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Abstract

The Florida Communities Trust (FCT) program provides grants to local governments to preserve open space. In doing so, this program plays an important role in supporting public health. A total of 617 FCT applications submitted between 2001-2006 were examined to determine in what ways the FCT is supporting public health. Results revealed that the FCT is supporting health most notably through the provision of park and greenway settings for physical activity and the protection of water quality. These findings are important because they reveal that programs such as the FCT have a latent ability to support public health. Making the important social benefit of public health more explicit can provide further justification for public land acquisition.

Keywords: parks, conservation, green infrastructure, open space, public health
Introduction

This study takes an explicit public health perspective on land conservation. This perspective asserts that conservation supports not only the most basic of human needs of water, air, and food but also myriad other conditions that are necessary for health. The social good of health is influenced by both the natural and built environments, and therefore should be a consideration in the development and conservation dichotomy. To date, largely untested is how land conservation efforts can be made more effective by combining them with social goals and programs (Daniels & Lapping, 2005).

The Florida Communities Trust (FCT) open space acquisition program is part of a larger growth management strategy in Florida. This program was evaluated to determine which criteria used to prioritize and fund land acquisitions are supporting health. This type of retrospective assessment is used to inform the ongoing development of existing work (World Health Organization [WHO], 2009), in this case, highlighting components of the FCT that supported community health and well being. The question this study addresses is as follows: Is there latent support for public health in communities funded by the FCT? This was answered by examining the response patterns of communities whose FCT applications were successfully funded and comparing these responses to those which were unfunded to determine if the differences between these two groups included criteria with public health significance. The results reveal that applicant communities proposing projects that support public health are indeed being funded, and the FCT is therefore supporting public health—one of the stated goals of growth management.

The paper proceeds by first examining the larger umbrella program under which the
FCT operates: Florida Forever. Next, evidence, both nascent and well established, is used to support the public health benefits of conservation. Then, after the analysis of the FCT, this paper concludes by offering a justification for giving greater priority to projects that can satisfy both ecological and public health goals.

**Florida Forever**

The Florida Forever program is the most recent and ambitious version among a series of land acquisition programs that started with the 1985 Growth Management Act. This Act, like most planning statutes across the country, requires that each city and county in the state create a local comprehensive plan that must aim to “preserve, promote, protect, and improve public health, safety, comfort, and good order” (Carriker, 2006). This Act also requires that local plans contain both a conservation element to protect natural resources and a recreation/open space element. With $3 billion devoted to Florida Forever over 10 years (2000–2010), the State of Florida now outpaces the federal government in resources devoted to land acquisition.

With the passage of the Preservation 2000 [the predecessor program to Florida Forever] and Florida Forever Acts, the State of Florida has one of the most aggressive conservation and recreation land acquisition programs in the United States and the world. Over the past thirty years, Florida has invested approximately $6.8 billion to conserve approximately 3.7 million acres of land for environmental, recreational and preservation purposes. (Florida Department of Environmental Protection, 2007)

The structure and delivery of Florida Forever are such that the vast majority of
funds, 70 percent, are devoted to managing lands (Department of Environmental Protection, Division of State Lands) and protecting watersheds (state water management districts). An additional 22 percent, or $66 million annually, is allocated to the Department of Community Affairs which administers the planning functions within the state including the Florida Communities Trust program.

*The Florida Communities Trust*

Florida Communities Trust is a state land acquisition grant program that provides funding to local governments and eligible non-profit environmental organizations for acquisition of community-based parks, open space and greenways that further outdoor recreation and natural resource protection needs identified in local government comprehensive plans. (Florida Department of Community Affairs, n.d.)

The legislature created the FCT as a non-regulatory action to encourage local governments to comply with the conservation, recreation and open space, and coastal elements in their local comprehensive plans. Communities can take advantage of the technical and financial support provided through the FCT to conserve and restore public open space in order to satisfy their comprehensive planning goals and objectives.

Over $1 billion have come through the FCT to conserve over 80,000 acres since its inception in 1989, and there is still great demand for FCT support in local communities. In 2008, a record number of communities applied for FCT funding (Florida Department of Community Affairs, 2008). With the enormous resources and popularity of this program, there is great potential to impact residents throughout the state and, considering Florida as
a popular location for tourists, people from throughout the world.

**Planning for Public Health**

There is a growing recognition in Florida, as elsewhere, that environmental issues span disciplinary bounds. In fact, the effect of green space on health has been used as a case study of multidisciplinary research in public health (Kessel et al., 2009). This has necessitated governmental departments breaching their traditionally confined roles. For example, the Florida Department of Health (FDOH) recently distinguished itself as the first public health agency to become a partner of the national Smart Growth Network. FDOH staffers also met with their counterparts at the Departments of Transportation, Community Affairs, and Environmental Protection to discuss the challenges of rapid growth in Florida. In an effort to build the public health capacities, urban planners in Florida have been trained in the use of Health Impact Assessments at the Centers for Disease Control and Prevention. These developments have increased the contact between public health and planning professionals and have subsequently created new needs for common methodologies to evaluate public health pertinence and prioritization.

