The Economic Impact of Greenways and Multi-Use Trails

A review of literature prepared as part of the
Naugatuck River Greenway Economic Impact Study
August, 2015

John McDonald
B.A. Candidate in Psychology, University of Connecticut-Waterbury

Laura Brown
Associate Extension Professor, Community & Economic Development Educator,
University of Connecticut-Extension

Derby Greenway, 2015 photo courtesy Aaron Budris, Naugatuck Valley Council of Governments

NAUGATUCK VALLEY COUNCIL of GOVERNMENTS

UCONN
COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES
EXTENSION

Table of Contents

The University of Connecticut-Cooperative Extension, Naugatuck Valley Council of Governments and University of Connecticut-Center for Economic Analysis have collaborated to produce an analysis to fulfill the Steering Committee's goal of quantifying the potential economic impacts of constructing the NRG and provides recommendations to municipalities regarding best practices for maximizing these impacts during and after trail construction. The study will be completed in Spring 2016. Specifically the study will include:

- A literature review regarding trail impact studies and background on the NRG
- An intercept survey of trail users to inform the economic impact analysis
- Assessment of economic impacts (direct) including local spending by trail users, property value and other impacts of both construction and use (indirect and induced)
- Interviews with trail administrators to advise best practices in trail development
- A discussion and analysis of consumer surplus including quality of life and health
- Recommendations regarding ways to best capitalize on the construction of the NRG through development and redevelopment strategies to attract visitors including marketing and amenity development

The literature review in this document was conducted by John McDonald as part of a summer internship with Laura Brown, Community and Economic Development Educator with the University of Connecticut Extension. The review involved a thorough search for relevant literature through standard academic search engines including SCOPUS and Google Scholar. Additional documents reviewed for this review included meeting minutes from the Naugatuck Greenway Steering Committee, reports and studies related to the completion of the existing sections of the NRG.

For more information about this study contact:

Aaron Budris - Regional Planner - GIS Specialist
Naugatuck Valley Council of Governments
49 Leavenworth Street, 3rd Floor, Waterbury CT, 06702
203.757.0535 abudris@nvcogct.org www.nvcogct.org

Laura E. Brown, Community & Economic Development Educator
University of Connecticut - Department of Extension
Fairfield County Extension Center, 67 Stony Hill Rd, Bethel, CT 06801-3056
Direct: 203.207.0063 Main: 203.207.8440 laura.brown@uconn.edu

1. Introduction

1.1 Purpose

Despite having the fourth highest population density in the United States (United States Census American Community Survey, 2013), Connecticut possesses many areas of great natural beauty. More significantly, these resources are located within a short drive of the state's major cities, and thus provide an easily accessible respite from the pressures of urban life. As the course of economic history has played out in Connecticut, many industrial complexes have been abandoned and reapportioned. Rivers and contaminated sites have been reclaimed and remediated, and many disused canals and railway lines are seeing new life as multi-use trails and greenways. Greenways are defined by the Connecticut State Legislature as corridors of open space that serve several key functions. Greenways protect natural and historical resources such as watersheds, rivers, scenic landscapes, and archaeological sites; connect existing protected areas and provide recreational access for local residents; and, if comprehensive plans reach their fruition, will link communities through an extensive network of public pathways which can also serve as an alternative mode of transportation (Connecticut General Statutes, as cited in Connecticut Department of Energy and Environmental Protection, 2015).

This literature review represents one part of a study to assess the potential economic impacts of the development Naugatuck River Greenway (NRG) Trail, a proposed 44 mile multi-use trail that will run through the eleven Connecticut communities through which the Naugatuck River flows: Torrington, Harwinton, Litchfield, Thomaston, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia, and Derby. As of this writing, five sections of the Greenway have been completed: the Derby Greenway (2 miles), the Ansonia Riverwalk (0.5 miles), Beacon Falls, (0.5 miles), and Naugatuck (1.1 miles). The study addresses the primary question "How will communities and residents along the Naugatuck River benefit from their investment in building the proposed trail?" It is important to note that the intrinsic value of greenspaces and trails, including the ecosystems and environmental services, mental and health benefits, and other factors that contribute to the quality of life for residents are difficult to monetize and may not be well represented in an economic impact analysis. Decision-makers should consider both intrinsic value and the economic impacts of greenways as vital elements in policy making and resource allocation.

While there will be significant costs involved in constructing the NRG, local decision-makers may see potential to capitalize on the trail as an economic engine for the region and to improve the quality of life for residents. Because it will not be constructed along an existing road or rail, the process of constructing the 44-mile Greenway will be long and involved. The valley is heavily urbanized in many spots, and access to the river is limited in many places. The property along the river is divided among federal, state, municipal, and private ownership. Additionally, the business of coordinating stakeholder negotiations and allocating funds for land acquisition requires buy-in on behalf of the communities in the valley. The Naugatuck Greenway Steering Committee, consisting of representatives from the eleven communities along the proposed NRG route and administered by the Naugatuck Valley Council of

Governments, has been largely involved in coordinating building efforts and provided oversight for comprehensive planning of the trail through the region. Communities must consider their investment in the trail in light of the overall economic conditions in the region. Many municipalities in this region never fully recovered from the loss of the manufacturing base in the 1970s and 80s, and their economies were further stressed as a result of the recent recession. The Naugatuck Valley towns and cities should assess the greenway as an investment that goes beyond open space preservation.

In 2014 the Naugatuck River Greenway Steering Committee realized the need for a more comprehensive economic impact analysis. Committee members expressed interest in potential trail usage and visitor spending, property value impacts, development and redevelopment possibilities, the possible tie-in with brownfield remediation, and health and quality of life impacts of the Greenway. The University of Connecticut-Cooperative Extension, Naugatuck Valley Council of Governments, and University of Connecticut-Center for Economic Analysis have collaborated to produce an analysis to fulfill the Steering Committee's goal of quantifying the potential economic impacts of constructing the NRG and provides recommendations to municipalities regarding best practices for maximizing these impacts during and after trail construction. The study will be completed in Spring 2016. Specifically the study will include:

- A literature review regarding trail impact studies and background on the NRG
- An intercept survey of trail users to inform the economic impact analysis
- Assessment of economic impacts (direct) including local spending by trail users, property value and other impacts of both construction and use (indirect and induced)
- Interviews with trail administrators to advise best practices in trail development
- A discussion and analysis of consumer surplus including quality of life and health
- Recommendations regarding ways to best capitalize on the construction of the NRG through development and redevelopment strategies to attract visitors including marketing and amenity development

The literature review in this document was conducted by John McDonald as part of a summer internship with Laura Brown, Community and Economic Development Educator the University of Connecticut-Extension. The review involved a thorough search for relevant literature through standard academic search engines including SCOPUS and Google Scholar. Additional documents reviewed for this review included meeting minutes from the Naugatuck Greenway Steering Committee, reports and studies related to the completion of the existing sections of the NRG.

