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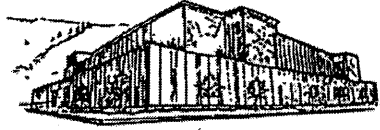
The Value of Open Space Attributes in Jamestown, Rhode Island:
An Application of the Choice Experiment

By

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The Value of Open Space Attributes in Jamestown, Rhode Island: An Application of the Choice Experiment

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　This thesis estimates the value of attributes associated with open space in the town of Jamestown, Rhode Island. A variation of the contingent valuation method was used to estimate these values. This variation is called the choice experiment. In order to elicit the value that people place on open space attributes, Jamestown residents were mailed a survey which asked respondents to choose between three open space preservation options. Using the data, the value of incremental changes in the level of the attributes was estimated.

　Jamestown residents showed a strong preference to pay for parcels that are characterized by limited public access, are scenically unique, are farmland, and would be protected by purchasing the development rights from the landowner than for parcels characterized by full public access, are wooded areas, are not scenically unique, and have hiking trails and picnic areas. Indeed residents are willing to pay as much for 20 acres of the preferred open space as 120 acres at the alternative open space. In addition, Jamestown residents are also willing to pay $18.54 more for parcels that are surrounded by land that is currently undeveloped than for parcels located in residential areas.

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Chapter 1

1.1 Introduction

Open space has become a hot topic in growing communities throughout the United States. It is hard to ignore the fact that the American landscape is changing rapidly. Wherever Americans travel, they are confronted with development and associated loss of forest and farmland. Bruce Babbitt, Secretary of the Interior, reported in 1999 that 7,000 acres of farmland and meadow were lost every day in the United States. In a very real sense, the loss of the amenities associated with farms, fields, and forests is not unlike the loss of clean air and clean water.

In January 1999 President Clinton, in his State of the Union address, proposed a multi-billion-dollar program to assist state, local, and tribal governments with the purchase of open space (Babbitt 1999). This open space movement has created an opportunity for biologists, land-use planners, state and local officials, and economists to develop scientific plans for future land use decisions. Not only do the criteria for balanced ecosystems and wildlife habitats need to be understood, but also this level of public funding increases the need to understand the factors affecting the public value of the land preserved.

Jamestown, Rhode Island, the only town on a small island located in Narragansett Bay, has historically been known for its peaceful, rural atmosphere and community spirit. In the second most densely populated state Jamestown seems like a refuge to many (U.S. Census Bureau, Census 2000). Especially an island, however, cannot go unaffected by the surge of development that is pressuring communities throughout the state. In fact, the theme of Jamestown's 2002 Community Comprehensive Plan is "protecting Jamestown's

rural character". The Planning Commission defined rural character as a character unique to Jamestown that combines "rural feeling, island spirit, and village identity." The landscape and the aesthetics of the island contribute significantly to Jamestown's character, and the Town is striving to develop land use plans and controls that maintain the special qualities of the island. The Comprehensive Plan sets forth goals regarding open space issues. These goals include preserving significant open space on the island, developing a plan to raise funds through bonding and grants to acquire a substantial portion of the remaining undeveloped land for preservation, and educating the public about the importance of open space. Without a clear and defined plan, however, local officials and other conservation agencies may fall into the pattern of buying land from friendly sellers in a catch-as-catch can method with no sense of the public's value of the land.

The purpose of this study is to measure the value that Jamestown residents place on the individual attributes of open spaces. Economists have long recognized the challenge of measuring the value of public goods and environmental economists have addressed the issue of welfare measurement by developing survey-based methods, such as contingent valuation, to measure the value individuals place on environmental impacts. This study employs a relatively new valuation method, the choice experiment. The choice experiment is unique because it allows economists to measure the value of the individual amenities that make up an environmental situation, rather than the situation as a whole. The objective of this study is to identify what amenities of open space, if any, people value, and determine their willingness to pay for the different amenities.

This study was undertaken with the support of the Conanicut Island Land Trust (CILT). The directors of CILT were interested in knowing the extent of the public's support for open space preservation, identifying land preservation priorities from the public's point of view, and estimating the public's willingness to provide financial support for open space preservation. Under the auspices of CILT, 3,000 Jamestown households were presented with a choice experiment survey intended to elicit their willingness to pay for different attributes of open space. This data was used to estimate the value that residents place on different levels of land attributes. These values should help local officials and conservation agencies rank land parcels and allocate funds in a more efficient manner.

Chapter 2: Jamestown, Rhode Island on Conanicut Island

2.1 Introduction: Conanicut Island Geography

Jamestown is located on Conanicut Island in lower Narragansett Bay, 26 miles south of Providence, Rhode Island's capital, and 2 miles west of Newport. Jamestown is bounded on the south by the Atlantic Ocean, known here as Block Island Sound, and surrounded by Narragansett Bay to the north, east, and west. Within Jamestown's jurisdiction are the smaller Dutch and Gould Islands, which are uninhabited, and the Dumplings, an outcropping of large rocks.

