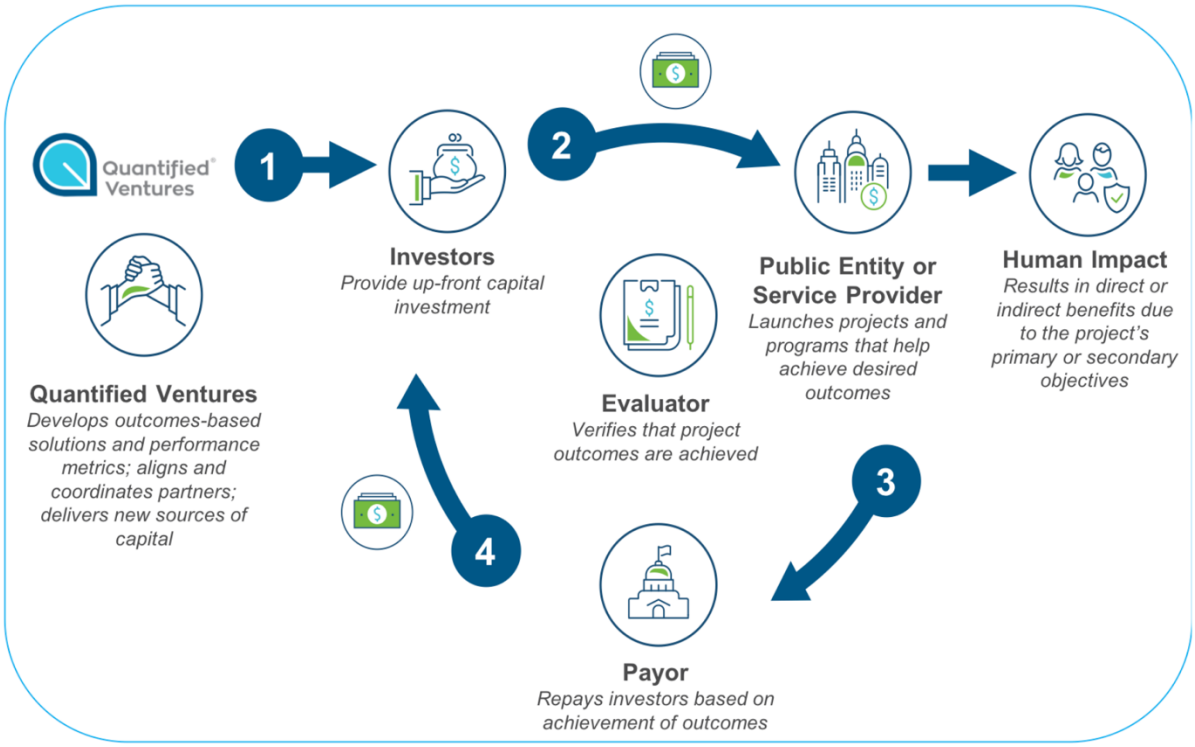
The SCORP must include public participation in its creation. States must conduct an Open Project Selection Process that ensures that there is public knowledge of LWCF grants available and their selection process and "Assure(s) the distribution of LWCF assistance is accomplished in a non-discriminatory manner, especially with regard to minority, elderly, disabled, and other underserved populations and ensure a fair and equitable evaluation of all applications for LWCF assistance" (NPS, 2008). Additionally, ORLP grants can only be obtained for underserved communities that traditionally lack access to green space and outdoor recreation due to their placement in cities. Due to this explicit focus, this alternative scored a 3 on equity.

ALTERNATIVE 2: DEVELOP ENVIRONMENTAL IMPACT BONDS

Environmental Impact Bonds (EIB's) employ a pay-for-success model to finance large-scale, risky environmental projects (Quantified Ventures, 2018). EIBs partner cities with private or public investors to help fund these projects and share the risk (Lewis, 2019). EIB's put a price on the project outcome's benefits, and then independent evaluators work with the municipality to evaluate the measurable outcomes the two parties agreed upon (*Environmental Impact,* 2018). In order to receive an EIB, the projects must be large, innovative and cost over $5 million (Thompson, 2020). EIB's allow investors to back a risky environmental project and their return on investment is based on the success of the desired environmental outcome. If the project underperforms, the investors pay a risk share payment, giving the city funds to try something new. If the project performs as expected, the city pays the investor the bond's set rate of return. If the project overperforms, investors receive an outcome payment with the understanding being that the project will save money in the long-run (Thompson, 2020). If the projects are successful, they provide empirical evidence and a model for other cities to follow. EIB's provide large amounts of capital quickly to municipalities under budget or bureaucratic constraints. Environmental impact bonds allow