1.2 Definition and History of "Greenways"

"Greenway" is a comparatively recent expression, first seeing use in the late 1970s. However, as early as 1878, Frederick Law Olmsted, Sr. began work on a linear park, today known as the Emerald Necklace, linking Boston's green spaces (University of Massachusetts, 2007). An interconnecting system of open space corridors also appears in Daniel Burnham's 1909 Plan of Chicago (Field, 2008). Burnham's plan was an example of the grand projects associated with the City Beautiful Movement, which was an attempt to recast American cities in a Neoclassical form (Thadani, 2014, pp. 151-154). Olmsted's pupil, Charles Eliot, continued his work in Massachusetts, but the concept of linear open space was largely forgotten in the United States until the environmental movement of the 1960s (University of Massachusetts, 2007). In 1964, Wisconsin architect Phil Lewis created a statewide vision plan which incorporated greenways. Lewis referred to these as environmental corridors (University of Massachusetts, 2007). Whyte (1968), always prescient, pointed out the spatial benefits of linear open space, particularly the greater perimeter of linear strips and their potential to link other green spaces in urban areas where land was otherwise hard to come by (p. 173). Whyte held up the example of the Ruhr Valley Authority in Germany, who had began their greenway construction in the 1920s and had created a very successful network of open spaces in a highly industrialized area (p. 177). Key legislation that gave impetus to the greenway movement in the U.S. included the Wild and Scenic Rivers Act of 1968 and the recognition of National Historic Corridors (Ahern, 2004). The President's Commission on American Outdoors for the United States in 1987 presented a vision of the future in which greenways played an important role. Soon after, a wealth of greenway literature was published including Charles Little's 1990 book, *Greenways for America*, which was described as "most influential" (University of Massachusetts, 2007).

> *Greenways are defined by the Connecticut State Legislature as corridors of open space that: protect natural and historical resources such as watersheds, rivers, scenic landscapes, and archaeological sites; connect existing protected areas and provide recreational access for local residents; and, if comprehensive plans reach their fruition, will link communities through an extensive network of public pathways which can also serve as an alternative mode of transportation (CGS, as cited in Connecticut Department of Energy and Environmental Protection, 2015).*

The greenway movement gathered momentum in the 1990s with Florida an early leader among the states initiating greenway policies. Florida's greenways program was formed in 1991, and a governor-appointed commission and legislation soon followed (Hoctor, Carr, Zwick & Maehr, 2004). In 1995 the Connecticut General Assembly passed Public Act 95-335, which institutionalized Connecticut's greenways program, and the Connecticut Greenways Council recognized the state's first greenway in 2001 (Connecticut Department of Energy and Environmental Protection, 2015). These governing bodies acknowledge that greenways allow for the preservation of urban and suburban open space and provide connections between these. Greenways also provide a public place where people can gather and recreate. The linear

nature of greenways creates multiple opportunities for access, and these pathways can function as unifying elements in the built and social environments. The East Coast Greenway is an ambitious project whose end goal is a non-vehicular, urban multi-use trail running along the eastern seaboard from Maine to Florida. As of 2009, 25 percent of the 196 miles in Connecticut had been completed and 31 percent were under construction (Central Connecticut Regional Planning Agency, 2009). Over fifty Connecticut rivers, trails, and trail systems have been designated greenways as of June 2015 (Connecticut Department of Energy and Environmental Protection, 2015) including the incipient Naugatuck River Greenway.

1.3 History of the Naugatuck River Valley and Implications

Although the recorded history of the Naugatuck River Valley is relatively brief, amounting to some 350 years or so, it is a rich and varied story. The Naugatuck River Valley was a largely arcadian place before the arrival of the first English settlers. Native Americans of the Quiripi tribes such as the Naugatuck and Paugusett fished in the Naugatuck River and hunted in the dense forests that covered the surrounding countryside (Bronson, 1858; Native Languages of the Americas, 2015). Remains of their presence are regularly unearthed, in fact, the archeological investigation of one such site is holding up the construction of Phase I of the Naugatuck River Greenway in Waterbury. The early European colonists made attempts at agriculture, but were thwarted by the rocky soil and hilly terrain. The limited amount of flat land along the river contained richer soil, but was routinely flooded and also unsuitable for growing crops. With the advent of the Industrial Revolution, the climate of the region was drastically altered. Numerous manufacturing enterprises sprang up along the banks of the main river as well as those of its many swiftly flowing tributaries. The early factories were small, but later expanded into major operations, in many cases achieving national prominence. In the early 19th century, pioneering industrialists began producing brass products in Waterbury, and brass manufacturing soon became the cornerstone of the valley's economy (Bronson, 1858; Anderson, 1896; Pape, 1918). The manufacture of rubber products became the dominant industry in the borough of Naugatuck, but the terms Naugatuck Valley and Brass Valley were often used interchangeably (Simons, 2014). A long history of abuse ensued as the Naugatuck River was dammed and diverted, and used as a conduit for waste disposal. The despoilment of the river was utter and extensive, and by the mid 20th century the Naugatuck River had become an environmental disaster zone.

Due to the relatively steep gradient of the Naugatuck River and many of its tributaries, flooding was a major problem and the main reason why Native Americans never established a permanent settlement in the vicinity of the river. The first major flood was recorded in Waterbury in 1691, during which the central green of the village was entirely submerged (Bronson, 1858). Numerous other floods followed, and a wealth of written and photographic evidence portrays often extensive damages to bridges and other structures. The most prodigious flood occurred in August of 1955. Catastrophic damage resulted and 24 people were killed. In the wake of this disaster, the Army Corps of Engineers constructed a system of dams and levees to ensure that such a flood would not be repeated (Connecticut Department of Energy and Environmental Protection, as cited in Naugatuck River Association, 2012). A significant portion of the Route 8 Expressway was built on areas devastated by the 1955 flood.

The project to upgrade Route 8 from a turnpike to an expressway began in 1947, but most of the section that parallels the Naugatuck River was constructed after the flood (America's Lost Roads, 2008). Portions of the old Route 8 still exist in places, and a 2010 greenway routing study identified the Beacon Falls section of the abandoned road as a potential path for the Naugatuck River Greenway in that community (Alta Planning and Design, 2010).

The issue of water pollution in the Naugatuck Valley remained unaddressed for many years. It was not until the nationwide trend toward environmental consciousness, the Connecticut Clean Water Act of 1967, and sweeping amendments to the Federal Water Pollution Control Act in 1972 that remediation efforts began in earnest in the region (Gregorski, 2007; Naugatuck River Association, 2012). As a result of the tireless work of volunteers and the cooperation of government, community, and environmental organizations such as the Naugatuck River Watershed Association, the Naugatuck River currently supports a significant population of native and non-native fish and other wildlife and is clean enough to be used for such recreational activities as fishing, canoeing, and kayaking. The importance of connecting the towns and cities of the Naugatuck Valley with the newly restored river became widely acknowledged, and, in this spirit, the Naugatuck River Greenway was conceived in 2001. The Naugatuck River Greenway Steering Committee mission statement reflects their economic orientation, as it states that their goal is to "harness the vitality and protect the health of the river for economic development and quality of life for all" (Naugatuck Valley Council of Governments, 2012).