Historically, the development patterns of Jamestown are closely related to the island's topography. Geologically, the island was separated from the mainland during the carboniferous period. Glaciers cut the East and West Passages into the once fresh water lake of Narragansett Bay, and then receding and melting, left deposits of soil and rock carried from northern New England. The Dumplings are the oldest geological out crop located across the East Passage, prior to the Ice Age. Seagulls and cormorants now mainly inhabit the Dumplings, although a large house does stand on top of one of the large rocks and is accessible only by boat.

Conanicut Island is approximately 9.7 miles long in the north-south direction, and is only 1.6 miles east west at its widest point. The island is divided into three separate landmasses. The largest, occupying the northern half of the island, rises to an elevation of 140 feet in its center. This half of the island was the location of the first intensive farming development because of the arable land. Gould Island, itself a landed farm, lay off the east coast of the north end.

The center of Conanicut Island is separated from the north end by salt marshes and a tidal creek. The village of Jamestown occupies the center of the Island, and most of the village activity is located along Narragansett Avenue. An old Native American trail, Narragansett Avenue later became part of the Newport to New York Post Road, traversing the Island east west from the Newport Ferry to the Saunderstown Ferry. Most of the original village developed on the land overlooking the east passage of Narragansett Bay, capitalizing on the extraordinary views of the bay and neighboring Aquidneck Island. Fort Wetherill, the most extensive military fort on the Island, is also located in this center region.

The south end of the Island, Beaver Neck, extends into the Atlantic Ocean and is connected to the main body of Conanicut Island by a sand bar that is only 100 meters wide. Conanicut Island's second fortification, Fort Getty, is located on the west side of this peninsula, overlooking Dutch Island, which also supported a military fort during World War II.

2.2 Brief Island History

European settlers from the Massachusetts Bay Colony settled neighboring Aquidneck Island in 1638, and started a community at Newport. The settlers began leasing land on the islands in Narragansett Bay for sheep grazing, and in 1657 Conanicut Island was purchased from the Narragansett Indians. The first town plan was drawn up in 1678: 6,000 acres were to be divided such that for every 20 acres of farmland there would be one house lot, and 260 acres were set aside for the village center. William Coddington and Benedict Arnold were given choice tracts of land, being the largest investors in the

town; Coddington had settled the north end of the Island and Arnold had settled the south end. It was also in 1678 that the Town was incorporated and named after King James II.

After farms were laid out on the island ferry service began across the east and west passages of the bay. By 1700, Conanicut Island's farmers had grown prosperous by selling cattle, sheep, and cheese in markets along the east coast and in the West Indies, benefiting from the large and thriving port in Newport. Early development included four main roads, a windmill, a schoolhouse, and a Quaker Meeting House. The Beavertail Lighthouse, located on the southern tip of the island, was built in 1749 and was the third lighthouse built on the Atlantic Coast. The lighthouse, however, was burned by the British in 1779 and was rebuilt in 1856.

The American Revolution halted Jamestown's development when the British occupied the bay from 1775 to 1779. During this period, many island residents fled as the British burned homes and confiscated livestock. Following the war, the island's population returned and continued to grow, aided by the overflow resulting from Newport's own revival as a Victorian resort.

The steam ferry, which was introduced in 1873, changed the island forever. In 1875, the Jamestown and Newport Ferry Company was formed, and the new steamer "Jamestown" was put into service, landing at the foot of Narragansett Avenue. In the same year, the Ocean Highlands Company was organized to improve the rugged lands in the southern part of the island for summer estates. Largely Philadelphia Quaker families seeking an escape from Newport's flamboyance settled this area, and the neighborhood soon became on of the finest on the East Coast.

The Spanish-American War and World War I saw extensive fortification of Jamestown property. Fort Wetherill and Fort Getty were built on the island, and Fort Greble was built on Dutch Island. A reinforced observation post disguised as a summerhouse was constructed on Beavertail and a torpedo repair facility and testing station was built on Gould Island that eventually produced 80 percent of the torpedoes used during World War II.

The Jamestown Bridge was constructed in 1940, across the west passage of Narragansett Bay, in order to connect Jamestown to the Quonset Navel Air Station on the mainland. The bridge made it fast and convenient to travel to the mainland, and newcomers began to discover the island's beauty and character. A large residential community developed at the bridge landing, altering the island's development pattern. Then, the Newport Bridge, connecting Jamestown and Aquidneck Island, was built in 1969. The two bridges and a connecting highway across the island eventually became a major regional highway route.

Today, Jamestown faces a burgeoning population. The island's scenic beauty, rural character, and sense of community draw people to the island. For those who work off-island, the construction of new highways and improved roads has made commutes to Providence, Boston, and Newport fast and convenient. The increasing population has led to the development of sub-divisions and in-fill housing, but the island retains many of its village characteristics. Several properties are still farmed, historic properties including lighthouses, windmills, and military fortifications remain unchanged and old neighborhoods are still intact and thriving.

2.3 Open Space and the Town of Jamestown

The Town of Jamestown has set forth a plan for the island's future land use in the 2002 Jamestown Community Comprehensive Plan. The Plan addresses the island's urgent problems and land use issues. Jamestown's largest land use issue is fresh water. The region has experienced decades of seasonal droughts, stressing the island's limited water supply, but the population continues to grow and new houses continue to be built. The Town's growth rate needs to be managed to ensure a sustainable water supply for the current and future generations on the Island.