As evidenced by a recent Protocol for Assessing Community Excellence in Environmental Health (PACE-EH) exercise in Wabasso, FL, community members did not fragment planning and public health issues when given an opportunity to express environmental concerns. In addition to their self-identified public health needs for street lights and sidewalks, empowered community members identified parks as important for community health. The communities for which both planners and public health professionals work recognize the connection between environmental improvements and
their health and well-being.

The Public Health Benefits of Conservation

As McCally states, “at least since the time of Hippocrates’s essay ‘Air, Water, and Places,’ humans have been aware of the many connections between health and the environment” (2002, p.1). Despite this awareness of the environment as a major determinant of health (Cortese, 2004) and the recognition that protecting the environment is one of the most important public health challenges of this century (Koplan & Fleming, 2000), seldom do we create an environment optimal for achieving health and well-being.

The link between environmental quality and health was formalized decades ago in the World Health Organization’s Ottawa Charter for Health Promotion (WHO, 1986). This Charter recognizes the necessity of supportive environments and the reciprocal maintenance between the human and natural environments (WHO, 2005). This health promotion perspective differs from a biomedical approach concerned with individual immunity and pathology or a health science perspective focused on the control of pathogens or hazardous substances. Rather, this paradigm promotes environmental improvements to address the root or “upstream” (Tabor, 2002) causes of disease.

Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. (WHO, 1986, p.1)

Among the fundamental conditions necessary for health are a stable ecosystem and
sustainable resources, both of which are dependent on land conservation. The World Health Organization’s publication *Ecosystems and Human Well-Being* (2005) represents an increased awareness of our place within and dependence upon ecosystems to deliver the goods necessary to support health. What is not explicit is the importance of land conservation in supporting ecosystem functioning and health.

Although there is a dearth of research devoted to studying the health benefits of conservation in the fields of either public health or conservation biology, there have been a handful of noteworthy attempts at ushering in the interdisciplinary collaboration necessary to address this complicated relationship. There is a considerable amount of work under the rubric of “conservation medicine” which connects ecosystem, animal, and human health (Aguirre et al., 2002), but this movement largely focuses on infectious diseases that are exacerbated by human encroachment into animal habitat. The approach taken in this study intersects conservation medicine in recognizing that there are human health ramifications to disrupting ecosystems, but diverges from it by focusing on the chronic conditions and human needs met by maintaining environmental integrity.

Ecotoxicology is another cross-over field which examines the relationship between ecosystems and human health (DiGiulio & Monsson, 1996). This is important for understanding the ecological products and mechanisms that make ecosystems and humans sick, but it doesn’t offer a solution to fix ecosystems. How this study diverges from this approach is that it examines a policy solution for conserving the land on which ecosystems and humans depend. If we are to improve the quality of the environment and the intertwined ecological and social benefits that ensue, then we must not only understand the
mechanisms but also the policy solutions and programs that will help us conserve and repair the landscape.

There has also been a movement in “health ecology” stemming from human ecology (Honari and Boleyn 1999). Health ecology is distinct from conservation medicine and ecotoxicology in that it makes ecology a humanistic endeavor. Health ecology places health as the core concept in human ecology, the ultimate aim of which “… is the creation and maintenance of healthy people in healthy environments” (Honari & Boleyn, 1999, p.17). A humanistic approach informs this study as it makes explicit the reciprocal determinism between changes in the environment and changes in an organism (Wolonski, 1999), the organism in question here being human.

A consideration of ecological influences is part of a contemporary public health paradigm (Duhl & Sanchez, 1999) increasingly pertinent to environmental protection. This “ecological” approach in public health unfortunately has little to do with ecology and is more a consideration of a holistic approach to health promotion that includes the often overlooked environment, recognizing there are forces beyond individual level indicators such as personal lifestyle that influence health (Green & Kreuter, 1999). The adoption of the new public health paradigm recognizes the importance of the environment but has yet to put biological ecology and ecosystems into the ecological framework. The benefits of doing so are only now creeping into view amidst a nascent public health interest in sustainability (National Environmental Health Association, n.d.), but even here land conservation is currently overlooked.

These are a number of the paradigms getting us closer to making the connection
between human well-being and landscape integrity. Some of these cross-over fields are doing meaningful work in beginning to untangle the intricacies of this complicated relationship, but there is still a limited amount of evidence supporting the importance of land conservation on health.

**How conservation influences health**

Various forms of conserved lands, from neighborhood parks to national forests, support health and health behaviors in various ways. For example, protecting a wetland improves water quality and creating a park with amenities, such as soccer or softball fields, may act as a setting for social interaction and physical activity. Conserved land in the form of linear greenways has the potential to connect habitats and protect sensitive natural features while simultaneously providing a setting for recreational or utilitarian physical activity and the alleviation of psychological and social stressors. It is likely time to move beyond striving for an elusive and often esoteric “well-being” and “livability”—reflecting our inherently understood dependence on environmental quality—and become more specific about the public health goals that can be achieved through ecologically sensitive growth management practices.

When considering the myriad ways in which land conservation can support public health, we not only acknowledge the ways in which landscape integrity can satisfy human needs for water and air but also other emerging environmental and contextual variables being empirically linked to public health outcomes. Positive correlations found between self-reported health status and the amount of greenspace in one’s immediate living environment (Maas et al., 2006, de Vries et al., 2003) demonstrates our tacit knowledge of
the benefits of everyday exposure to nature beyond the services that nature and ecosystems provide. A more recent study reveals that objective measures of mortality also confirm the importance of green space whose benefits are distributed equally among all segments of a population (Mitchell & Popham, 2008).