The eleven communities through which the Naugatuck River flows and the completed greenway will run are, from north to south, Torrington, Harwinton, Litchfield, Thomaston, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia, and Derby. The population of these cities and towns is expected to increase at a rate greater than the state average between 2012 and 2020 (Connecticut Economic Resource Center, 2014). The projected 2020 population of 303,253 in the Naugatuck Valley region indicates a large number of residents within a short distance of the proposed greenway (Connecticut Economic Resource Center, 2014). Certain recreational activities including fishing and boating will draw people from other areas, adding to the potential pool of greenway users. Connections will be provided between the Naugatuck River Greenway and other trails. In the town of Derby, the greenway will meet up with the proposed multi-use trail running the length of the Housatonic River Valley (Connecticut Department of Energy and Environmental Protection, 2014; Housatonic Valley Association, 2015). This linkage would provide access to the larger statewide network of greenways. The Naugatuck River Greenway will also connect with two hiking trails of the Connecticut Forest and Park Association's Blue-Blazed Trail System, the Mattatuck Trail in Watertown, and the Naugatuck Trail in Beacon Falls (Connecticut Forest and Parks Association, 2006; Alta Planning and Design, 2010). These linkages will enable greenway users to explore the surrounding state forests. The completed greenway will pass through urbanized sections of Torrington, Thomaston, Waterbury, Naugatuck, Seymour, Ansonia, and Derby. Preliminary trail user data from Derby suggests robust greenway usage, and it is hoped that this trend will be replicated in the other urban portions of the NRG.

2. Review of Literature on the Economic Impacts of Greenways

2.1 Definitions

2.1.1 Defining Economic Impacts

According to our review of literature, there are two basic types of analyses generally used in evaluating greenway projects: economic impact and benefit cost analysis (Bunting & Briand, 2003). Economic impact can be defined as "the effects of a project or program on the level of economic activity in a given area" and these analyses generally involve the use of formal economic models (Weisbrod & Weisbrod, 1997; Bunting & Briand, 2003). For the purposes of this study, the change in the economy is the construction and implementation of the full extent of the Naugatuck River Greenway. The potential impacts of greenways may be estimated based on many rationales including impacts as a result of: spending by local residents or tourists who use the trail, spending as a result of trail construction or maintenance, and impacts on local property values. Additional considerations include potential reductions in public costs as the result of the greenway as well as any "consumers' surplus," the net benefit consumers gain in general from a natural amenity over and above what they pay to use it (XX). The National Park Service produced the useful Guide "Economic Impacts of Parks, Rivers, Trails and Greenways" (UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, 1995) that presents a summary of relevant literature for various realms of economic impact but this has not been updated since 2004 (Nadel, 2005).

A benefit cost analysis can also be useful in determining a project's feasibility, cost effectiveness, and net present value by taking the expected benefits of the greenway in terms of dollars and dividing this figure by the expected cost of construction. The number arrived at is called the benefit cost ratio (Brodnitzki, 1994; United States Department of Interior, National Park Service, 1995; Weisbrod & Weisbrod, 1997; Bunting & Briand, 2003, Nadel, 2005). Used in conjunction, economic impact and cost benefit analyses can provide a comprehensive picture of the effect that a greenway will have on the local economy. While a full cost benefit analysis is not within the scope of the Naugatuck Greenway Economic Impact Study this study does consider ways the trail creates values, such as property valuation, over and above direct expenditures alone.

2.1.2. Defining Economic Effects

There are three main classes of economic effects which are considered by nearly all economic impact analyses. These are direct economic effects, indirect economic effects, and induced economic effects. Dynamic economic effects are also often examined (United States Department of Interior, National Park Service 1995; Weisbrod & Weisbrod, 1997; Nadel, 2005). The total economic impact is generally acknowledged to be the sum of these effects (United States Department of Interior, National Park Service, 1995; Nadel 2005; Weisbrod & Weisbrod, 2007; Morgan, 2010). *Direct effects* are impacts as a result of direct spending by consumers. In the example of a greenway or multi-use trail, direct effects can be defined as purchases made by greenway users including spending on food, gasoline, gear, equipment like bikes or services.

This also includes tourism expenditures such as lodging or recreational activities or labor hired by construction firms to build the trail. *Indirect effects* refer to the effects of a change in the economy, in this case the NRG trail construction, on inter-industry transactions. Indirect economic effects may include purchases of supplies and materials by the producers of greenway-related products and services. That is, when consumers purchase more bicycles, local suppliers may need to buy more parts or construction companies purchase necessary equipment or supplies. *Induced effects* refer to the increased or decreased buying power as a result of any changes in household income. These may include purchases of production supplies and materials by producers, resulting from purchases by households in the area where the greenway is located (United States Department of the Interior, National Park Service, 1995; Nadel, 2005). A useful analogy is to think of indirect and induced impacts as the ripple effect of the direct impacts (Morgan, 2010). Dynamic economic effects are shifts over time in population and business location, and changes in land value and land use patterns as a result of the greenway (Weisbrod & Weisbrod, 1997, p. 5). These effects can further be broken down into *net impact*, which is the expansion or contraction of an area's economy due to the project or program, and *gross impact*, which is the project or program's contribution to the area economy. Economic impacts can lead to additional *fiscal impacts*, which are changes in government revenues and expenditures (Weisbrod & Weisbrod, 1997). These changes can affect an ongoing project or program, and have an effect on the regional economy.

Multipliers are often used to determine the net impact of a project or program and consider gross output, or the value of all outputs produced in the region of study; aggregate personal income, value added, and employment. Multipliers are ratios derived by dividing the net impact by the direct effects. The most commonly used multipliers are the Type 1 Multiplier [direct effects + indirect effects / direct effects] which measures the industrial response to change due to a project or program, and the Type 2 Multiplier [direct effects + indirect effects + induced effects / direct effects] which, in addition, measures the consumption-induced response to change due to a project or program. (United States Department of the Interior, National Park Service, 1995; Nadel, 2005, Queensland Government, 2012). Multipliers vary by industry sector. Businesses who buy most of their supplies and materials locally and sell outside of the region will have larger multiplier effects than those who purchase supplies and materials from outside of the region and sell locally (Morgan, 2010). In a regional economy with a large variation between industries, applying a single multiplier does not produce the most accurate results and analysis via formal economic models becomes necessary (Morgan, 2010).

2.2 Economic Models

The methods used to determine economic impact have advantages and drawbacks, and a comprehensive analysis involves consideration of the study region and the nature of the project or program in selecting the best measure. The formal economic models used to determine multiplier effects are input/output models such as IMPLAN (IMpact analysis for PLANning) and RIMS-II (Regional Input/output Modeling System II) and economic simulation models such as REMI (Regional Economic Models, Inc.) (United States Department of the Interior, National Park Service, 1995; Weisbrod & Weisbrod, 1997; Bunting & Briand, 2003,

Nadel, 2005). Input/output models take existing economic data and use these to directly estimate full income and jobs effects and effects of changes in spending due to the project. Input/output (I/O) models are popular because they are easy to use and relatively transparent (Queensland Government, 2012, p. 2). One drawback of input/output models is that they do not determine the dynamic impacts of a given project (Weisbrod & Weisbrod, 1997, p. 8). Also, they do not account for changes in industry structure due a project or program nor do they account for price responsiveness, whereby price change functions as a rationing device to compensate for constraints on the availability of inputs (Queensland Government, 2012, p. 2). For this reason, I/O models are sometimes used in conjunction with an economic simulation model. Economic simulation models work the same as I/O models, but also provide a long-term economic forecast for the study area based on the total effects over time of full job and income effects and the effects of changes in spending (National Park Service, 1995; Weisbrod & Weisbrod, 1997; Bunting & Briand, 2003).