Recently, the island's rapidly growing population and increased housing development has put tremendous pressure on the fresh water supply. After the construction of the Newport Bridge in 1969, the population increase from 1970 to 1980 doubled that of the previous decade. The 1990 U.S. Census indicated that the island's population reached 4,999 people, a 24 percent increase since 1980, and by 2000 the population had reached 5,622, an 11 percent increase since 2000. In addition, new building permits for single-family homes have averaged 25 to 35 per year for 1990 to 2000.

In addition to threatening the fresh water supply, the population increase over the past twenty-years and the increased housing development has significantly reduced open space, further pressuring island resources. Fortunately, however, the community recognizes that if development continues in its current pattern, problems will arise in the future. Recently the community has taken steps to plan and dictate the pattern of future development in order to protect the island's natural resources.

2.4 Recent Measures for Open Space Protection

In response to the increasing development pressure, two organizations were created to encourage the preservation of open space and undeveloped land on Conanicut Island. The Conservation Commission was created in 1983 and the private Conanicut Island Land Trust (CILT) in 1984. Cooperation between the Conservation Commission, CILT, the State of Rhode Island, other private organizations, and private citizens has led to the temporary protection of 821 acres and permanent protection of 1,170 acres on the island. CILT calculated the breakdown of the protected land under their stewardship: 112.2 acres are protected through conservation easements, 74.6 are owned by the land trust, and the CILT owns the development rights to 25 acres. In the last case, the landowner retains ownership of the land, but sells his right to ever develop the land. In 1987, Jamestown voters approved a bond referendum (which had 89 percent approval), not to exceed 5 million dollars, for the purpose of purchasing and developing open space and recreational land. The bond funding has been used once since its approval for protecting 32 acres from development. The protected area became known as the Conanicut Island Sanctuary and is located in the center of the island, adjacent to a large wetlands area, and is managed by the Conservation Commission. In 1999, voters approved $100,000 for water resources protection, and in 2000, voters approved $110,000 for natural resources protection.

Another measure that was taken was to survey island residents regarding their opinions on water use and open space. The survey was conducted in 1998 by the Town Planning Office, and indicates that Jamestowners are highly in favor of open space preservation and natural resource conservation. 76.6 percent of the respondents wanted

more open space and recreation land protected, with 19 percent of those only agreeing if

land protection did not cost anything. Private-public partnerships were the most popular

method of protecting open space, and others suggested impact fees, real estate transfer

fees, and a municipal bond. The respondents were also asked to rank their reasons for

protecting open space by their importance. Responses indicated that buying open space

for the protection of the drinking water supply was the most important reason (67.3

percent), followed by protecting natural resources, limiting the development of new

houses, and protecting agricultural land. The responses from this survey indicate that

Jamestowners are in favor of controlling development in order to actively protect open

space, and the information from the survey was used in the creation of the 2002

Community Comprehensive Plan.

2.5 Current Open Space Protection on Conanicut Island

Though the Town is committed to open space preservation, land protection must

be tied to the function of the land and the goals of the Town. Protecting the Town's

watershed, farmland, salt marshes, and the Beavertail peninsula is the Town's current

focus. Permanently protecting the watershed is a priority because over 55 percent of

Jamestown's residents get their drinking water from the Town's reservoirs. 70 percent of

the watershed is currently protected. Of the remaining unprotected land, 7 percent is

temporarily protected under the Farm, Forest, and Open Space Program, 5 percent is

undeveloped, but zoned RR-200 for residential development, and 20 percent of the land

is located on the Watson Farm, which is owned by the Society for the Preservation of

New England Antiquities (SPNEA), and is not considered permanently protected by the

Town. The goal of the Town is to purchase the remaining undeveloped land that falls within the watershed area, and permanently protect this land.

The 2002 Community Comprehensive Plan gives several reasons why protecting the existing farmland is important, including preserving the Island's agricultural heritage and maintaining the role of agriculture in the local economy. Other benefits of farmland include maintaining the Island's character and providing aesthetic landscapes.

While Jamestown was historically an agricultural community and over 70 percent of the island's topsoil is prime for agriculture, there are only 6 farms left on the island. The farms provide Christmas trees, hay, alfalfa, pasture, sudan grass, melons, raspberries, tomatoes, sweet corn, silage corn, pumpkins, herbs, sheep, dairy cows, and beef cattle. Statewide pressure to develop farmland has prompted strong support for farmland preservation on the federal, state, and local level. Through state farmland preservation programs and private contributions, a number of island farms have been permanently protected. Beaverhead and Foxhill Farm are protected through conservation easements held by The Nature Conservancy, and the Conanicut Island Land Trust permanently protects 22.5 acres of the Godena Farm and 43.5 acres of the Hodgkiss Farm, and the 259-acre Watson Farm is owned and protected by SPNEA. The Dutra Farm, the Neale Farm, the Greig Farm, and the remainder of the Hodgkiss Farm still are unprotected. The goal of the Town is to permanently protect as much of the remaining farmland as possible.