The following subsections covering water, food, air, physical activity, mental health, social capital, safety, and ecological integrity represent a number of ways in which land conservation can support public health.¹ Most of what we know pertains to the effect of environmental modification on environmental elements, while the effect of environmental elements on human beings is often addressed separately. There is rarely a perspective which links the associative chain from environmental modification to human health impacts. The following sections are by no means meant to represent a comprehensive treatise on the ways in which the environment influences health. Rather, they are offered as a compendium of the many, and often interrelated, ways in which our health is dependent on maintaining environmental quality. They are presented to illustrate the many ways that land acquisition, and in particular actions taken under the auspices of the Florida Communities Trust, could influence health.

Water

We, as human organisms, maintain a daily need for the consumption of the most basic of life supporting elements: water. The quality and quantity of this resource is dependent upon the ability of the landscape to filter pollutants and facilitate the recharging of groundwater stores. Ecologically insensitive development practices that consume and replace land area with impervious surfaces increase the levels of non-point source pollution
in surface and groundwater (Arnold & Gibbons, 1996). Runoff carried unchecked over impervious surfaces and into lakes and streams carries with it the pollutants accumulated on these surfaces. Runoff that passes over permeable open space filters moderate levels of non-point source pollution and allows absorption into groundwater reservoirs. In addition to partially alleviating the deleterious health effects associated with exposure to toxic pollutants, the conservation of natural floodplains and riparian corridors also helps to control and absorb an overabundance of surface water. As witnessed most disparagingly in the devastation of Hurricane Katrina, but evidenced in many other areas of the world as well, consuming open space in floodplains can cause serious, if not fatal, injuries and infections. On the other end of the spectrum, land conservation can also reduce the severity of droughts. Where drought in the developed world is associated with the stress of altered diets and collapsing livelihoods, drought in much of the developing world results in starvation. Water is of course intertwined with another life sustaining element: food and food production.

Food

Not only is the conservation of the landscape vital to drought reduction, flood protection, pollution removal, and hydrological functioning on which productive agriculture relies, but it can preserve functioning ecosystems—also a key to agricultural production. For example, the natural qualities of conserved land are important to maintain habitat for insects that pollinate crops. This service alone is worth an estimated $217 billion worldwide (Helmholtz Association of German Research Centres, 2008) and $57 billion in the U.S (Cornell University, 2006). Maintaining ecological integrity may also
increase the longevity of productive agriculture. Conversely, there is also the argument for protecting agriculture as an essential component of our green infrastructure (Cremer, 2009). Techniques that deplete the soil and otherwise create ecological imbalances exacerbate the need for herbicides, pesticides, and genetic engineering that pose both proven and suspected risk factors.

**Air**

Land conservation efforts can be complementary to efforts aimed at reducing airborne pollutants. Selected forms of vegetation, most notably trees, have the capacity to filter both gaseous and particulate airborne pollutants (Bealey et al., 2007, Nowak, Crane & Stevens, 2006). These pollutants exacerbate asthma, a growing malady among children in the U.S., and are associated with lung cancer and cardiopulmonary mortality (Pope et al., 2002). Conserving land and vegetation also plays a role in sequestering carbon (Nowak & Crane, 2002). This action not only improves air quality but also helps to mitigate climate change.

The risks to health caused by the desertification and diminished biodiversity of global climate change include changing patterns of infectious disease (Frumkin et al., 2008; McMichael, Woodruff & Hales, 2006; Patz et al., 2003; Dobson & Carper, 1993) and threats to food security. Although it has been shown that local temperatures in urban environments can be partially reduced through the cooling effect of urban nature (Gill et al., 2007), it is less clear what effect a national or global land conservation effort may have on reducing temperatures within the biosphere as a whole.

Conservation of flora may also have some benefit for not only the remediation of
pollutants but also the prevention of their release. Conserved space in the form of greenways and trails supports the substitution of motorized transport with walking and biking, thereby reducing emissions and increasing air quality. Better yet, the physical activity gained through non-motorized forms of transportation and recreation has substantial cumulative health benefits.

*Physical activity*

Environmental supports for the performance of physical activity have been the focus of a considerable amount of research over the past decade (Frank, Engelke & Schmid, 2003; Kahn et al., 2002; Sallis, Bauman & Pratt, 1998). This thrust in research was spurred by the theory that physical activity is facilitated or hindered by environmental supports and barriers. Included in a supportive environment is the availability and accessibility of attractive public space which provides a setting for physical activity (Cohen et al., 2007; Bedimo-Rung, Mowen & Cohen, 2005; Coombes et al., 2010) and increases the likelihood of walking (Giles-Corti et al., 2005). An activity as simple as walking can help someone achieve the level of physical activity known to have health benefits. Even modest amounts of physical activity, such as the levels recommended by the Centers for Disease Control and Prevention (CDC), can prevent increases in visceral fat, a major risk factor for many diseases (Slentz et al., 2005). In addition, the regular physical activity that could be achieved by walking to the store or taking a stroll in a park could reduce the risk of cardiovascular disease, type 2 diabetes, selected forms of cancer, and osteoporosis, as well as improving mental health and mood and increasing general longevity (CDC, 2008).
Creating access to public space that could support physical activity means locating these spaces in areas where most of the population lives, namely urban and urbanizing environments. The importance of creating these settings within urban environments has gained recognition at the national scale, with four of the six newly designated National Recreation Trails in Florida planned for urban and urbanizing settings. Although termed “recreational” trails, these facilities also have the potential to be used for transportation. In other words, these are not just places to visit in order to recreate and be active but also spaces with utilitarian purposes. Facilities that have multiple purposes are likely to appeal to more people. The FCT recognized the importance of this and maintains a mandatory allocation of at least 30 percent of its funding to projects in metropolitan areas.

