Section 1: Why is This an Important Question Now?

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The United States’ healthcare and conservation communities are undergoing massive transformations as new business models are developed in response to financial, political, and other pressures. Given the historical connections between access to natural areas and impacts on human health – both good and bad – now is an appropriate time to review the opportunities for each community to work together to navigate through these turbulent times.

The purpose of this background paper is to give the Workshop participants a common base for conversations and, hopefully, some ideas for new directions. It is intended to provide an “on ramp” for the discussions by reviewing the current state of play in several key areas and identifying both questions and sources of information for further exploration.

1.1 Introduction

Throughout human history, people have both extolled the healthful benefits and feared the harmful dangers of the natural world. Early settlers to the Northeastern United States believed that disease-spreading spirits dwelled in the deep woods, leading the pioneers to shun their region’s thick forests. In turn, the ancestors of these colonialists viewed those same woods from a softer perspective, one perhaps enlightened by the onslaught of the industrial revolution and its attending clamor. By the mid-1800’s “[a] growing urban population began to embrace the romanticism of nature and sought out beautiful places among the rivers and mountains to relax, recreate, and improve their physical and mental health” (Valkenbergh and Olney). Today, the protection, management, and utilization of natural spaces are increasingly being viewed as an area of public health interest. At the same time, improving public health is a growing opportunity for the land conservation community.

In many regards, the conservation community has already begun to demonstrate the importance of land conservation to the public’s health. Efforts to protect forestlands as a source
for clean, inexpensive drinking water have been a popular and well-understood reason for land conservation. This purpose has helped to support the preservation of large tracts of undeveloped land around major urban areas. Cities like Portland, Boston, New York, and Seattle all receive their drinking water from forested landscapes. More recently, many land trusts have begun to take an active role in helping to address the United States’ growing obesity and diabetes epidemics through preservation of agricultural lands (for the provision of healthy food) and the protection of undeveloped spaces (to promote physical fitness through active and passive recreation).

While these efforts are critically important, a growing body of research also reveals that human health and open spaces are connected in even broader ways. As the chapters in this background report will document, urban green spaces and more rural natural areas offer a variety of health benefits and risks to different types of communities. Patients recovering from surgery or traumatic events heal faster when exposed to nature (Section 2). Adults focus better after simply looking at pictures of green space (Section 2). And children develop more creativity and better self-control through unstructured play in green spaces (Section 3). Conserved or restored lands and waters can also both reduce and, unfortunately, sometimes facilitate the spread of infectious diseases (Section 4). Improved access to health care is also being explored as an incentive for more sustainable management of working lands (Section 5). Finally, brief descriptions of some of the other connections between land conservation and human health (exercise/obesity; climate change/heat island effects) are provided at the end of the report.

Each day practitioners, scientists, and conservationists are uncovering new connections between land conservation and public health. While the relationships between these two systems are complex and, at times, obscure, they offer professionals within both the conservation community and the health care profession considerable opportunities for constructive collaboration and action.

What follows now is a rough review of some of the major themes governing consideration of human health and land conservation, including reasons why both issues may benefit from simultaneous attention. Threats from a changing climate, the continuing fragmentation of open lands, spreading invasive species, and growing healthcare access inequalities are a few of the major issues that require attention and which would benefit from partnerships between the healthcare and land conservation sectors.

1.2 Environmental Trends and their Potential Impacts on Public Health

The earth’s natural systems are being transformed at an unprecedented rate and in manner never before experienced by humans. These changes are happening in such a way and at such a scale that the International Union of Geological Sciences is considering designating our time as a new geologic epoch, the Anthropocene, to reflect the impact that people are having on the planet (Stromberg, 2013). The continued fragmentation of landscapes, the emergence and spread of vector-borne and zoonotic diseases, the effects of non-native organisms, and the impacts of climate change are all influencing the public’s health. They are contributing to
a variety of novel human ailments that directly stem from how the environment is managed on the local, regional and even global scales. All these issues require concerted attention.

**Climate Change**

Climate change may eventually influence all areas where the land conservation community interacts with the healthcare sector. Changes in climate are likely to lead to:

- Increases in infectious diseases;
- Increased heat stress mortality;
- Increased respiratory illness from air pollution;
- Nutrition impacts from changing food availability;
- Increased natural disasters; and ultimately
- Forced migrations of large populations.

Warming and precipitation trends associated with climate change over the last 30 years have already claimed over 150,000 lives a year according to the World Health Organization – and this trend is only expected to worsen (Patz et al., 2005).