One method currently being used to protect farmland is the previously mentioned Farm, Forest, and Open Space program (FFOS). This state program is implemented by towns in Rhode Island, and provides temporary protection for natural areas and open

spaces. The program allows landowners to be taxed on the use value of their land if their property meets certain criteria, which are defined by the Rhode Island Department of Environmental Management. The use-based tax evaluation is less than the traditional "highest and best use" method of assessing land value. The program requires that landowners maintain their property to meet the criteria of farmland, forest, or open space for fifteen years, after which the landowner can do what he likes with the land, including renewing his participation in the FFOS program. By temporarily protecting land from development, the FFOS program gives towns the time to find funding to purchase important properties. This program is significant in "stalling" development on Conanicut Island. The largest contiguous landmass on the island includes two farms, the Dutra Farm and the Neale Farm. Neither of these farms is permanently protected, and fifty new homes could be built on these properties. Half of the Dutra Farm is located in the watershed, and both farms are visible from the Newport and Jamestown Bridges, creating scenic landscapes that exemplify the island's beauty and character.

Despite the active role of the Town and private organizations in land preservation, there is still the possibility for more housing developments on the island. The build-out analysis conducted of the Town by the Planning Department in 2000 indicates that 1,128 acres of developable land are still on the island. Developable land includes all privately owned property that is not prohibited from development due to environmental constraints or deed restrictions. This developable land is about 18 percent of the total land area of Jamestown and includes large tracts of farmland and wildlife habitats.

The following is an abbreviated inventory of open spaces and farmland on Conanicut Island. The inventory is limited to the larger and more significant areas of

protected land. Ownership of the properties is varied and includes federal, state, local, private non-profit agencies, and individuals. Type of protection also varies, including purchase or donation of development rights, fee simple purchase, sale or donation of conservation easements, or regulation. Public access is allowed in some areas and restricted in others.

1) **Gould Island**: 16.9 acres, open to public, only accessible by water, partially owned by the Federal government

2) **North Reservoir**: 114 adjacent acres within the watershed, owned by Town and used for the Town's drinking water supply. Public access is not encouraged.

3) **Cedar Hill Farm Conservation Easement**: 28 acres of wetland, subdivided into 6 lots with frontage along North Road. CILT holds a conservation easement to this property and public access is prohibited.

4) **Watson Farm**: 259 -acre working farm permanently protected through Thomas Carr Watson's will. The farm is open to the public during visitor hours and special events.

5) **South Pond Reservoir**: 25.26 acres of land and water, public access is limited. This area is owned by the Town of Jamestown.

6) **Hodgkiss Farm**: 150 acres along North Road, adjacent to Watson Farm. 43.5 acres are protected by a conservation easement held by CILT. The remaining land is privately owned. No public access is allowed to the privately owned portion of the property.

7) **Great Creek**: This is a 95- acre wetlands area protected by the State of Rhode Island and the Rhode Island Audubon Society. Public use of the area is limited.

8) **Conanicut Island Sanctuary**: 33 acres adjacent to Great Creek and owned by the Town. Public access is encouraged and hiking trails are maintained.

9) **Racquet Road Audubon Thicket Site**: 19- acre wildlife habitat, including 2 acres of salt marsh. This site is owned by the Audubon Society of Rhode Island and can be accessed with permission.

10) **Sheffield Cove Audubon Site**: 13 acres of salt marsh across from Mackerel Cove. The cove is open to the public with some restrictions.

11) **Fort Wetherill State Park**: 58 acre state-owned park providing hiking, scenic views, fishing, a boat launch, scuba diving, and a fisheries laboratory operated by the Rhode Island Department of Environmental Management. The park also contains old fortifications, restrooms, and parking.

12) **Fox Hill Farm**: 61 acres protected by a conservation easement held by The Nature Conservancy. Public access is prohibited.

13) **Fox Hill Audubon Site**: 32- acre salt marsh adjacent to Fox Hill Farm and the Fort Getty Town Park. A permit from the Audubon Society of Rhode Island is required to access the marsh.

14) **Fort Getty Park**: 41 acre town-owned facility. Fort Getty is primarily a recreational vehicle campground. The park also has a beach, boat launching dock, a walking trail, a public pavilion, and old fortifications. During the summer, fees are charged for camping and a sticker is needed for residents to park.

15) **Conanicut Battery**: 22 acre wooded area and the historic site of a fortification. This parcel is owned by the Town of Jamestown. The Friends of the Conanicut Battery actively manage hiking trails and a parking area.

16) **Beavertail State Park**: 183 acres located at the southern end of the Island. The park is a popular fishing and passive recreation area. Volunteers operate the Beavertail Lighthouse and museum. No fees apply and parking is available.

17) **Godena Farm**: 25 acres of active farmland protected by a conservation easement. Public access is prohibited.

18) **Mackerel Cove Beach**: 1.7 acre town beach located on a sandy isthmus between the mainland Jamestown and Beavertail peninsula. A non-resident fee is required to park in the summer, and residents can purchase a parking pass.

19) **Vera Farm**: 45- acre parcel stretching from North Road to East Shore Road. The Conanicut Island Land Trust acquired this property in 2000.

20) **Ryng Property**: Acquired by the Conanicut Island Land Trust in 2002 and located within the Town's watershed.