municipalities to address the urgency of climate change and its effects on their communities while protecting taxpayer dollars and public budgets (Quantified Ventures, 2018).

Figure 6: How EIB's Work (Quantified Ventures, 2018)



The first EIB was created by DC Water and funded by Goldman Sachs and Calvert Impact Capital. The bond, like all EIB's so far, was structured by Quantified Ventures. The goal of the project was to use green infrastructure to completely redesign DC Water treatment facility in order to prevent the 2 billion gallons of sewage that flows from DC into the Chesapeake Bay annually. No city had ever used green infrastructure at this large of a scale, which is why DC partnered with private investors to take on the risk (Quantified Ventures, 2018). More cities are partnering with Quantified Ventures to design EIB's that will increase green infrastructure, protect against climate change, and advance environmental justice (Brey, 2019).

Every environmental impact bond awarded as of now has been used to expand green infrastructure projects to prevent stormwater runoff. Green infrastructure includes permeable pavements, bioswales, raingardens, planter boxes, urban trees, natural areas (such as parks), and green roofs (*Proctor Creek*, 2020). These large-scale green infrastructure projects have environmental, economic, social, and infrastructure benefits, including increased access to green space for underserved communities (Behrend et al., 2019). In Baltimore, they are focusing the projects in underserved communities lacking green space (*Environmental Impact,* 2018). Atlanta's bond seeks to restore the Proctor Creek Watershed (Behrend et al., 2019), an area declared impaired by the EPA ("Urban

Waters," 2014). The pollution and associated flooding of Proctor Creek has caused housing and health problems to underserved communities living in the area, resulting in economic distress (Lewis, 2019). All of the EIB's currently created have been used to expand green infrastructure in underserved communities. The Nature Conservancy has already funded research into EIB's, so they are familiar with the alternative and have the knowledge to expand the alternative and apply it to more municipalities (*Financing resilient*, 2018).

EIB's require large plans and investors. While this allows cities to tackle big problems and confront systemic environmental failures and injustice, it also excludes smaller cities and projects. Additionally, for some cities, finding investors could prove difficult. Cities that house big corporations are becoming eager to give back, but those lacking corporations might struggle to find readily available investors.

POLITICAL FEASIBILITY = 1

Environmental impact bonds scored low on political feasibility. They are very new with the first occurring in 2016. EIB's, by nature, are risky projects. While the bond ensures that the city does not have to provide the capital upfront and that they only have to pay if the project performs well, the projects themselves are new and innovative and the city is enacting a systemic structural overhaul using a solution that has not been proven on such a wide scale. Finally, EIB's have only been adopted by liberal cities. The mayors of Washington D.C., Atlanta, and Baltimore are democrats and their constituents are largely democratic as well. While the projects conducted using the EIB's could be replicated in other municipalities after research, it is unlikely that non-liberal cities will use EIB's until more cities have adopted them.

COST-EFFECTIVENESS = 3

The project must cost at least $5 million. EIB's are relatively new so this analysis will look at the three most prominent ones. DC Water, the first EIB in the United States, spent $25 million ("DC Water's," 2017). for 498 acres of green infrastructure (*Clean Rivers,* n.d.). Atlanta acquired a $14 million (Lewis, 2019) bond for green infrastructure on 10,100 acres (*Proctor Creek*, 2020). Baltimore acquired a $6.2 million bond for green infrastructure on 4,000 acres (*Environmental Impact,* 2018). The average of these is $45.2 million/14,598 acres is $3,096 per acre.