Mental health

Beyond the implications that land conservation may have on physical health, exposure to and contact with nature also influence mental health. If we are to fully achieve health, defined by the World Health Organization as the “state of complete physical, mental [ital added] and social well-being and not merely the absence of disease or infirmity” (WHO, 1948), then mental health must be a component of environmental interventions aimed at improving overall health.

Modern tendencies towards what has been termed our “nature deficiency disorder” run counter to the biophilia hypothesis (Kellert & Wilson, 1993) or our innate connection to nature and natural elements. This hypothesis has been confirmed by research in the environmental psychology field which demonstrates that exposure to nature provides psychological regeneration (Kaplan and Peterson 1993). A more recent review of studies
concluded that contact with nature has a wide variety of mental health benefits (Maller et al., 2006).

**Social capital**

Social capital is the value of the relationships that exist between people in a community. Those bonds have been proven to be important indicators of many health outcomes fostered by the presence of shared public space. Creating appropriate spaces for human interaction is essential for creating a sense of community, as “… community cannot form in the absence of communal space …” (Duany, Plater-Zyberk & Speck, 2000, p.60). Parks and open space can provide gathering places for social interaction, recreation, and civic function. More specifically, public spaces with natural elements such as vegetation are an important indicator of the degree of social ties built by the use of these spaces (Kuo et al., 1998; Coley, Sullivan & Kuo, 1997).

**Safety**

There are two general ways that the built environment influences safety: injuries incurred from accidents and crime or violence. The relationship between conservation and violence, to the best of my knowledge, is remote and untested, but there is great potential for conserved lands to improve safety by reducing accidents between pedestrians and automobiles. Nationally, there are 5,849 pedestrians and cyclists killed and 64,000 pedestrians injured in traffic accidents every year (National Highway Transportation Safety Administration [NHTSA], 2005). In Florida in 2005, there were 3.24 pedestrian fatalities per 100,000 persons in the population. This was double the prevalence that occurred in the state of New York with a comparable total population. Until our roadways include
amenities for pedestrians and cyclists, conserved lands in the form of multi-use greenways and parks can improve their safety by separating them from roadways.

Ecological integrity

The dependency between ecological integrity and public health is likely the most complex, understudied, encompassing, and important factor presented here. This is an area of intersection for many disciplines including public health and urban planning. Recognizing that people suffer the consequences when ecosystems collapse was a significant contributor to a renewed collaboration between planners and public health practitioners (Jackson & Kochtitzky, 2001). The World Health Organization report, *Ecosystems and Human Well-Being* (2005), illustrates the complex way that our health and existence are linked to the integrity of ecosystems. The natural functions on which our health and ultimate existence depend are influenced by the structure of the natural landscape.

This is pertinent to both infectious and chronic disease. Urban sprawl has been considered for its propagation of infectious disease (Koontz & Daszak, 2005). While the relationship between ecosystem integrity and infectious disease is certainly worthy of further investigation, the chronic diseases associated with lifestyle choices are the leading causes of mortality in the developed world. Therefore, in these places and in addition to the basic needs of water, air, and food to which none are immune, land conservation that ensures ecological integrity should be explored for its ability to support the lifestyle choices (e.g., physical activity) that can alleviate chronic disease.

The importance of land conservation in the developing world may be even more
acute to protecting public health. Without a robust infrastructure, the basic human needs of food and water are often precariously dependent on the local landscape and ecosystem integrity. There may be little hope for an attainable technological fix to temporarily overcome these basic needs. Therefore, land conservation is not only intimately entwined with health, but it may be the only reasonable way to sustain it.

A public health ecology approach (Coutts, 2010) is concerned with securing the landscape needed to ensure ecological integrity and the health of the humans and animals dependent upon it. As the human signature expands and the prospect of an increasingly tainted environment leads to greater risks to human health, this notion of public health ecology will become increasingly pertinent. It will become of increasing importance to think globally by planning locally in order to protect the landscape on which public health depends.

**Landscapes that Support Public Health**

Protecting public health is not the purpose of the Florida Communities Trust program, but public health is a community benefit of conservation. This is not to say that all forms of conserved land are equal in their ability to support public health. A small isolated patch of public open space is likely to have limited, albeit still important, benefits to both ecosystems and human health. Considering the form of conserved lands and how these individual pieces fit together is essential to provide the maximum benefit to natural systems and to create an environment that supports public health. This systems thinking requires the interspersion and mingling of conserved lands within developed areas as opposed to relying on larger green swaths in the hinterland separated from human
settlements. Protecting public health and ecosystem integrity involves the creation of everyday green infrastructure within urban and urbanizing areas connected to regional systems. This green infrastructure is the “… interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to wildlife and people” (Benedict & McMahon, 2006, p.1). Figure 1 displays the infrastructure approach to land conservation. Not only are patches or hubs essential (think city or county parks), but so are the corridors connecting these hubs to one another and to larger regional hubs. Distinct from a typology approach to open space that categorizes open space by function, this is a structural approach (Erickson, 2006).