**Habitat Fragmentation & Infectious Disease**

Habitat fragmentation, the loss of undeveloped open space to land-use changes, continues to alter the planet’s ecological landscape. Around the world, changes are occurring to forests, farmlands, wetlands and waterways because of human demand for food, fiber, water, and shelter (Foley et al., 2005). Nearly 6,000 acres of open space are lost to “developed uses” every day in the United States (USDA, 2013).

These alterations are not only harmful to biodiversity, the integrity of natural systems, and the character of communities, but also to human health. Not only does development itself increase levels of air and water pollution, there are new findings that land fragmentation by itself may also increase the emergence and outbreak of infectious diseases, largely through the linking of natural and non-natural areas (allowing diseases to “jump” from animals to humans) (Patz et al., 2004) and the creation of habitats conducive to disease vectors like mosquitoes and ticks (Norris, 2004). Land conservation or restoration initiatives have the potential to help reduce fragmentation and some of its associated health risks, as will be discussed more in a later chapter of this paper.

**Invasive Species & Altered Landscapes**

Non-native organisms are significantly impacting the planet’s ecosystems and can, as a consequence, harm human health. Invasive insects in the United States – just one example of many – are currently destroying or altering large forest regions. The spread of the Asian longhorned beetle (*Anoplophora glabripennis*) has led to widespread loss of maple trees in New England, the hemlock woolly adelgid (*Adelges tsugae*) has reduced the complexity of forests in the mid-Atlantic, and a small green beetle known as the emerald ash borer (*Agrilus planipennis*) has killed over 100 million ash trees across the Midwest and Northeast (Donovan et al. 2013).
Such devastation has obvious impacts to local economies, peace of mind, and cultural values that relate to human health. But there may also be direct physical impacts from such invasions as well. A recent study suggests that the loss of ash trees from the ash borer has resulted in a marked increase in human mortality related to cardiovascular and lower-respiratory-tract illness in regions where the insect has proliferated (Donovan et al. 2013). Examination of 18 years of data by Donovan et al. (2013) revealed that Americans “living in areas infested by the emerald ash borer suffered from an additional 15,000 deaths from cardiovascular disease and 6,000 more deaths from lower respiratory disease when compared to uninfected areas” (World Health, 2013, January 25).

More investigation is required to illuminate the mechanisms of these interactions and the other realms in which an explosion of invasive species may lead to degradations in human health. But these early results attest to the role that intact ecosystems can play in supporting or harming health.

1.3 Healthcare Trends Potentially Relevant to Land Conservation

Healthcare is a huge and complex issue, with many important trends and moving targets requiring policy action or concerted attention. Two big trends that may hold tie-ins for the land conservation community are the continuing efforts to:

- Stem the rising costs of health care in the United States; and
- Address rising inequalities in access to healthcare.

Both conservation organizations and the lands they steward may find room to contribute on both of these fronts.

Cost Control & Chronic Disease

The United States’ ever-increasing health care costs are a point of great concern. In 2010, U.S. health care expenditures reached nearly $2.6 trillion - more than ten times the $256 billion that was spent in 1980. This dramatic increase has largely been attributed to three developments:

- The price of technology and prescription drugs has increased;
- Chronic disease rates are on the rise; and
- Administrative costs are and remain high (Kaiser, 2013).

The issue of rising healthcare costs has major implications for individuals and private insurers, as well as for the U.S. government’s fiscal health. Along with defense spending, social insurance programs, which include Medicare and Medicaid, are the government’s greatest expenses (CBO, 2011).

Estimates by the Center for Disease Control and Prevention (CDC) attribute approximately 75% of all health care expenditures to the treatment of chronic conditions (Kaiser, 2013). Land
conservation may not be able to bring down the costs of prescription drugs or healthcare administration, but it may have something to contribute to future reductions in chronic diseases. Many, though not all, chronic diseases, like obesity and diabetes, are firmly related to lifestyle trends and, as these chapters will discuss, may be improved by access to open spaces.

**Access to Care**

Today, 6.5% of Americans fail to obtain medical care because of cost and only 86.8% of people have a usual place to visit for care (CDC, 2013). Much of the inequity surrounding these statistics is directly related to the demographic factors of socioeconomic status and geographic location. There is an unequal distribution of providers and places to receive care in both inner city and rural communities. Entitlement programs that primarily assess qualification based on financial status, such as Medicaid, offer some improved access for the nation’s poor; however, many people still lack access to care.

While the politics of insurance mandates are controversial, a large portion of the population remains uncovered by any type of health insurance. At the time of the 2011 National Health Interview Survey, 48.2 million people or 18.2% of the population did not have health insurance coverage (CDC, 2012). What is most interesting about this survey is that 7.0% of children under the age of 18 did not have any insurance coverage, while about 53% of the same age had private insurance and 41% had some form of a public plan (CDC 2012).