EQUITY = 2

EIBs receive a score of 2 for equity because while every EIB created so far has meaningfully increased green space access and economic benefits to underserved communities, that is not their express purpose. In the future, EIB's could be designed without assisting underserved communities. However, if the purpose of the EIB is to help underserved communities, they can achieve large, sustainable, and systemic projects that have environmental, social, health, and economic benefits.

ALTERNATIVE 3: CONVERT BROWNFIELDS

The EPA defines brownfields as, "a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." There are at least 450,000 brownfields in the United States ("Overview of," 2014). Examples of brownfields include old factories, waste-dumping sites, and abandoned buildings and parking lots (*Converting brownfields,* 2019). Brownfields lower the value of surrounding properties in the community, and if they are contaminated, can result in negative health outcomes for residents ("Anatomy of," 2019).

Brownfields most commonly exist in densely populated urban areas that often lack access to green space ("Brownfields to," n.d.). When a brownfield is converted into a greenfield, benefits include neighborhood revitalization, improved health outcomes, environmental benefits, increased access to green space ("Brownfields to," n.d.), increased local tax base, and job creation. Conversion improves quality of life, increases access to green space, and removes contaminated, polluting properties that hurt both the economic value of the community and the physical well-being of its residents (Siikamäki & Wernstedt, 2008). The EPA offers a variety of grants to assist with everything from preparing a plan of conversion, to cleaning the brownfields, to environmental job training ("Smart Growth," 2014). The EPA's Brownfield Program provides seven different types of grants to assist with the entire process of converting brownfields, including assessment, clean-up, and job development. In the program's twenty-six years of existence, the EPA has seen projects leverage $20.13 for every EPA dollar spent, 170,724 jobs created, a 5% - 15.2% increase in property value near the brownfield sites, and an increase in local tax revenues ("Overview of," 2014).

Because these sites are often contaminated and the community has a negative perception of them, deciding who is liable for the site and changing the public's mind about its use are the most difficult challenges (*Converting brownfields,* 2019). Municipalities are more likely to convert brownfields if the state government assumes some of the liability. Additionally, including the surrounding community in the conversion process is essential to gaining public trust. Finally, converting brownfields into green space raises property values in the surrounding areas. Governments must ensure that the rise in value does not drive out current residents (Siikamäki & Wernstedt, 2008).

POLITICAL FEASIBILITY = 2

Federally, brownfield conversion is very politically feasible. In 2001, H.R. 2869 incorporated the "Brownfields Revitalization and Environmental Restoration Act of 2001" and passed the House by voice vote and the Senate by unanimous consent ("Summary of," 2014). The 2018 Brownfields Utilization Investment and Local Development Act which reauthorized the EPA's Brownfields Program passed with 67% of the vote in the Senate with 39 Democrats and 25 Republicans voting Yea (*H.R. 1625,* 2018). Brownfield conversion is a bipartisan issue on the federal level, and the EPA Brownfields Program is very active. However, this alternative scored a 2 because brownfield conversion is less politically feasible at the state and local level. The liability associated with

developing a property that potentially contains hazardous substances is high. Much of the EPA's program and grants go towards assessing the level of contamination at the site and educating the community on environmental liability defenses ("Brownfields and," 2020). This assessment takes a long time and often the public's view of the site is negative. Cities and localities must agree to take on a lot of time and risk in order to convert brownfields.

COST-EFFECTIVENESS = 1

Brownfields can often be purchased at a reduced cost due to the risk they present by being contaminated. However, the cost of conversion and development of these contaminated properties is often high. According to the EPA, they have spent $1,711,972,180.82 on 140,919 acres ("Brownfields Program," 2020). $1,711,972,180.82/140,919 acres is $12,148.63 per acre.

EQUITY = 2

Underserved communities are far more likely to live near brownfields. Revitalization of these sites can provide many social, economic, and health benefits to these communities. However, there is also the risk of gentrification pushing out these underserved communities. Brownfields can be very equitable if the community is consulted throughout the process and the space is intended to increase access to green space, jobs, and economic opportunities for that community. However, often the city will not consult the local community and sell the property to private developers, which further increases the risk of gentrification. Finally, while brownfields conversion usually increases green space and green infrastructure, that is not its sole purpose, and they can be converted into new developments.