Economic simulation models include *econometric models*, which produce estimates based on statistical analysis, and address the shortcomings of the I/O model, and computable general equilibrium (CGE) models, which provide a more comprehensive account of the effects of price on a regional economy. General equilibrium refers to the state reached when supply and demand are balanced, and CGE models assume profit maximization on the part of producers and utility maximization on the part of consumers (Queensland Government, 2012, Regional Economic Models, Inc., 2015). In addition, there are economic geography models which examine spatial relationships such as transportation costs and accessibility to skilled workers and specialized inputs. CCEA will be running a REMI analysis in addition to a survey of area residents in order to determine the overall potential net impact of the Naugatuck River Greenway. The REMI model works by combining elements of four major modeling approaches: Input/output, General Equilibrium, Econometric, and Economic Geography. REMI builds on the strengths of each of these approaches to provide a comprehensive analysis (Regional Economic Models, Inc., 2015).

2.3 Measuring Economic Impacts

This section discusses how various types of expenditures related to greenways can affect an economy and provides a short review of relevant literature. Because each greenway or trail is unique, we include areas of potential expenditure and impact that are most relevant for the NRG. These include trail user expenditures, tourism impacts, amenity benefits (which include consumer surplus and increases in property values, tax revenue, public cost reductions, and quality of life and health impacts), expenditures by agencies, and expenditures due to construction and development. Some trails or greenways may have significant impacts related to commercial uses such as rentals for events, impacts related to agency oversight, or fees charged for trail use, most of which are not anticipated for the NRG.

2.3.1 Outdoor Recreation Trends

Understanding trends in leisure and outdoor recreation may provide guidance in estimating current or future use, and related expenditures, on the NRG. Leisure activities are typically considered activities that take place outside of work during free time and spending on these activities is typically discretionary. Outdoor recreation is one component of leisure spending and includes activities that are common on trails and greenways including bicycling, walking, or running/jogging. Because the Naugatuck River Greenway runs parallel to the Naugatuck River, other anticipated uses along the Greenway may include fishing and kayaking. The following statistics provide an overview of general trends related to outdoor recreation participation and spending:

- According to the Outdoor Foundation, 48.8 % of all Americans, 141.4 million people, participated in at least one outdoor activity in 2014. While overall participation in outdoor activities shifts from year to year based on weather conditions, it has remained relatively unchanged since 2006. Nationally, the most favored (by frequency of activities) activities among those under the age of 25 are running, jogging and trail running, bicycling and skateboarding while the most favored activities for adults above the age of 25 are running, jogging and trail running, bicycling and bird-watching. Running, fishing, and bicycling were the most popular adult activities by participate rate (Outdoor Foundation, 2015).
- Activities that have seen the greatest increases in national participation in the past three years include adventure racing (+37.6%) and backpacking (+12.8%) however, other greenway related activities have experienced increases as well including trail running (10.3%), fishing (+1.0%), day hiking (+1.7%), recreational kayaking (+2.5%) and running/jogging (+0.7%) (Outdoor Foundation, 2015).
- While there were national participation increases in adventure and mountain biking, paved surface biking declined by 0.5 percent (-0.5%) over the past three years (Outdoor Foundation, 2015).
- Outdoor enthusiasts overall are male (54%, compared to 46% female), Caucasian (70%), and are motivated to recreate outdoors as a way of getting exercise (70%) (Outdoor

Foundation, 2014). Thirty percent (30%) of outdoor enthusiasts earn an annual household income of $100,000 or more.

- A report by the Outdoor Industry Association estimates that 61% of Connecticut residents participate in outdoor recreation each year, generating $6.9 billion in consumer spending, 71,000 direct jobs and $502 million in state and local revenue (Outdoor Industry Association, 2013).

2.3.2 Trail User Expenditures

One of the most basic ways of considering economic impact is in the value of dollars spent by trail users. Spending by local residents typically refers to residents who reside within a given radius of a trail or greenway. While this generally does not include spending by tourists who live out of the area and tend to stay overnight, some studies do not explicitly differentiate between local and non-local visitors. Local resident spending may include clothing or footwear, equipment, gear or related outdoor recreational services, travel to and from the trail, food or concessions, as well as any fees paid to use the trail or park. Local resident spending can be estimated using data directly from users or from local businesses in communities along a trail. It is important to use caution in estimating changes in business sales however, since the presence of a trail or greenway may be one of many factors impacting a business. In September 2015 researchers for this study will collect spending data and trail user information through an intercept survey assessed at six points along existing portions of the NRG. Because only a few small sections of the NRG are built, there are not likely to be significant numbers of trail users from outside of the local area. Economic models can be used to determine the likely spending on the full extent of the trail based on primary data collected on the NRG as well as reasonable estimates from similar trails.

The actual amount of local spending on a trail or greenway may vary significantly by state or region, demographic of trail users, proximity to a major metro area, or proximity to or availability of amenities. There is also significant variation in how "local visitors" or spending categories are defined when, and if, primary data is collected from a trail. These factors complicate the task of determining average or generalized spending figures from trail to trail. Collecting primary data on a trail over a period of time is probably the most effective way to estimate spending.

- A 2013 study of 3,133 national participants (distributed across regions) in non-motorized recreational activities found that participants spent an average of $60.26 per trip on trail-based recreational day trips $43.81 on bicycle related recreational day trips. (This study used in or out of state to distinguish between local travelers and thus does not differentiate between local and non local tourists within the state) (Outdoor Industry Association, 2013)

Average Per Trip Expenditures for Non-Motorized Recreation

Day Trips	Trail Based	Bicycle Based
Food and Drink	$18.73	$14.91
Transportation	$20.97	$15.05
Recreation & Misc	$12.93	$8.61
Souvenirs	$7.62	$5.24
TOTAL	**$60.26**	**$43.81**
Overnight Trips		
Food and Drink	$32.66	$33.54
Transportation	$37.17	$31.65
Recreation & Misc	$20.47	$20.85
Souvenirs	$5.40	$17.04
Lodging	$43.91	$47.86
TOTAL	**$148.89**	**$150.93**

Outdoor Industry Association, 2013

- Participants in *trail based* recreation spent an average of $119.30 annually on equipment and accessories including:

Average Annual Expenditures for Equipment and Accessories

	Trail Based	Bicycle Based
Apparel	$33.21	$31.25
Equipment	$26.12	$55.78
Accessories	$20.54	$19.98
Services	$16.25	$11.27
For Children	$23.18	$13.10
TOTAL	**$119.30**	**$131.38**

Outdoor Industry Association, 2013

- The same report estimates that Connecticut residents spend a total of $353,489 annually on trail based recreation and $704,067 on bicycle based recreation.

Many impact studies have been conducted on greenways and trails around the United States using methods similar to those used for this study. The following selected studies were reviewed as comparable recent examples of east-coast trails.

- A 2010 study of the 12.5 mile Burlington Waterfront Path in Vermont estimated that in-state day users spent an average of $60.20 per trip and out-of-state domestic day users spent $67.16. In-state overnight users spent $124.78 while overnight out of state domestic users spent $156.84. Out-of-country users has the highest expenditures per trip at $80.63 for day users and $193.31 for Overnight users (University of Vermont Transportation Research Center, 2010).

- A 2004 survey of the 20 mile Northern Central Railroad Trail in Maryland found that users spent an average of $333.12 on "Hard goods" such as bikes, gear, shoes and supplies, $9.14 on "Soft goods" such as snacks, food, and rentals, and $61.09 on Accommodations (Trail Facts, 2004).
- The Georgia Silver Comet Trail Economic Impact Analysis conducted in 2013 found that most trail users spend about $50 on trail use, (additional spending data was not collected and all other figures are extrapolated) (Alta Econsult Solutions, 2013).
- A 2004 Study of the Virginia Creeper Trail found that primary day users of the trail spent $17.16 and users who stayed overnight spent $82.10. Those who used the trail but were in the area for another primary purpose spent $12.31 if they were there for the day and $7.02 for overnight (Bowker, 2004).