21) **Capozzi Property**: 10 acres located on Eldred Avenue, within the watershed. This property was acquired by the Town with the aid of a grant from the Department of Environmental Management.

Other recreational areas include:

22) **Jamestown School Recreation Area**: Playing fields occupy 6.3 acres. Outdoor recreational facilities include baseball fields, soccer fields, tennis courts, basketball courts, and a playground.

23) **John Eldred Recreation Area**: 8 -acre parcel deeded to the Town by the Rhode Island Department of Transportation. This parcel consists of soccer fields and wooded space. Deed restrictions prevent the installation of athletic field amenities.

24) **Jamestown Golf Course and Country Club**: Special Use Area- Though privately

leased, the 75-acre golf course has been owned by the town since 1987. The golf

course abuts Great Creek and the Conanicut Island Sanctuary.

2.6 Community Achievements and Goals for Open Space and Conservation

Since 1991, the Town of Jamestown has made progress towards the conservation

goals of the Town. These achievements include the creation of a priority list of

significant open space parcels for acquisition, encouragement of land donations, changes

in subdivision regulations to require the donation of land or fee in lieu of land for

conservation and recreation purposes, and the proposal of a Conanicut Island Greenway,

linking the North Pond Reservoir and the golf course. In addition, the CILT succeeded in

protecting the Hodgkiss Farm and in purchased the development rights for the Godena

Farm.

In 2002, the Town's goals regarding open space, farmland, and recreation were

reevaluated and outlined in the Community Action Plan. The plan includes Town goals,

policies, time-frames for implementing actions, initiation responsibility, and resources.

The 2002 Jamestown Community Comprehensive Plan (148) lists three

community goals regarding conservation and open space. These are: 1) preserve

significant conservation and open space on the island, 2) develop a comprehensive Land

Acquisition Action Plan to raise funds through bonding and grants to acquire and/or

protect a substantial portion of the remaining undeveloped land in Jamestown for the

preservation of water and coastal resources, access to the shore, scenic vistas, and open

space, and 3) increase public awareness of the importance of conservation and open

space.

Some of the actions that the Town intends to undertake in order to achieve these goals include: investigate growth management alternatives that allow adequate time to acquire a significant amount of open space, promote creative strategies for land conservation, protect valuable natural resources, identify undeveloped land that should be publicly acquired or protected from development, and develop management plans for all public open space areas that focus on the protection of the specific features that make them valuable.

The Town's goal concerning agriculture is to protect and where possible increase the current acreage of working farmland. By actively pursuing the acquisition of development rights or fee simple acquisition (an outright purchase) of farmland, the Town would like to maintain farming as a viable economic enterprise on the island. The Town will also encourage participation in the Farm, Forest, and Open Space program to provide tax incentives for active farms.

The recreation action plan calls for providing all residents with safe and accessible passive and active recreational opportunities. Policies to achieve this goal include: 1) maintaining public participation in community recreational programs at the current high rates, 2) improving and expanding indoor and outdoor facilities, 3) promoting a coordinated system of bike routes linking residential areas to recreational, scenic, and cultural areas, 4) expanding available facilities to accommodate the Island's growing population, and 5) implementing additional improvements to the Town owned park at Fort Getty.

2.7 Jamestown's Demographic and Socio-Economic Characteristics

Jamestown's commercial economy is confined by the small landmass of the island, limited commercial district zoning, high land costs, a relatively small population, and close proximity and easy access to larger cities. At the same time, easy transportation access offers off-island employment opportunities to island residents. As reported in the 1998 Community Survey, only 24 percent of Jamestown's working population was employed on the island.

In recent years, Jamestown's commercial economy has been composed mostly of businesses catering to residents and tourists including recreation and leisure, boating, marine services, retail shops, restaurants, and home-based businesses. The Rhode Island Economic Development Corporation (RIDEC) classifies all of the island's businesses as "small", i.e. as having fewer than 500 employees. Similarly, across the state 99 percent of the businesses are also classified as being small. The RIEDC lists the service industry as the largest sector in Jamestown, accounting for 44 percent of the private industry employment on the Island. Second, retail trade contains 25 percent of the private industry employment. The Town of Jamestown is the largest employer, with 100 municipal employees and 89 full-time educational employees.

According to the 2002 Plan, RIEDC data indicate that private industry employment and gross retail sales have grown between 1988 and 1998. The increases were from 507 employees to 808 employees, and from $22,196,000 to $31,501,000 (1997) in gross retail sales. The largest employment growth between 1990 and 1998 occurred in service industries, with an additional 191 jobs added, followed by 66 jobs in retail trade. The following table shows a break down of Jamestown residents' employment status, on and off the island.

Table 2.1 Employment Status of Residents 2000

Category	Number	Percent
Population	4,551	100
In labor force	3,052	67.1
Employed	2,938	66.9
Unemployed	106	2.3
Armed Forces	8	0.2
Occupation		
Management & professional	1,424	48.5
Service	379	12.9
Sales and office	728	24.8
Farming, fishing, forest	50	1.7
Construction	184	6.3
Production	173	5.9
Class of Worker		
Private wage & salary	2,096	71.3
Government	535	18.2
Self-employed	307	10.4

Note: All information obtained from the U.S. Bureau of the Census, Census 2000.