ALTERNATIVE 4: CREATE SLOW STREETS

The creation of slow streets boomed during the early months of the pandemic as governments tried to find safe activities for their communities to engage in while social distancing. At their most basic, slow streets involve blocking off street segments to cars to allow for people to use that space to bike, walk, run, eat, play, or exercise (Fermoso, 2020). Slow streets allow for the introduction of green space in the middle of cities, improving air quality, reducing emissions and heat, promoting exercise, and benefiting mental and physical health (Glandorf, 2020). The most radical example of this transition is Paris's plan to convert the Champs-Élysées to an "extraordinary garden" (Pires, 2021). This more elaborate green street proposes turning streets into mini-parks and outdoor recreation areas. Slow streets enable cities to expand green space and access without having to acquire land, making it easier to serve low-income and minority communities. Slow streets in Oakland now comprise 10% of the city's streets or 74 miles (Glandorf, 2020).

The permanent existence and expansion of slow streets will depend on continued community support after the pandemic ends and financing by cities with tight budgets. Additionally, if marginalized communities are not included in the design of slow streets, they can be overlooked or

face gentrification. City planners who do not take the time to consult with these communities will lose their support (Bliss, 2021).

POLITICAL FEASIBILITY = 3

Slow streets have high political feasibility. They received a lot of positive attention and press in the early months of the pandemic. Oakland's program was featured favorably in *The New York Times, The Washington Post, The Guardian, Forbes,* and more (Fermoso, 2020). The closure of streets polled favorably with the majority of constituents in cities that implemented them. In D.C., over three quarters of survey respondents approved of slow streets. Although, there have been instances in Baltimore and D.C. of people crashing into or removing light-weight barricades, the majority of people and cities approve of the initiative (Solomon, 2020). In many cities, there were demands to increase the number of slow streets (Bliss, 2021). Finally, slow streets are bureaucratically and administratively easy to implement. Because the city owns the streets and putting up barricades or signs is not costly, it is very easy for municipalities to temporarily close or restrict traffic on streets.

COST-EFFECTIVENESS = 3

The City of Oakland has been widely recognized for its expansive slow streets program that it rolled out during the pandemic. Oakland was used as a model for other cities and therefore, provides a good case study for the evaluation of slow streets' cost-effectiveness. As of September 2020, the city had spent $160,000 (Fermoso, 2020) on the program to make 21 miles of slow streets. 21 miles is 13,440 acres (Patton et al., 2020). $160,000/13,440 acres is $11.90 per acre.

EQUITY = 2

Slow streets have the potential to be very equitable. Because they do not involve acquiring land, slow streets can be easily implemented in any area, including underserved areas. However, slow streets are only equitable if the communities impacted are involved in their planning from the very beginning and are given ways to meaningfully contribute and offer feedback. In an effort to curb the spread of the coronavirus before major holidays or lifted restrictions, many cities quickly shut down streets to address the urgency of the situation and asked for feedback later (Fermoso, 2020). In Oakland, city officials realized that their initiative was only reaching wealthy, White citizens. Upon reaching out to majority Black and Latinx communities, they found that those residents felt resentful that they had not been consulted. They were confused as to what the purpose of the slow streets were, and they felt as though the initiative was not meeting their needs (Fermoso, 2020). Upon hearing this, Oakland met with neighborhood groups and community-based advocacy organizations, stopped choosing slow streets and instead partnered with the community to make them, and added the essential places program which improved traffic safety at health clinics, grocery stores, and COVID testing sites (Patton et al., 2020). Slow streets can be extremely equitable if the municipality partners with the community to create them.

OUTCOMES MATRIX

The matrix below shows how all of the alternatives scored on each of the criteria and gives the total score out of the maximum of 9.