2.3.3 Tourism Impacts

While tourism and travel represent an economic engine for many areas of the United States, tourism does not encompass one particular industry sector, product or service making its impact difficult to quantify (Smith, 1997, Nadel 2005). Industrial sector areas from the Census Bureau's SIC or the NAICS often include hotel and other forms of lodging, restaurant or other eating establishments, travel, retail, and some services. As described above, "local" visitor spending is sometimes difficult to separate from "tourist" spending unless there are overnight stays or the origin of the visitor or the intention of the visit is known.

Natural amenities, trails, parks, greenways, open space and wildlife habitat play an important role in tourism, particularly for leisure travelers. Amenities with significant tourist drawing power might include national parks or established bike trails or walks. Not all of these amenities have significant tourist drawing power and the extent of the draw may help to determine what proportion of travel expenditures can be attributed to the amenity itself (Nadel, 2005).

The Connecticut Department of Community & Economic Development has contracted with Witan Intelligence to conduct "Vision Intercept" tourism intercept surveys throughout the state, including casinos, beaches, parks, shopping destinations, arts venues, farms and markets, vineyards and other tourist venues every year since 2001. This survey includes questions about spending, demographics, and satisfaction.

- According to the 2014 Vision Intercept Survey report 35% of all parties included someone from out of state and visitors from New York and New Jersey accounted for 46% of all out of state visitors (Witan Intelligence, 2015).
- Connecticut residents represent 2/3 of the state's overall tourism market. Over the past 4 years the number of tourism trips by Connecticut residents has grown from 6.7 to 10 trips annually (Witan Intelligence, 2015).
- Visitor parties spent an average of $623 during each trip, and a total of $4,859 each year. Local residents spent $369 per trip (mainly on shopping, meals and recreation)

while out of state visitors spent $1,114 per trip (mainly on lodging, wagers and shopping). Two out of three parties spent an overnight (Witan Intelligence, 2015).

- The median household income of visitors was $76,300 and 16% earned more than $150,000. Thirty-eight percent (38%) of parties included children and 33% included someone 55 or older.
- While the percentage of parties with out of state residents declined slowly from 2002 (48%) to 2014 (37%), the average percent of all trips made in Connecticut increased from 47% in 2002 to 61% in 2014 (Witan Intelligence, 2015). The peak of 82% in 2006 during the recession suggests that economic downturns may cause a "staycation" effect in which tourists to seek recreation opportunities and vacations closer to home.

The 2013 Traveler Research Profile compared Connecticut travelers to a set of travelers in other New England states. This study suggests that at the time of this study travelers to Connecticut (including business and leisure travelers) are largely not participating in activities related to trails and greenways compared to travelers to eight other New England area states. These were largely out of state travelers (81.5%) from the New York metro area with overnight stays (73.9%).

- Fewer travelers to Connecticut participate in hiking or other adventure sports (1.1%) than travelers to other New England States (3.0%). Fewer travelers to Connecticut participate in fishing (1.3%) compared to other states (2.0%), biking (0.8%) compared to other states (1.9%), or bird-watching (2.0%) compared to other states (2.5%). Primary activities included visiting relatives and friends, dining, gambling, and going to the beach (H2R Market Research, 2013).

Trails and greenways have also been shown to support local business development as a result of increased visitation to the area or to "gateway communities." Following trail openings, communities have documented increases in businesses such as lodging and restaurant facilities, bike rental establishments, and bed and breakfasts (Nadel, 2005). Business output, or sales volume, includes the gross level of business revenue and net business income and is probably the most common measure of business activity. This can be a misleading measure of economic impact however, since it does not distinguish between activity which generates substantial local profit and that which generates relatively little local profit or income from the same level of sales (Weisbrod & Weisbrod, 1997, p. 3). It is important to note, that the presence of a trail itself does not imply that business will naturally increase. Communities might facilitate business development efforts by providing adequate signage and access to the trail, supporting local businesses by helping them understand trail user demographics and spending preferences, and coordinating efforts for local businesses to reach trail users.

2.3.4 Trail Construction and Maintenance

In addition to direct spending, a commonly used method determining economic impact is measuring total employment, or the number of jobs created by a trail. With regard to the Greenway, the greatest increase in jobs is likely to be the result of trail construction or maintenance. Employment may in turn impact aggregate personal income, the increase in personal income in the area or personal income which we would expect to increase as pay levels rise and/or additional workers are hired. Other impacts as a result of construction may include value added, or gross regional product, the sum of wage income and business profit generated in the study area. This is the most widely used measure, but care must be taken as the value added method often overestimates a project or program's impact due to the globalization of economy whereby goods are often purchased and profits often invested outside of the study area (Weisbrod & Weisbrod, 1997, p. 2).

For the purposes of this analysis, construction and maintenance estimates were determined for each section of trail and will be integrated into the REMI model. The project of estimating construction costs for the NRG is complicated by the piecemeal approach to construction as each community will undertake its own section of trail, as well as the unique conditions faced by each community in creating the trail around existing transportation, rail, and industrial infrastructure.

2.3.5 Health and Fitness Impacts

This section provides a brief overview of possible health and fitness impacts that might be included in an impact analysis. Since many trail and greenway users primarily use these facilities for exercise, it is logical to consider how these amenities may improve physical and mental health and reduce the costs of healthcare. In the face of the obesity and other chronic illnesses, planners, public health and medical professionals have begun to consider how changes in the built environment, such as parks and trails, might contribute to a solution. While a full literature review for health and fitness impacts was not in the scope of this work, this will be explored in future revisions of this document.

2.3.6 Estimating Consumer Surplus

Trails and greenways provide many benefits that do not have existing and established market values. Greenways are considered non-market goods as they are publicly accessible by all, not just those who would pay to utilize their recreational resources (Brodnitzki, 1994; Bunting & Briand, 2003). *Consumers' surplus*, or net willingness-to-pay, is a monetary measure of net consumer benefit. Net willingness-to-pay is calculated by subtracting the amount spent on a good or service from an individual's willingness-to-pay. If the number derived is positive, it is consumers' surplus. This surplus money may be spent locally, directly affecting the regional economy (Dumas, Herstine & Whitehead, 2012). Because many greenways do not have explicit fees, willingness to pay for perceived or actual benefits of a greenway is an important part of an impact analysis. This section provides a brief overview of some aspects of valuation that may be discussed further in an impact analysis.

Typically, benefit cost analyses work by assigning economic value to all aspects of a given project in order to determine the present net value of economic benefits (Bunting & Briand, 2003, p. 7). Researchers will place a value on non-market goods by assessing an

individual's *willingness-to-pay*. Willingness to pay is an accepted technique for measuring the value of outdoor recreation and refers to the maximum amount someone is willing to pay to engage in recreation rather than forego it (Loomis, 1997).

The methods used to assign to willingness to pay values include *revealed preference* and *stated preference*. Revealed preference techniques rely on aggregate behavioral data to arrive at a monetary figure. The two most common revealed preference methods are *hedonic pricing* and *travel cost method (TCM)*. The hedonic pricing approach examines property values both near and away from the greenway. After accounting for all pricing variables, the hedonic pricing method can calculate the estimated willingness-to-pay for properties located next to the greenway (Bunting & Briand, 2003). The travel cost method works by estimating greenway users' willingness-to-pay based on amount they spend traveling to and using the greenway (Bunting & Briand, 2003).