Though land trusts are unlikely to become direct providers of healthcare, there may well be ways to enlist their support in the quest to expand healthcare across the country. This seems particularly true in the rural regions where need is great and land trusts often act as stewards of the communities in which they work, in addition to being stewards of the land.

**New Health Initiatives and Possible Connections with Land Trusts**

In an effort to contain health care costs, several novel initiatives have emerged since the Patient Protection and Affordable Care Act was signed into law in 2010. While still in development, these initiatives, to be run through accountable and coordinated care organizations (ACOs and CCOs) offer the potential to improve patient care while making the health care system more efficient and less costly. Additionally, an increased use of Health Impact Assessments (HIA) may offer another way to improve community health while containing expense.

ACOs and CCOs are composed of doctors, hospitals, and other health care providers who voluntarily join together to coordinate care for their patients and the chronically ill. They strive to provide better health outcomes through better management, taking more time to assess real health needs and reducing, for example, unnecessary duplication of medical procedures (CMS, 2013). CCOs, in particular, focus on disease prevention, in addition to helping patients with chronic conditions receive efficient care, by spreading financial responsibilities and risks across patients, health care providers, and community members (OHPB, 2013). The State of Oregon is a big champion of CCOs as part of its ambitious plan to contain Medicaid costs, and to date there are 15 CCOs operating across the state.

Oregon Governor John Kitzhaber spoke to the effects of CCOs on improving health outcomes while reducing costs in an interview for the *New York Times* (April 12, 2013). Kitzhaber uses
an example of an elderly woman who develops congestive heart failure during a heat wave. He points out that under the current system, Medicaid will pay for the ambulance ride and $50,000 of hospital coverage; however, it will not pay for a $200 window air-conditioner that would outright prevent the problem. This type of comprehensive perspective looks beyond traditional medicine to incorporate more of the factors that contribute to costly ailments and conditions.

Land trusts may, by joining these CCO and ACO partnerships, find a way to help contribute to efforts by healthcare funders, municipalities, and patients. Such initiatives could help to expand the effectiveness of cost reduction programs and broaden the concept of what makes a community healthy. The protection and stewardship of open space lands has the potential to better control health care costs by creating communities where the natural environment can help improve overall wellness.

Health Impact Assessments (HIAs) may offer another opportunity to incorporate land conservation efforts into public health initiatives. Widely used in Europe, HIAs are a process that assesses the health impacts of a particular policy, project, or program where health is not the primary objective (Lock, 2000). At times, HIAs are conducted as supplements to environmental impact statements. In this context, the role that open space plays in supporting public health may become a barrier to projects that include poorly planned development. Conversely, land conservation efforts that are associated with mitigating development projects, like habitat banks, can be used to bolster public health benefits as well.

Within the United States, the City of Francisco and the State of Alaska are known for their use of HIAs. The City of San Francisco’s widespread use of HIAs provides some unique insights into the effectiveness and benefits of using this type of assessment tool. A review of more than 10 years of HIAs found that the health impact assessment process helped to improve the political conditions for changing public health policy (Bhatia and Corburn, 2011). Researchers reported that:

“Health impact assessments have helped increase public awareness of the determinants of health, routine monitoring of these determinants, cooperation among institutions, health-protective laws and regulations, and organizational networks for health advocacy and accountability” (Bhatia and Corburn, 2011).

The breadth of benefits that HIAs provide offers an opportunity for increased collaboration across various disciplines to achieve improved health care outcomes.
**HIA Case Study: Point Thomson, Alaska**

In June 2011, a health impact assessment was completed as a supplement to an environmental impact statement for a large oil development project on Alaska’s North Slope. As part of ExxonMobil’s desire to drill in the Thompson Sand oil reservoir just outside of the Arctic National Wildlife Refuge, an assessment was conducted in order to assess how the project would potentially impact the local environment and the subsistence resources of surrounding communities. The assessment was conducted by the State of Alaska’s Department of Health and Social Services with assistance from the Alaska Native Epidemiology Center. Among other factors, social determinants of health, potential exposure to hazardous materials, impacts to water and sanitation, and effects to subsistence food supply and nutrition were all studied.

This project exemplifies the potential that HIAs have as a planning and conservation tool. By comprehensively examining the impacts of proposed development projects, a holistic perspective on subsistence and traditional land use patterns was evaluated (AK DHSS). Such a consideration for the environment’s connection to human health allowed for the development to occur in the least impactful way.