Jamestown has a low unemployment rate (2.3 percent) compared to the rest of the State of Rhode Island, in which the unemployment rate in 2000 was 3.6 percent. Jamestown's percentage of workers in management and professional occupations is significantly greater than the State's percentage (33.9 percent), and Jamestown's percentage of workers in production occupations is much lower than the State's percentage (15.2 percent) (U.S. Census Bureau 2000).

Table 2.2 Income and Poverty Status 1999

Income Status			Poverty Status		
Income in 1999	Number	Percent	Poverty Status	Number	Percent
Households	2,343	100	Families	27	1.7
< $10,000	121	5.2	No husband present	22	12.6
$10,000- $14,999	66	2.8	Individuals	163	2.9

$15,000-$24,999	134	5.7	18 years +	146	3.3
$25,000-$34,999	231	9.9	65 years+	26	3.3
$35,000-$49,999	355	15.2	Under 18 years	17	1.4
$50,000-$74,999	464	19.8			
$75,000-$99,999	334	14.3			
$100,000-$149,000	344	14.7			
$150,000-$199,999	139	5.9			
$200,000 +	154	6.6	Median Household Income:	$63,073	

Note: All information obtained from the U.S. Bureau of the Census, Census 2000.

Table 2.2 shows the income distribution and poverty status of Jamestown's population. Compared to the rest of Rhode Island, Jamestown is a relatively wealthy community. 5.2 percent of Jamestown's residents have incomes less than $10,000 per year, while 10.7 percent of all Rhode Island residents have incomes less than $10,000. While the local and state statistics are similar for the middle- income brackets, the differences are noticeable in the upper income levels. 14.7 percent of Jamestown residents have incomes $100,000 to $149,999, while only 7.6 percent of Rhode Island residents have incomes equal to that amount. 6.6 percent of Jamestown residents have incomes over $200,000 per year, compared to 1.9 percent of all Rhode Islanders. The median household income in Rhode Island is $42,090 and the median household income in Jamestown is $63,073.

Table 2.3 Age, Gender, Race, and Educational Attainment

	Number	Percent		Number	Percent
Total Population	5,622	100	**Race**		
Sex and Age			One race	5,575	99.2
Male	2,733	48.6	White	5,484	97.5
Female	2,889	51.4	Black	44	0.8
Under 5 years	222	3.9	American Indian	12	0.2
5 to14 years	799	14.2	Asian	22	0.4
15 to 19 years	301	5.4	Another race	13	0.2
20 to 34 years	691	11			
35 to 54 years	2,190	38.9			
55 to 64 years	663	11.8			
65 to 84 years	755	13.4			
85 years and older	73	1.3			
School Enrollment			**Educational Attainment**		
Population in school	1,382	100	Population 25+ years	4,160	100
Nursery School	57	4.1	Less than 9th grade	114	2.7
Kindergarten	102	7.4	Some high school	170	4.1
Elementary	596	43.1	High school graduate	816	19.6
High school	361	26.1	Some college	889	21.4
College or graduate school	266	19.2	Associate degree	271	6.5
			Bachelor's degree	1,097	26.4
			Graduate degree	803	19.3

Note: All information obtained from the U.S. Census Bureau, Census 2000.

The age and gender distribution of Jamestown's population is similar to that of the rest of the state. Large differences are apparent, however, in the level of educational attainment of the two populations. While only 2.7 percent of Jamestown's population has less than a 9th grade education, throughout the rest of the state, 8.1 percent of the population has less than a high school education. At the higher education levels, 26.4 percent of Jamestown residents have a Bachelor's degree, compared with 15.9 percent of

the Rhode Island population. 19.3 percent of Jamestown residents have a graduate or professional degree, compared with only 9.7 percent of the Rhode Island population.