Stated preference techniques involve gathering data from users and include *contingent valuation* and *unit day value*. Contingent valuation is a hypothetical model used to assign monetary value to both the positive and negative aspects of a project. This method is employed through the administration of a survey to a sample of the affected population (Brodnitzki, 1994; Bunting & Briand, 2003, p. 7). While contingent valuation is used more frequently than unit day value, it may introduce respondent bias (Bunting & Briand, 2003, p. 7). One example of this is presented in Brodnitzki's (1994) work as part of a benefit cost analysis of the proposed Lower Housatonic River Greenway. Survey participants were first presented with a dichotomous choice question asking if they would be willing to pay to use the greenway. Next, participants were given a payment card with several ranges of payments and asked to choose one. From these questions, the researcher was able to assess these residents' willingness-to-pay for the proposed greenway. *Unit day value* is much less hypothetical than contingent valuation. Various agencies, such as the Water Resources Council (Nadel, 2005) have use this method to determined recreational expenditures for certain activities per day per person. The Recreation Use Database of North America includes 352 studies of economic valuation studies for various outdoor recreation activities (Recreational Use Values Database, 2015).

Currently little local data exist to inform reliable instrument to measure consumers' surplus for the purposes of this study. The UConn Extension and Naugatuck Valley Council of Governments have designed a trail-user survey that will be administered via intercept at various points along the extent portion of the Naugatuck River Greenway. The data obtained will support the more detailed economic information generated by REMI, and allow for the calculation of such variables as willingness-to-pay. Better understanding consumers' surplus for trails and greenways in the state of Connecticut also spurred the development of a statewide trail survey project that would involve regular longitudinal data collection on trails throughout the state.

2.3.7 Amenity Benefits and Property Valuation

Resources such as trail and greenways may have value even to those who do not explicitly use them. These may be considered *passive-use* values. One form of passive use

value is preservation (Walsh, Sanders, and Loomis as cited in Nadel, 2005). Preservation values include option value, the knowledge of guaranteed future access to the greenway; existence value, the knowledge that the greenway will be preserved in perpetuity; and bequest value, the knowledge that future generations will have access to the greenway.

Another form of passive use value is property valuation. This describes changes in property values as a result of proximity to trails or green spaces. Weisbrod notes that property values should be used with caution since increases in property values due to a project or program are often offset by a decrease in other areas and may have little net impact on a regional level (Weisbrod & Weisbrod, 1997). Property values may increase due to proximity to open space, and this seems to be most pronounced when the greenways highlight open space, prohibit vehicular access, and have regular maintenance and security (United States Department of the Interior, National Park Service, 1995). It is important to note that while the effect of greenways on property values remains unclear, no negative effects have yet been determined (Nicholls & Crompton, 2005).

- A 2011 study by the Connecticut Center for Economic Analysis analyzed the value of properties overlooking state parks and or forests and state trails. While the results varied by region, this study identified a "green space bonus" of $41,961 to $50,124 of properties overlooking DEP managed green spaces compared that those that were not (Gunther, Parr, Graziano, Carstensen, 2011).

A full literature review of other forms of passive valuation was beyond the realm of this report but further research should be conducted to discover valuation techniques most relevant to the NRG.

3. Trail case studies from Connecticut ??? Greenway Case Studies

The value of regional trails has increased in recent years due to changes in the leisure industry that are tied to overall economic conditions. Due to financial constraints, people are taking shorter, more frequent trips, both in duration and distance, and are more apt to choose promises to have a positive effect on local destinations (economies, contributing to what is referred to as recapture, in this sense meaning a region's ability to retain local tourists. (Belson, 2007; Carstersen, 2015). Trail length and connections are an important factor to consider when determining the potential of a trail to draw non-local users as completed trails and interconnecting trail systems see heavier use than incomplete or isolated trails and offer connections to communities outside the trail region (Trail Facts, 2005). For this reason, we consider the following short case studies of trails in Connecticut that are comparable to the NRG.

As can be seen from these case studies, very little directed research has been conducted regarding trail user or trail impact in the state of Connecticut. Despite the twenty year history of the Connecticut Greenways Council, construction of greenways and studies of their impacts have been progressing a slow pace. In this sense, the Naugatuck River Greenway is both a common example and a new opportunity. The partnership between the UConn Extension, the Naugatuck Valley Council of Governments, and the Connecticut Center for Economic Analysis represents the first collaborative effort of its kind and the first economic impact study of a Connecticut greenway. The Naugatuck River Greenway Economic Impact Analysis Study which this review prefaces, promises to set a precedent for subsequent studies.

3.1.1 Farmington River Trail / Farmington Canal Heritage Trail

Length: 29.5 miles/56.5 mi

Region: Hartford, New Haven Counties

In Connecticut, the Farmington Canal Trail and Farmington River Trail are part of the Farmington Canal Heritage Trail extending into the neighboring state of Massachusetts.

The Farmington Canal was constructed in the 1820s and 30s as a means of bypassing Hartford, where the navigable portion of the Connecticut River ends, in order to transport goods from the harbor at New Haven into central Massachusetts. The canal ceased operations twelve years after its completion in 1835, but a railway was built within its right-of-way, portions of which remained active until the late 1990s (Central Connecticut Regional Planning Agency, Farmington Valley Greenway, 2009). In the 1990s, work began on the Farmington Canal Linear Trail in Cheshire and Hamden and on the Farmington River Trail in Burlington. The idea of creating the Farmington Canal Heritage Trail from New Haven to Massachusetts was borne of the nationwide greenway movement of the 2000s. The Connecticut portion of the East Coast Greenway will follow much of the Farmington Canal trail. (East Coast Greenway, 2015).

A 2013 Farmington River Trail user study extrapolated data gathered in Farmington, Canton, and Suffield from May to October of 2013 and arrived at roughly 250,000 trail uses per

year. This data was collected using infrared motion sensors. (Farmington Valley Trails Council, 2014). The Naugatuck River Greenway study proposes a similar trail count method in addition to intercept surveys. In 2013, the Burlington portion of the trail was studied, and an estimate of nearly 100,000 annual uses was predicted (Central Connecticut Regional Planning Agency, 2014). Both studies used National Bicycle and Pedestrian Documentation Center methodology to arrive at these figures. The Farmington Canal Trail sees even heavier usage, with over 400,000 annual uses estimated for its Southington location (Central Connecticut Regional Planning Agency, 2014). The Burlington study determined that most trail users were locals, although some came from Massachusetts, and that the majority of people used the trail for walking (Central Connecticut Regional Planning Agency, 2014). These utilization and demographic characteristics are likely to be common for most Connecticut greenways, and can be expected to be found along the existing sections of the Naugatuck River Greenway.