For more information see: [http://www.epi.alaska.gov/hia/PointThomsonCompletedHIA.pdf](http://www.epi.alaska.gov/hia/PointThomsonCompletedHIA.pdf)

### 1.4 Opportunities for Collaboration & Action

The rich connections between open space conservation and public health which are explored throughout these background papers offer an opportunity to align many stakeholder groups around a series of common goals. Both land trusts and healthcare professionals have much to gain from novel collaborations. As a result, there is a need to develop new networks and mechanisms to allow for such interdisciplinary work.

**Land Trusts**

The potential to improve community wellness through the protection and sound management of open space presents the land trust community with many promising opportunities. Traditionally, land trusts have had to spend considerable time and resources recruiting individuals and organizations to assist in their efforts to protect land solely for the “sake of Nature.”

In the case of land conservation for the benefit of public health, however, the paradigm begins to shift away from “what individuals can do for conservation” towards “what can conservation do for individuals” and, of course, their communities (Anderson, 2012). This change in thinking has the potential to re-contextualize the role of open space in our society such that all people have more of a personal stake in the conservation and protection of open space lands. With a clear understanding of management goals and the health values that open space provides, land trusts have the potential to significantly grow their constituencies and influence within communities.
Conservation organizations’ capacities to achieve their land protection and program goals have also not been fully appreciated by many in the public health field. Many land trusts are more sophisticated, business savvy, and organized than they are perhaps often given credit for. Land trusts have repeatedly proven their ability to raise, leverage, and manage large amounts of money to advance objectives for the public good. The “2010 National Land Trust Census Report” completed by the Land Trust Alliance provides some insights into the significance of land trusts efforts. Since 2000, land trusts have conserved 23 million acres of land and, as of 2010, local, state, and national land trusts were managing $1.6 billion in the form of endowments and designated funds (Chang, 2011). While the scale of these efforts do not compare to the enormity of the United States’ health care system, few other civic organizations contribute as much to the public’s well-being.

Public Health Professionals & Organizations

C.E.A. Winslow, a formative figure in the field of public health, famously defined the field as:

“The science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals” (Winslow, 1920).

Such a definition speaks to the foundational concept of prevention through comprehensive and collaborative efforts. By aligning public health goals with conservation initiatives, land trusts have a unique opportunity to help fill a gap within the public health field. All too often a comprehensive understanding of health issues emerges from academic institutions, but leads to limited action within society. Partnerships between land trusts and public health professionals could produce more accelerated and productive action – the former having strong boots-on-the-ground connections to communities and the latter having the knowledge and tools to assess or improve health.

Co-Benefits

Land conservation for the benefit of human health offers a truly wide breadth of benefits. While the connections between human health and land conservation can be very broad (e.g. the need for biodiversity to study and answer unique biomedical questions), there are numerous ways that land conservation can directly help address an individual’s or community’s health needs. Some of the most tangible connections surrounding the relationship between open space and human health include:

- Drinking water purification.
- Air pollutant removal.
- Areas to grow healthy food.
- Places for exercise and recreation.
- Temperature extreme mollification.
- Storm surge protection.
- Mental health improvement.
Support for childhood cognitive development.
Community and social network creation.

**Costs & Funding**

The prevention of health problems is considerably cheaper than treating acute ailments or managing chronic conditions. As such, land conservation has the potential to help reduce health care costs through the numerous services and benefits that natural systems provide – particularly in preventing acute conditions, such as those resulting from chronic stress and inactivity. In addition to the many reductions in health care costs that open space can provide, undeveloped areas also generate economic savings by providing services like treating storm water and cooling buildings.

The health benefits of access to natural areas and the need to manage any health problems arising from the outdoors has the potential to leverage novel sources of funding. The demand for healthy, local food is a prime example of how changing public desires have led to increased sources of state, federal, and private funding for small farming operations. By using an ever-growing body of research and a clearly articulated message, land trusts and public health professionals can work together to secure new sources of funding from government agencies and foundations.

**Walk for Wellness: Wildlands Conservancy, Pennsylvania**

The Walk for Wellness program is a prime example of a land conservation organization working to promote public health benefits from access to its properties. On their website the Wildlands Conservancy writes: “The Walk for Wellness program was created to encourage and facilitate walking for its beneficial, restorative effects. Walking has been shown to be the easiest and healthiest physical activity in which most people can engage. It benefits our mind and our body - wellness for the heart and soul!” To date, the organization has created a series of maps for 55 of the best hiking trails in the Lehigh Valley.