Photo 1: Jamestown Golf Course overlooking Great Creek

Photo 2: Hiking trails at the Conanicut Island Battery

Photo 3: Hay and alfalfa at Foxhill Farm

Photo 4: Fields at Foxhill Farm overlooking West Passage

Photo 5: East Passage and The Newport Bridge

Photo 6: Jamestown's rough, glacial shoreline
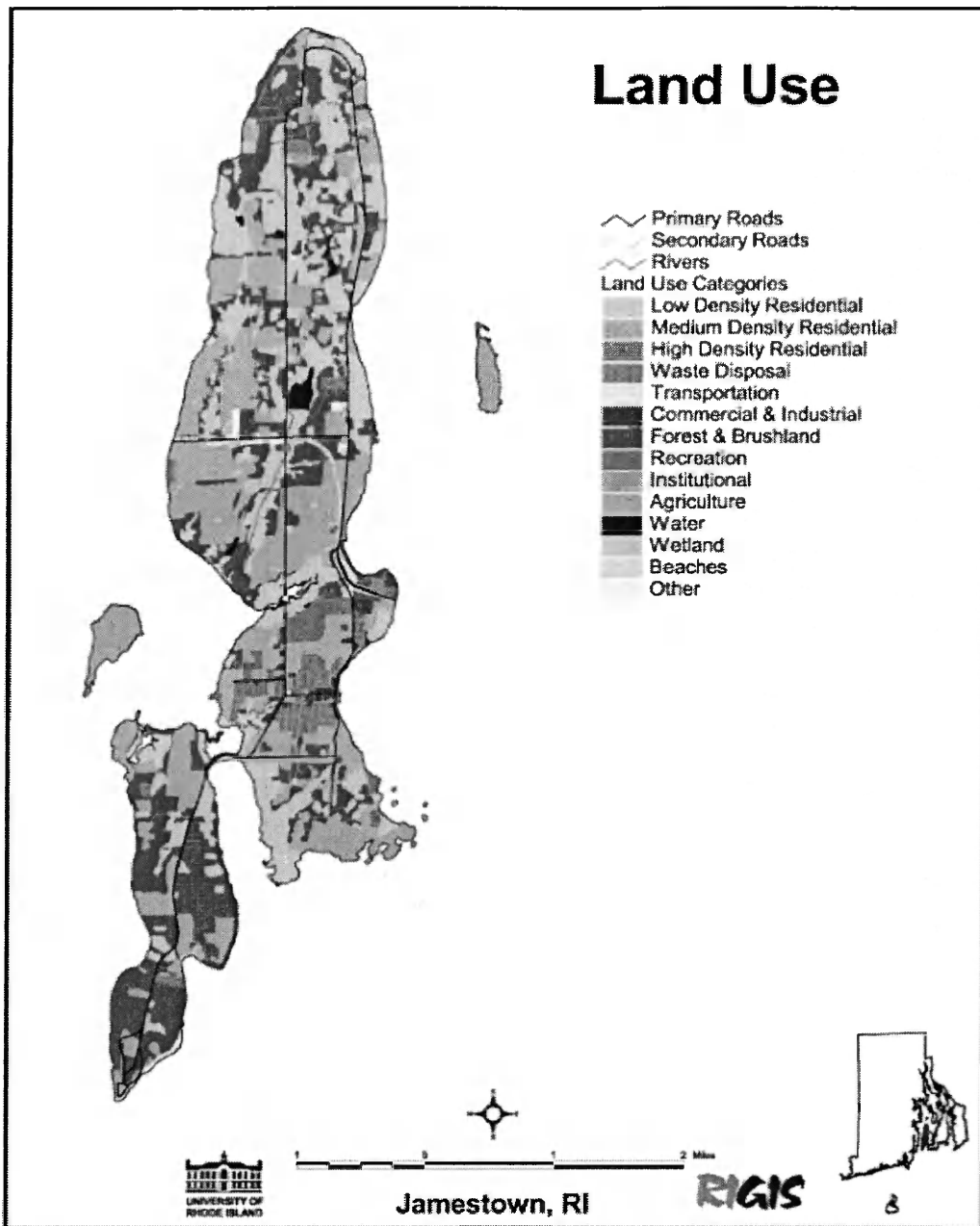
Map 1: 1995 Land use on Conanicut Island
http://www.edc.uri.edu/riatlas/Town/Maps/small/ja_landuse.GIF
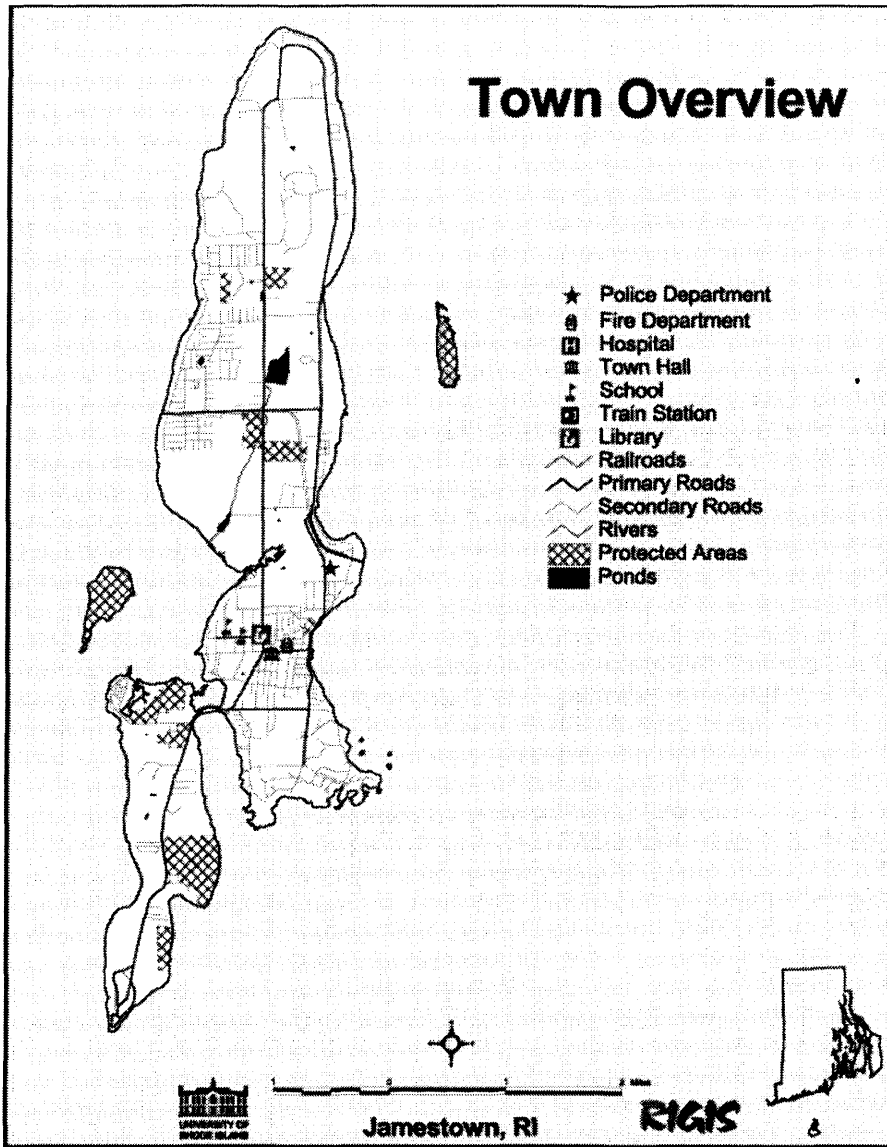
Map 2: Town overview
http://www.edc.uri.edu/riatlas/Town/Maps/small/ja_landuse.GIF