[Figure 1 about here]

Green infrastructure in the form of hubs and corridors add to the composition of land uses in the planned environment. Corridors which support landscape structure support not only the composition but also the configuration of the greenspace system by increasing connectivity. Parks and preserves have long been considered important components of land use planning and development, but the importance of connecting these conserved lands with conservation corridors is not commonly recognized. When corridors are planned, they often occur in the form of multi-use greenways. Multi-use greenways are an important form of open space, which can repair the fragmentation of green infrastructure (Forman, 1995; McHarg, 1992). When there is access to these conservation corridors in the form of a trail, they can simultaneously support ecological systems and provide public health benefits. For example, a greenway routed along a river corridor has the potential to protect
water resources, provide a safe setting for physical activity, bestow the mental health
benefits associated with exposure to nature, and create a public forum for social interaction
while simultaneously creating the interconnected landscape structure necessary for
ecological functioning. Environmentally sensitive growth management policies are
important for these corridors to be realized (Ryder, 1995).

**Preservation or conservation when supporting public health**

There is an inherent tension between preserving and conserving land. Preservation
involves maintaining the land in its pristine state without consideration of the potential
human benefits of doing so. Conservation, on the other hand, involves the sustainable use
of natural resources to satisfy human needs. Preserving sensitive lands in a pristine state by
limiting access may be critical in some circumstances to protect fragile ecosystems, but
conservation that allows access, likely with site-specific limitations, will often be a
necessary compromise to satisfy and balance a wider range of environmental and social
goals.

Many of the public health benefits that conserved lands support stem from their
ability to be accessed by the public. Once access is granted, there is another potential
tension regarding the allowable *passive* and *active* uses of the public space. Active
recreation areas provide a setting for those forms of recreation where physical activity is
performed. These forms of recreation can be highly intrusive on the land. A nature trail
could be considered slightly intrusive while a park largely consisting of a soccer field
could be considered very intrusive. While both provide access to conserved land and
support community health, their contribution to land conservation goals varies. Although
facilities such as sport fields are important to some communities and support community health, they do little to support the services of functioning ecosystems. On the other hand, a larger land acquisition that includes, but does not consist entirely of, sports fields may be beneficial to multiple realms of health and a useful compromise to multiple community interests. For the purposes of fostering the essential public and political will to make conservation happen, some level of access and facilities will likely need to be found in concert with landscape conservation. The multidimensional role of parks, including their support for both human and ecological health, is likely to be of an increasing necessity (Hough, 1994).

Is the Florida Communities Trust Supporting Public Health?

Now that we are aware of the many ways that land conservation and public health are connected, let us examine a large and well-established land acquisition program to determine how it is supporting health and how it can be improved further to achieve this goal. A total of 617 Florida Communities Trust (FCT) applications submitted between 2001-2006 were examined to determine in what ways the FCT is supporting public health. The FCT application questions with public health significance were those that contributed to at least one of the aforementioned aspects of public health. In reviewing the instrument that communities complete to apply for funding, it was determined that 18 out of the 60 questions total are pertinent to the health of the candidate communities. These questions related to the provision of recreational amenities, the protection of water quality and quantity, and the reduction of exposure to environmental hazards. A list of the questions with public health significance and their corresponding health component(s) is provided in
Table 1.

Next, the proportions of positive responses to questions with public health significance in the funded and unfunded communities were plotted on a histogram (Figure 2). Proportions were used to normalize the varied number of applications submitted in different years.

Table 2 reveals a noticeably varied percentage of projects being funded from year to year. This was due to the fact that in some years more costly projects were funded and they consumed more of the finite budget allocation. There was a steady decrease in the number of applications submitted between 2001 and 2005, with a subsequent upturn in 2006. The upturn in 2006 resulted in a low percentage of projects being funded.

The total number of points a community received on their FCT application determined whether they were funded or not. The FCT application was structured in such a way that negative or “no” responses to questions resulted in zero points. Positive or “yes” responses resulted in the allocation of five points. Responses to all questions were recoded as a binary response (0,1) where 1 was assigned if any points were given and 0 if none. Only projects that were either funded or not funded were included in the analysis. Projects classified as either “withdrawn” or “ineligible” were excluded.

Funded communities gave a higher proportion of positive responses on almost all questions. This was expected because funding decisions are based on cumulative point
totals; the more positive responses, the more points a prospective community earns. Table 3 provides the results of a test determining if statistically significant differences existed between funded and unfunded communities in the proportion of positive responses to public health significant questions. There were only four questions (1, 4, 8, 18) with no statistically significant difference between the funded and unfunded groups.

[Table 3 about here]

Question 1 determines if the project is connected to a sidewalk or will be within two years. This is important to increase pedestrian accessibility and safety, and a large proportion of both funded and unfunded applications provided a positive response to this question. Noting below that very few funded projects are located within built-up commercial or high density mixed use areas (Question 8), one may conclude that many sidewalks are being built or are planned to be built into the many forms of lower density development.