3.1.2 Airline State Park Trail

Length: 53 miles

Region: Hartford, Middlesex, New London, Windham Counties

The Air Line State Park Trail runs 53 miles from the Massachusetts border to the town of East Hampton. The trail follows the route of a former railway line from New York to Boston. The Air Line Railroad was completed in 1873 and is a remarkable feat of engineering, maintaining a relatively level grade while cutting through the hilly region (Rails-to-Trails Conservancy, 2015). The modern multi-use trail is part of the proposed East Coast Greenway and a Connecticut state park. There are plans to create a counterpart trail in Massachusetts along the former Air Line right-of-way. In the town of Willimantic, the Air Line Trail intersects with the Hop River Trail and Willimantic River Greenway, providing a link to trails to the west and to the proposed path of the East Coast Greenway (Willimantic Whitewater Partnership, 2015). The Air Line trail runs through an area that is largely rural, referred to as the Last Green Valley, as it is one of the few places on the eastern seaboard that has not been built up (The Last Green Valley, 2015). As of the time of this review, no trail user surveys had been conducted on the Air Line trail.

3.1.3 Housatonic Riverbelt Greenway

The Housatonic Riverbelt Greenway was conceived in the late 1990s and officially recognized in 2001 (Housatonic Valley Association, 2015; Connecticut Department of Energy and Environmental Protection, 2015). Various offshoots received greenway status in following years including the Pequonnock Valley Greenway in Trumbull, the Still River Greenway running from Danbury to New Milford, and the Shelton Greenway System (Connecticut Department of Energy and Environmental Protection, 2015). The Trumbull trail is of interest to the University of Connecticut Extension and may be included in a statewide study of multi-use trail usage. The Housatonic Riverbelt Greenway currently exists in a fragmentary state, much like the proposed Naugatuck River Greenway. Numerous plans are in place, including those in the Lower

Housatonic Valley in Stratford (Greater Bridgeport Regional Planning Authority, 2008) but relatively few trail sections have been completed.

Given the greater length of the Housatonic River, about 139 miles from its source at Lake Washington in Massachusetts to its mouth at the Long Island Sound in Stratford and Milford, and the interstate region involved, this system can be expected to take longer to construct. While canoe and kayak use of the river is encouraged, many dams exist, some providing hydroelectric power. Portages are necessary, and, in some instances, boaters are required to walk along area roads (Housatonic Valley Council of Elected Officials, 2015). These gaps in the greenway's continuity will be difficult to address. As in the Naugatuck River Valley, riverside land is divided among numerous jurisdictions, including several state parks. Many hiking trails intersect with the proposed greenway, including the Appalachian Trail which follows the portion of the Housatonic River located in Kent. No trail user data exists for the Housatonic Riverbelt Greenway as a whole, and, as of the time of this review, there have been no in-depth trail user studies of its extant sections and various spurs.

References

Ahern, J. (2004). Greenways in the U.S.A.: Theory, trends, and prospects. In R. Jongman & G.Pungetti (Ed.), *Ecological networks and greenways: Concept, design, and implementation*. Cambridge: Cambridge University Press. DOI: http://dx.doi.org/10.1017/CBO9780511606762.005

Alta Planning and Design. (2010). Regional Naugatuck River greenway routing study: Town of Beacon Falls, Connecticut. Retrieved from http://nvcogct.org/sites/default/files/COGCNV-Naugatuck-River-Greenway-Routing-Study-Beacon-Falls_0.pdf

Alta Planning and Design. (2010). Regional Naugatuck River greenway routing study: Town of Watertown, Connecticut. Retrieved from http://nvcogct.org/sites/default/files/COGCNV-Naugatuck-River-Greenway-Routing-Study-Watertown.pdf

Alta Econsult Solutions. (2013). Silver Comet Trail Economic Impact Analysis and Planning Study. Retrieved from http://www.bwnwga.org/wpcontent/uploads/Silver_Comet_Combined.pdf

America's Lost Roads. (2008). Connecticut Route 8. Retrieved from http://lostroads.wikidot.com/ct-8

Anderson, J., Prichard, S., & Ward, A. (1896). *The town and city of Waterbury, Connecticut*. Vol. 2. New Haven, Connecticut: Price and Lee.

Belson, K. (2007). Vacations get shorter, but turn up more often. *New York Times*. Retrieved from http://www.nytimes.com/2007/08/18/nyregion/18weekend.html?_r=0

Bowker, J. M., Bergstrom, J. C., & Gill, J. K. (2004). The Virginia Creeper Trail: an assessment of user demographics, preferences, and economics. *Virginia Department of Conservation*. Retrieved from https://www.greenway.org/pdf/va_creepertrail_study.pdf

Brodnitzki, W. (1994). An economic evaluation of a proposed greenway using a contingent valuation method in a benefit/cost framework : a case study of the lower Housatonic Riverbelt. Thesis. Storrs, Connecticut: University of Connecticut.

Bronson, H. (1858). *The history of Waterbury, Connecticut; the original township embracing present Watertown and Plymouth, and parts of Oxford, Wolcott, Middlebury, Prospect and Naugatuck*. Waterbury, Connecticut: Bronson Bros.

Bunting, D. & Briand, G. (2003). Impact of trails and greenways in Spokane's Great River Gorge. Eastern Washington State University Institute for Public Policy and Economic Analysis. Retrieved from http://friendsofthefalls.org/documents/EWU-ecostudy.pdf

Carstersen, F. (2015). August 7, 2015 meeting of the Naugatuck River Greenway economic impact analysis team.

Central Connecticut Regional Planning Agency. (2013). User survey of the Farmington River Trail. Retrieved from http://www.ccrpa.org/projects/trails/Burlington%20Trail%20User%20Survey%202013%20Report.pdfhttp://www.ccrpa.org/projects/trails/Burlington%20Trail%20User%20Survey%202013%20Report.pdf

Central Connecticut Regional Planning Agency. (2009). Southington-Plainville Farmington Canal Greenway Study. Retrieved from http://www.fvgreenway.org/pdfs/Southington-Plainville-Farm-Canal-Greenway-Study.pdf

Connecticut Department of Energy and Environmental Protection. (2015). Connecticut greenways. Retrieved from http://www.ct.gov/Deepdeep/cwp/view.asp?a=2707&q=323858&DeepNavdeepNav_GID=1704%20

Connecticut Economic Resource Center. (2014). Town profiles. Retrieved from https://www.cerc.com/TownProfiles/

Connecticut Forest and Park Association (2006). *Connecticut walk book: West.* Rockfall, Connecticut: Connecticut Forest and Park Association.

Dumas, C., Herstine, J. & Whitehead, J. (2011). Joint estimation of revealed and stated preference trip and willingness-to-pay data to estimate the benefits and impacts of an Atlantic Intracoastal Waterway dredging and maintenance program. In J. Whitehead, T. Haab & J. Huang (Ed.), *Preference data for environmental valuation: Combining Revealed and Stated Approaches*. London, UK: Routledge.