For more information see: http://wildlandspa.org

**1.5 Conclusion**

Author E.B. White once wrote: “I would feel more optimistic about a bright future for man if he spent less time proving that he can outwit Nature and more time tasting her sweetness and respecting her seniority” (Lloyd Albert, 2004).

The need for collaboration between land trusts and health care professionals speaks to this point. There is no escaping the fact that people are biological organisms with an innate connection to the natural world. Environmental change, humans’ drift from nature, and
challenges with the health care system make this a critical moment in which to expand the purpose of land conservation and the role of natural areas in the pursuit of improved public health. With sound science guiding the way and an emphasis on helping the communities who need it most, great public benefits can be achieved.

1.6 Possible Questions for Discussion

- How can land trust and health care professionals translate research findings linking nature to better health into concrete programs or interventions?
- In what ways can the benefits of open space be better quantified in order to demonstrate conservation’s importance to public health?
- What potential issues arise from land trust’s involvement in public health? How might these conflicts be mitigated or avoided?
- What policy avenues should be pursued to bridge the gap between land conservation and human health?
- How might land trusts best work with health care funders/providers to achieve their mutual goals?

Some of the Organizations Doing Interesting Work on this Topic

**Human Impact Partners** - This nonprofit organization provides technical assistance to public agencies and other organizations working on health-based analysis in low-income communities. See: [http://www.humanimpact.org/](http://www.humanimpact.org/)

**Harvard Center for Health and the Global Environment** – Housed at the Harvard School of Public Health, the Center studies and promotes research on the connection between biodiversity, climate, energy, food and health. The Center also offers educational material for policymakers and students from the kindergarten to graduate school level. See: [http://chge.med.harvard.edu/](http://chge.med.harvard.edu/)

**Nelson Institute, Center for Sustainability and the Global Environment (SAGE)** – Located at the University of Wisconsin-Madison, the researchers at this academic hub explore the “connections between natural resources, technology, policy, human health, security, and changes in the global environment.” See: [http://www.sage.wisc.edu/](http://www.sage.wisc.edu/)

**Program on Health, Equity, and Sustainability** – Staffed by an interdisciplinary team, this program is part of the City of San Francisco’s Department of Public Health. The program works to promote healthy environments and social justice within the city.

Useful Readings/Works Cited


1.7 Examples, sources of information and other key points from the discussion

Some of the examples, sources of information and key points from the discussion included the following:

- There are deep historical connections in America between human health and access to nature, including:
  - Galen Clark, the man who discovered the Giant Sequoias of Yosemite Valley and led to their eventual protection, originally moved to the California mountains, like many at the time, to convalesce after contracting tuberculosis.
  - Henry David Thoreau, it was noted at the workshop, had been encouraged to go to Walden Pond, the eventual setting of his most famous transcendentalist work, as a response to deep mental restlessness that we would now classify as depression.
  - Frederick Law Olmstead, America’s most treasured landscape architect, designed parks to be spaces of healing for the urban poor and the mentally ill. He believed in “sanitation” through design, and often took commissions to redesign the grounds of mental institutions and hospitals.

- New connections are being made as well:
  - The Los Angeles Neighborhood Land Trust is partnering with a hospital and high school to create a therapeutic garden and health clinic in one of LA’s least healthy neighborhoods.
  - The Freshwater Land Trust in Birmingham, AL is working with local health care providers to fund bike and walking trails as part of efforts to reduce community obesity.
  - In Fresno, CA state health funds are being used to create neighborhood gardens to serve the mental health needs of immigrant communities with refugee status. See: http://www.nytimes.com/2013/05/26/us/in-california-gardening-for-mental-health.html?pagewanted=all
  - In Troy, NY local youth work on local farms to make local food available through convenience stores and “veggie mobiles”. See http://www.theveggiemobile.blogspot.com/
  - The New Jersey Conservation Foundation has a goal of linking parks, farmland, trails, and historic lands across the Garden State to create an interconnected system of preserved land - these “hubs” can be used to get people outdoors and serve larger fitness, tourism, recreation, and conservation goals.
The Regional Equity Atlas of the Pacific Northwest’s Coalition for a Livable Future (http://clfuture.org/equity-atlas) is taking a geographical look at regional health disparities, linking health outcomes to quality of housing, transportation, airways and access to natural areas.

Oregon Public Health Institute’s Healthy Eating Active Living (HEAL) Campaign is helping civic leaders implement policies for healthier communities that include bike lanes, community gardens, and city employee health incentives. See: http://www.orphi.org/strategic-projects/strategic-overview/

Portland’s Upstream Public Health non-profit works to improve health by addressing, among other things, public transit, land use planning, and climate change goals. See: http://www.upstreampublichealth.org/issues-overview