Question 4 relates to the inclusion of recreation facilities in the proposed project. The results indicate that approximately half of the funded and unfunded applications included the provision of these facilities. Therefore, the inclusion of recreational facilities was not associated with a successful application, and the potential public health benefits of facilities that may attract users was not present.

Three questions address the location of the proposed project in an urban area. Although it is promising that funded projects were more likely to be located in urban service areas (Question 6) and within ½ mile of a “… built-up commercial or high density mixed use area” (Question 7), it is somewhat discouraging that proposed projects were not
incorporated within built-up commercial or high density mixed use areas (Question 8). It is possible that there were not many high density mixed use areas to locate these projects within. A failure to incorporate conserved spaces within built-up commercial areas is a missed opportunity to connect green infrastructure and provide utilitarian and recreational opportunities. Having both higher population density and land use mixture and connecting greenways to parks are important to maximize use for physical activity (Coutts, 2008, 2009).

Although there are 165 state designated brownfields in the state of Florida totaling almost 150,000 acres (Department of Environmental Protection, 2008), the results of Question 18 reveal that almost none of the applications, funded or unfunded, proposed reclaiming them.

Some other selected points of interest include:

- 95 percent of funded communities provided a positive response to Question 3 which asks if the proposed project includes recreational facilities such as trails, picnic pavilions, or campsites.
- There was a large difference between funded and unfunded communities in the cluster of Questions 9–12. Funded communities were much more likely to propose trails and greenways projects. This is promising to the creation of a green infrastructure system and the myriad public health benefits of establishing a sound landscape structure.
- The large difference between funded and unfunded applicants in Question 5 indicates that many more funded communities proposed providing access to a
shoreline or beach. In Florida, waterfronts are year-round attractive public spaces.

**Summary**

The results indicate that the FCT is supporting public health. Communities funded by the FCT are providing positive responses to almost all of the FCT criteria with public health significance. Based on the positive responses to 2001–06 FCT application criteria, public health is being supported through open space acquisition in the following ways:

- Physical activity gained through nonmotorized recreational and/or utilitarian activity is supported by increasing pedestrian accessibility through acquisitions located ½ mile or closer to built-up commercial or high density areas.
- Creating trail and greenway systems provides opportunities for physical activity and contributes to the green infrastructure needed for ecological integrity and the filtering of ambient pollution. Recreation in green settings also provides psychological benefits.
- The creation of attractive public space that contains recreational facilities for active uses increases the potential for both spontaneous and organized social interaction.
- The quantity and quality of surface waters is protected and the percolation of water into aquifers is enhanced.
- The mitigation of potential hazards improves public safety by preventing injury and death.
- Supporting ecosystems by providing the landscape structure on which they depend reduces the likelihood of the deleterious effects of ecosystem collapse.

There is certainly room for optimism regarding the accomplishments of the FCT,
but there are a handful of considerations which may further improve the public health impact of this program and possibly others like it:

- An explicit statement of the ecological and social benefits stated adjacent to application criteria would not only make the state’s awareness of these benefits clear, but it may also be educational to the communities completing the FCT application.

- Giving public health significant questions more weight, to reward communities that satisfy multifaceted ecological and social goals, is more congruent with the FCT mission of considering both outdoor recreation and natural resource protection needs.

- A wider dispersal of funds to a larger number of smaller projects may have greater public health benefits. Large swaths of conserved land are undoubtedly important, but everyday nature connected to these hubs is also important. A larger number of smaller projects could bring these public facilities within closer proximity to where greater numbers of people live and work.

The environmental supports provided through land conservation are absolutely necessary, but not sufficient, to foster community health and well-being. A comprehensive health promotion framework is necessary which captures not only the environment but also the intra-and inter-personal, community, and policy levels of intervention (Green & Kreuter, 1999). Accepting that, it is still the natural environment and the ecosystems it supports which is the foundation to which all other levels of intervention should be subordinate (Coutts, 2010). “The state of one’s environment is one of the most important
determinants of health” (Cortese, 2004, p.27), and protecting the environment is one of the most important public health challenges for the new century (Koplan & Fleming, 2000).

Health has a historically significant role in justifying planning actions (Shilling & Linton, 2005; Hebbert, 1999; Ashton & Ubido, 1991) and this relationship has recently undergone a rebirth (Frank & Kavage, 2008). What is not currently clear is if it still carries weight or has regained a legitimate place in the planning discourse when considering, for example, the extent and pattern of a state level open space system. Health might very well provide a justification for conservation, offering the humanistic impetus to increase public support—leading to political support—for green infrastructure projects. The health of our communities might become an indicator of how well we understand and subsequently protect the landscape on which we ourselves and ecosystems depend, making the benefits of conservation more tangible to the public at large and to legislators prioritizing projects.

It is through their influence on public health that ecosystem management and sustainability relate to comprehensive planning (DeGrove, 2005). The stated justification for growth management is to “preserve, promote, protect, and improve public health” and land conservation is integral to supporting health. Therefore, the protection of open space in growth management is necessary to achieve its stated goal.