East Coast Greenway. (2015). Farmington Canal Heritage Trail. Retrieved from http://www.greenway.org/

Farmington Valley Greenway. (2009). Southington-Plainville Farmington Canal greenway study. Retrieved from http://www.fvgreenway.org/pdfs/southington-plainville-farm-canal-greenway-study.pdf

Farmington Valley Trails Council. (2013). Farmington Valley Trail usage study. Retrieved from http://fvgreenway.org/pdfs/FVTC%20Trail%20Usage%20Study%20Complete.pdfhttp://fvgreenway.org/pdfs/FVTC%20Trail%20Usage%20Study%20Complete.pdf

Field, C. (2008). Burnham plan. *Encyclopedia of Chicago*. Retrieved from http://www.encyclopedia.chicagohistory.org/Pg. s/191.htmlhttp://www.encyclopedia.chicagohistory.org/Pg. s/191.html

Greater Bridgeport Regional Planning Agency. (2008). Greater Bridgeport Housatonic River Greenway Project Draft Pathways and Study Plan. Retrieved from http://www.gbrct.org/uploads/PDFs/Publications/Reports/Transportation/Pedestrians-Bikes/Housatonic-Greenway/GBRPA-Housatonic-Greenway-Plan-February-2008.pdf

Gregorski, B. (2007). Brief history of the restoration of the Naugatuck River and its tributaries (1967-2007). Naugatuck River Watershed Association. Retrieved from http://naugawatshed.org/Naugatuck%20River%20History.htm

Gunther, P., Parr, K. E., Graziano, M., & Carstensen, F. V. (2011). The Economic Impact of State Parks, Forests and Natural Resources under the Management of (Connecticut) Department of Environmental Protection. *Connecticut Center for Economic Analysis (CCEA) University of Connecticut*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2195058

H2R Market Research. (2013). Connecticut 2013 Traveler Profile & Benchmark Comparison Study. Retrieved from http://www.cultureandtourism.org/cct/lib/cct/tourism/outreach2015/connecticut_-_tns_traveler_profile_2013-final_022615.pdf

Hoctor, T., Carr, M., Zwick, D., & Maehr, D. (2004). The Florida statewide greenways project: Its realization and political context. In Jongman, R. & Pungetti, G. (Ed.) *Ecological networks and greenways: Concept, design, and implementation.* Cambridge, UK: Cambridge University Press.

Housatonic Valley Association. (2015). Housatonic Riverbelt Greenway. Retrieved from http://www.hvatoday.org/what-we-do/protecting-land/housatonic-riverbelt-greenway/

Housatonic Valley Council of Elected Officials. (2005). Housatonic Valley Greenway and river trail: River trail management plan. Retrieved from http://www.hvceo.org/rivhttp://www.hvceo.org/river

The Last Green Valley (2015). What is the last green valley? Retrieved from http://thelastgreenvalley.org/tlgv/what-is-the-last-green-valley/

Maryland Department of Natural Resources. (2005). NCR Trail 2004 User Survey and Economic Impact Analysis. Prepared by Trailfacts. Retrieved at https://www.railstotrails.org/resourcehandler.ashx?id=4792

Morgan, J. (2010). Analyzing the benefits and costs of economic development projects. University of North Carolina School of Government. *Community and Economic Development Bulletin*. 7. 1-16. Retrieved from http://www.nationalresourcenetwork.org

Nadel, R. (2005). *Economic impacts of parks, rivers, trails and greenways*. University of Michigan. Retrieved from http://erb.umich.edu/Research/Student-Research/Nadel.pdf

Native Languages of the Americas. (2015). Native american tribes and languages. Retrieved from http://www.native-languages.org/languages.htm

Naugatuck River Association. (2012). Flood control. Retrieved from http://www.naugatuckriver.net/watershed-and-river-management/flood-control.php

Naugatuck Valley Council of Governments. (2014). Naugatuck River Greenway Steering Committee Mission statement. Minutes of February 12, 2014 meeting. Retrieved from http://nvcogct.org/sites/default/files/NRG-Notes_2014-02-12_0.pdf

Naugatuck Valley Council of Governments. (2014). Naugatuck River Greenway Steering Committee Naugatuck Valley Council of Governments. (2014) WATER benefit cost analysis. Minutes of May, 14, 2014 meeting. Retrieved from http://nvcogct.org/sites/default/files/NRG-Notes_2014-05-14.pdf

Nicholls, S., Crompton, J. L., & others. (2005). The impact of greenways on property values: Evidence from Austin, Texas. *Journal of Leisure Research*, *37*(3), 321.

Outdoor Industry Association. (2013). The Economic Contributions of Outdoor Recreation: Technical Report on Methods and Findings by Southwick Associates. Retrieved from https://outdoorindustry.org/images/ore_reports/oia-state-recreation-economy-technical-report-2013.pdf

Outdoor Foundation. (2015). Outdoor Recreation Participation Topline Report. Retrieved from http://www.outdoorfoundation.org/pdf/ResearchParticipation2015Topline.pdf

Pape, W. (1918). *History of Waterbury and the Naugatuck Valley, Connecticut.* Vol. 1. Chicago, IL: S. J. Clarke.

Queensland Government. (2012). Overview of some alternative methodologies for economic impact analysis. Queensland Treasury. Retrieved from http://www.qgso.qld.gov.au/products/reports/overview-econ-impact-analysis/index.php

Rails-to-Trails Conservancy. (2015). Air Line State Park Trail. Retrieved from http://www.traillink.com/trail/air-line-state-park-trail.aspx

Rails-to-Trails Conservancy. (2015), Housatonic Rail Trail (Pequonnock Valley Greenway). Retrieved from http://www.traillink.com/trail/housatonic-rail-trail-in-trumbull-(pequonnock-valley-greenway).aspx

Recreation Use Values Database. Oregon State University. (n.d.). Retrieved August 18, 2015, from http://recvaluation.forestry.oregonstate.edu/

Regional Economic Models, Inc. (2015). The REMI Model. Retrieved from http://www.remi.com/the-remi-model

Simons, M. (2014). Cradle of the rubber industry. The Naugatuck Historical Society. Retrieved from http://www.naugatuckhistory.com/hi-cradle_of_the_rubber_industry.htm

Smith, V. K. (1997). Pricing What is Priceless: A Status Report on Non-Market Valuation of Environmental Resources. http://doi.org/10.2139/ssrn.31974

Thadani, D. (2010). *The language of towns & cities: A visual dictionary*. New York, NY: Rizzoli.

Trail Facts. (2005). NCR Trail 2004 User Study and Economic Impact Analysis. Retrieved from http://www.railstotrails.org/resource-library/resources/ncr-trail-2004-user-survey-and-economic-impact-analysis/?state=Maryland

United States Census. (2015). 2013 American Community Survey Population Estimates. Retrieved from https://www.census.gov/programs-surveys/acs/

United States Department of Interior, National Park Service (1995). *Economic impacts of protecting rivers, trails, and greenway corridors.* Rails, Trails, and Conservation = Assistance Program. Retrieved from http://www.United States Department of the Interior, National Park Service.gov/pwro/rtca/econ_all.pdf

University of Massachusetts. (2007). New England Greenways: Greenway history. Retrieved from http://www.umass.edu/greenway/Greenways/2GR-his.html

University of Vermont Transportation Research Center. (2010). Estimating Tourism Expenditures for the Burlington Waterfront Path and the Island Line Trail. Retrieved from http://www.uvm.edu/tourismresearch/

Walsh, R., Sanders L., & Loomis, J. (1984). Measuring the economic benefits of proposed wild and scenic rivers. [as cited in Nadel, R. (2005). *Economic impacts of parks, rivers, trails and greenways*.]

Weisbrod, G. & Weisbrod, B. (1997). Measuring economic impacts of projects and programs. Economic Development Research Group. Boston, MA: EDRG. Retrieved from http://www.edrgroup.com/library/economic-impact-analysis/primer-measuring impacts.html

Whyte, W. (1968). *The last landscape*. Garden City, N.Y.: Doubleday.

Witan Intelligence. (2015). 2014 Year Connecticut Visitor Intercept Study. Documents provided by Witan Intelligence.

Willimantic Whitewater Partnership. (2015). Vision. Retrieved from http://www.willimanticwhitewater.org/