	Political Feasibility	Cost-effectiveness	Equity	Total
LWCF	3	2	3	**8**
EIB	1	3	2	**6**
Brownfield Conversion	2	1	2	**5**
Slow Streets	3	3	2	**8**

RECOMMENDATION

This report recommends using Land and Water Conservation Fund State Grants to increase access to green space in underserved communities. LWCF tied with Slow Streets for the highest score on the outcomes matrix. However, this report recommends LWCF over slow streets due to its expressed focus on equity and assured increased access to green space. While slow streets are more cost-effective, they do not ensure access to green space. Shutting down streets ensures increased access to outdoor recreation and reduced pollution; however, without more money invested in landscaping and redesign, these streets do not require increase of green space. LWCF state grants are less cost-effective due to the associated cost of creation of parks, outdoor recreation, and green space. LWCF scores the highest on equity due to the Outdoor Recreation Legacy Partnership Program's explicit focus on serving low-income and minority communities and expanding green space access and outdoor recreation opportunities to these communities. This focus guarantees that this alternative will be serving the population; unlike environmental impact bonds and brownfields conversion which do not guarantee service to that population. Finally, LWCF has broad bipartisan support and has served almost every county in the United States. Permanent funding and vocal support from the current administration makes certain that if used effectively, states and municipalities can use LWCF funds to fight for environmental justice and bring environmental, social, economic, and health benefits to underserved communities.

IMPLEMENTATION

Acquiring Land and Water Conservation Fund state grants begins and ends with the Statewide Comprehensive Outdoor Recreation Plan (SCORP). States must submit their SCORP at least once every 5 years in order to be eligible for grants. However, many states' SCORPS are outdated, under-researched, and poorly planned. The best way to ensure that a state gets large grants that meaningfully expand access through a sustainable program is to adequately prepare the SCORP.

STAKEHOLDERS

Every state Governor must appoint a State Liaison Officer (SLO) to accept and administer funds and oversee the creation of the SCORP. It is also recommended that an alternate is appointed in order to assist the SLO. Local units of government and private citizens and organizations have the opportunity to contribute to the SCORP and propose projects. Nongovernmental organizations can contribute in numerous ways. NGOs can assist in the planning of the SCORP and the data collection and analysis that it needs. They can also help local governments and private organizations evaluate their status and plan projects (National Parks Service, 2008).

Many states use LWCF funds for the same purposes every year. For example, Colorado primarily uses the grants to clear trails. Reevaluation of the SCORP and proposals to change how the funds are used could upset those who traditionally get the funds. Knowing what purpose the funds traditionally serve and what organizations usually get them will be essential in proposing changes.

REQUIREMENTS

According to the National Parks Service's LWCF State Assistance Manual, "A SCORP program evaluates the demand and supply of public outdoor recreation resources throughout a State, identifies capital investment priorities for acquiring, developing, and protecting all types of outdoor recreation resources, assures continuing opportunity for local units of government and private citizens to take part in planning for statewide outdoor recreation, and coordinates all outdoor recreation programs throughout the State" (NPS, 2008).

It is essential that public participation is included in the plan. LWCF planning grants are available to assist with the creation of the SCORP. States can use these grants to conduct more sophisticated data collection and analysis, such as GIS mapping of the state.

GETTING THE FUNDS

In order to receive LWCF funds, the state must prepare the SCORP, submit projects and receive approval from the National Parks Service, and submit a request to the Federal Government to obligate apportioned funds. After Congress appropriates the funds, the Secretary of the Interior will apportion the appropriation and notify the state of their apportionment. States then have 3 years to

spend their obligation. The National Parks Service monitors each state's effectiveness at administering the program. NPS will conduct visits to state offices at least once every 3 years in an attempt to gather information, improve communication, ensure that the state is following the rules and regulations, and identify areas of improvement (NPS, 2008).

CONCLUSION

The benefits of green space and the harms associated with lack of green space are unequally distributed across racial and socioeconomic lines. Disparate access hurts the health and well-being of individuals and communities and incurs an economic cost on society. The Land and Water Conservation Fund provides an avenue for states and municipalities to meaningfully and intentionally expand access to underserved communities at reduced cost. It is essential to include the communities effected throughout every step of the process from planning to project completion. Taking the time to ensure that the SCORP is well done is incredibly important to the implementation of the mission of expanding access to green space equitably. Funding for the Land and Water Conservation Fund is permanent and constant, giving states time to plan well to ensure that the funds are used effectively and equitably. LWCF state assistant grants allow the community to identify their needs and create sustainable outdoor recreation opportunities for all at half of the price.

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