Although conserved lands support the health of the public that governments are chartered to protect, local governments and developers have little incentive to create these spaces (Daniels & Lapping, 2005). Therefore, programs such as the Florida Communities Trust are essential to the conservation of public lands. Further, other departments and agencies receiving funds through the Florida Forever program, such as the Department of
Environmental Protection and the state water management districts, can also aid conservation and support public health in various ways.

Finally, there is the issue of equity, as there are greater benefits to those nearer and having greater access to green spaces. The concept of green infrastructure overcomes this through its dispersion over the landscape, making it more likely that some part of the system will be proximal to more people. As a health promotion strategy, green infrastructure benefits everyone regionally and globally, although those persons closer and with greater access benefit more. A protected river corridor and cleaner water and air know no age, race, income, nationality, or ethnicity, as the benefits of local efforts are spread spatially. Most persons become free-riders to the health benefits of land conservation.
References


WHO (1986) *Ottawa Charter for Health Promotion*. Available at

WHO (2005) *Ecosystems and Human Well-Being: Health Synthesis*. Available at

WHO (2009) *Health Impact Assessment*. Available at

Figure 1. Green infrastructure
Figure 2. Proportion of positive responses to questions with public health significance in funded versus unfunded FCT applications 2001-2006

Note: Question 1 occurred only in 2005-2006.
<table>
<thead>
<tr>
<th>Question number</th>
<th>Question</th>
<th>Influence on public health</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>Neighborhood access. The project site is accessible by an existing sidewalk or will be connected to an adjacent sidewalk within the next two years. Will the project provide outdoor recreation areas or open space adjacent to existing publicly-owned upland area, such as, existing parks, museums, schools, libraries, affordable housing, or transit stations?</td>
<td>Air, PA, Safety</td>
</tr>
<tr>
<td>2</td>
<td>Will the project include two or more resource-based outdoor recreation facilities, such as a nature trail, picnic pavilion, fishing pier, wildlife observation platform, boardwalk, camping area or canoe launch?</td>
<td>PA, Mental health, SC</td>
</tr>
<tr>
<td>3</td>
<td>Will the product include two or more user-oriented outdoor recreation facilities, such as, playgrounds, basketball courts, tennis courts, bocci ball courts, shuffleboard courts, volleyball courts or fitness trail?</td>
<td>PA, SC</td>
</tr>
<tr>
<td>4</td>
<td>Will the project provide access to a shoreline or beach and be managed for recreation uses?</td>
<td>PA, EI</td>
</tr>
<tr>
<td>5</td>
<td>Is the project site located within an existing urban service area, as defined in Rule 9K-7.002(40) F.A.C.</td>
<td>Many</td>
</tr>
<tr>
<td>6</td>
<td>Is the project site located within an urban service area and also within ½ mile of a built-up commercial or high density mixed use area?</td>
<td>Many</td>
</tr>
<tr>
<td>7</td>
<td>Is the project site located within an urban service area and is also within a built-up commercial or high density mixed use area?</td>
<td>Many</td>
</tr>
<tr>
<td>8</td>
<td>Will the project include new or enhance land-based nature, bike or equestrian trails that are at least ¼ mile in length?</td>
<td>PA, Safety</td>
</tr>
<tr>
<td>9</td>
<td>Will the project enhance or connect local, regional or statewide land-based recreational trail systems by extending an exiting trail system or by providing trailhead or trailside facilities?</td>
<td>PA</td>
</tr>
<tr>
<td>10</td>
<td>Will the project enhance or connect local, regional or statewide network greenways by expanding existing greenways, such as wildlife corridors or canoe trails?</td>
<td>Water, Air, PA, Mental health, EI</td>
</tr>
</tbody>
</table>

Table 1. FCT questions with public health significance.
12 Will the project further a locally adopted greenway, water trail, or land-based recreational trail system plan for the community?  

Will the quality of the surface waters occurring on or adjacent or in close proximity to the project site be improved by the elimination of existing pollution sources from the project site, removal of impervious surfaces, or other means?  

13** Will acquiring the project site protect adjacent Outstanding Florida Waters, as designated by the Department of Environmental Protection?  

14 Will acquiring the project site protect adjacent Class I Waters, as identified by the Department of Environmental Protection, or is the project site in a locally designated wellfield protection zone?  

15 Flood Hazard Area. Will the project provide recreational opportunities and open space areas that direct residential and commercial development away from a coastal high hazard area or a 100-year flood plain?  

16 Local Mitigation Strategy Priority. Is the project site located within an area identified in the County’s adopted Local Mitigation Strategy as a mitigation priority?  

17 Designated Brownfield Area. Will the project provide recreational opportunities or open space areas within a state designated brownfield area?  

18 

Note: *2005-06 only. **2001 does not make the “from the project site” specification; 2005-06 makes specification for the inclusion of stormwater facilities that create open space. PA=Physical activity; SC=Social capital; EI=Ecological integrity; Many=Supportive of most aspects, depending on type of project.

The Florida Administrative Code (FAC) defines Urban Service Areas as “…built-up areas where public facilities and services such as sewage treatment systems, roads, schools, and recreation areas, are already in place. For the purpose of this rule, it may also include other similar designations that have been formally adopted by a local government on its Future Land Use Map….”.

An Outstanding Florida Water, (OFW), is a water designated worthy of special protection because of its natural attributes. This special designation is applied to certain waters, and is intended to protect existing good water quality.”

Class 1 Waters are potable supplies

Local Mitigation Strategy plans are intended to reduce the vulnerability to disasters and identify opportunities for post-disaster mitigation in Florida communities.

Existing commercial and industrial sites that are abandoned or underused due to environmental hazards
Table 2. Summary of funded and unfunded FCT applications, 2001–2006

<table>
<thead>
<tr>
<th>Funding Year</th>
<th>n</th>
<th>Funded (%)</th>
<th>Unfunded (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>138</td>
<td>88 (64)</td>
<td>50 (36)</td>
</tr>
<tr>
<td>2002</td>
<td>114</td>
<td>42 (37)</td>
<td>72 (63)</td>
</tr>
<tr>
<td>2003</td>
<td>97</td>
<td>55 (57)</td>
<td>42 (43)</td>
</tr>
<tr>
<td>2004</td>
<td>76</td>
<td>47 (62)</td>
<td>29 (38)</td>
</tr>
<tr>
<td>2005</td>
<td>77</td>
<td>35 (45)</td>
<td>42 (55)</td>
</tr>
<tr>
<td>2006</td>
<td>115</td>
<td>31 (27)</td>
<td>84 (73)</td>
</tr>
<tr>
<td>Total</td>
<td>617</td>
<td>298 (48)</td>
<td>319 (52)</td>
</tr>
</tbody>
</table>
Table 3. Differences in questions with public health significance between funded and unfunded groups

<table>
<thead>
<tr>
<th>Question</th>
<th>Proportion</th>
<th>Funded n=298</th>
<th>Unfunded n=319</th>
<th>Difference</th>
<th>$\sigma_p$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>0.61</td>
<td>0.67</td>
<td>-0.06</td>
<td>0.07</td>
<td>0.344</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.79</td>
<td>0.6</td>
<td>0.19</td>
<td>0.04</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.95</td>
<td>0.74</td>
<td>0.21</td>
<td>0.03</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.51</td>
<td>0.51</td>
<td>0</td>
<td>0.04</td>
<td>0.951</td>
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</tr>
<tr>
<td>5</td>
<td>0.68</td>
<td>0.42</td>
<td>0.26</td>
<td>0.04</td>
<td>&gt;0.001</td>
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</tr>
<tr>
<td>6</td>
<td>0.86</td>
<td>0.77</td>
<td>0.09</td>
<td>0.03</td>
<td>0.003</td>
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<tr>
<td>7</td>
<td>0.73</td>
<td>0.6</td>
<td>0.13</td>
<td>0.04</td>
<td>0.001</td>
<td></td>
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<tr>
<td>8</td>
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<td>9</td>
<td>0.87</td>
<td>0.64</td>
<td>0.23</td>
<td>0.03</td>
<td>&gt;0.001</td>
<td></td>
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<tr>
<td>10</td>
<td>0.6</td>
<td>0.31</td>
<td>0.29</td>
<td>0.04</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0.6</td>
<td>0.22</td>
<td>0.38</td>
<td>0.04</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.6</td>
<td>0.26</td>
<td>0.34</td>
<td>0.04</td>
<td>&gt;0.001</td>
<td></td>
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<tr>
<td>13</td>
<td>0.59</td>
<td>0.41</td>
<td>0.18</td>
<td>0.04</td>
<td>&gt;0.001</td>
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<tr>
<td>14</td>
<td>0.27</td>
<td>0.11</td>
<td>0.16</td>
<td>0.03</td>
<td>&gt;0.001</td>
<td></td>
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<tr>
<td>15</td>
<td>0.11</td>
<td>0.05</td>
<td>0.06</td>
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<td>0.005</td>
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<tr>
<td>16</td>
<td>0.85</td>
<td>0.66</td>
<td>0.19</td>
<td>0.03</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>0.57</td>
<td>0.34</td>
<td>0.23</td>
<td>0.04</td>
<td>&gt;0.001</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.898</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.58</td>
<td>0.42</td>
<td>0.16</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Note: *Question 1 appeared only in the 2005-06 year-group cycle (Unfunded n=126, Funded n=66).
Notes

1 Unless otherwise noted, evidence for the following sections was derived from evidence summaries provided by the Metropolitan Design Center’s Design for Health initiative (Metropolitan Design Center 2007), the National Association of County and City Health Officials (NACCHO 2003), and the Trust for Public Land (2006), and from reviews of environmental audit tools and guides which capture the public health impacts of development. These latter include the Design Guidelines for Active Michigan Communities (Alaimo et al. 2006) and the Healthy Development Tool (San Francisco Department of Public Health 2007). Specific to land conservation and health, a recently published literature review by Tzoulas et al. (2007) provides more references which support many of the health considerations listed in the individual subsections.

2 From an environmental sciences perspective, passive recreation involves low impact activities such as walking or hiking while active recreation involves climbing, hunting, horseback riding, and bike riding. This is very different from a public health perspective where recreation is considered “active” if physical activity results. Walking or hiking qualifies as passive within the rubric of environmental science but is active from a public health perspective. Conversely, horseback riding, considered active or invasive from an environmental sciences perspective, would be termed passive from a public health perspective because no physical activity is being achieved. For the purposes of this paper, we will adopt the public health perspective of active and passive use.