Chapter 3: Economic Valuation of Environmental Amenities

3.1 Introduction

The ability to place monetary value on changes to the environment is a cornerstone of the economic approach to the environment. Economic valuation refers to measuring the value associated with particular environmental states. It is easy to value most consumer goods because they are bought and sold in markets. In a store, each good is labeled with a price tag. Environmental goods are different because they cannot be bought and sold in a market. For example, a consumer could not purchase clean air in a store, even though he may place a very high value on breathing clean air.

There are two reasons why environmental goods are not traded in markets. First, the provision of most environmental goods is non-excludable, in other words, no one can be excluded from enjoying such good without payment. When clean air is available, no one can be excluded from breathing it, and it would be nearly impossible to charge everyone for his or her enjoyment of the clean air. Second, the provision of most environmental goods is non-rival. If a good is non-rival one person's enjoyment of the good does not detract from anyone else's enjoyment. Environmental goods that are non-excludable and non-rival in their provision are also called pure public goods. These two characteristics of environmental goods make it impossible for these goods to have market prices that reflect their true value. For example, if it were possible for one person to purchase clean air in a market, he would have no incentive to do so. Other people could easily breathe his air and benefit from cleaner air without compensating the owner of the air. This type of public benefit is called a "positive externality." Because of this feature,

economists must use alternative methods to determine the value of the benefits that people derive from the environment (Tietenberg, 2003).

Economists use several methods to identify the value of environmental goods or benefits arising from changes in environmental situations. The valuation methods can be classified according to the way in which people's preferences are observed. Preferences can be revealed in the market or stated in a survey. Revealed preference methods discussed in this chapter include the travel cost method and the hedonic price method. The stated-preference methods discussed include the contingent valuation method and the choice experiment method.

3.2 Revealed Preference Methods

Revealed preference methods use observations of actual behavior and choices to infer values. Thus, individuals' preferences are revealed by their choices. Revealed preference methods are advantageous because the methods are based on objective data, similar to market situations, but revealed preference methods are limited because they depend on the existence of an observable behavior that is clearly connected to the amenity to be valued. Fore example, to be able to estimate the value of a river, one must be able to observe people fishing or boating on the river. The first type of revealed preference method is the travel cost method and the second is the hedonic price method.

3.2.1 Travel Cost Method

The travel cost method is used to estimate the value of recreational benefits generated by ecosystems. It assumes that a lower bound on the value of the site or its recreational services is reflected in how much people are willing to pay to get to it. The

travel cost method is considered a revealed preference method because individuals' travel choices are used to infer the value of different destinations.

Time and travel cost expenses that people incur to visit a site represent the "price" of access to the site. Thus, people's willingness to pay to visit the site can be estimated based on the number of trips that people make at different travel costs. This is analogous to estimating people's willingness to pay for a marketed good based on the quantity demanded at different prices. The travel cost method can be used to estimate the economic benefits or costs resulting from changes in access costs for a recreational site, the elimination of an existing recreational site, the addition of a new recreational site, or changes in environmental quality at a recreational site. The travel cost method is advantageous because it is relatively uncontroversial (the method is based on actual behavior) and is often inexpensive to apply.

To apply the travel cost method, first one must determine that people who live farther from a site will visit it less often because it costs more in terms of actual travel costs and time to reach the site. The number of visits from different distances, and the cost of traveling from each distance, are used to derive a demand curve for visits to the site, and thus for the recreational or scenic services of the site. This demand curve shows how many visits people would make at different travel cost prices, and is used to estimate the willingness to pay by people who visit the site. Other factors may also affect the number of visits to a site. People with higher incomes will usually make more trips. If there are similar, alternative sites, people will generally make fewer trips. Personal interest in a particular type of recreation will also affect the number of trips people make. When observing individuals' choices, information must be collected about the number of

visits from each person's place of origin, demographic information, round-trip mileage from the origin, travel costs per mile, and the opportunity cost of each person's travel time. Additional information may include the other locations visited during the same trip, substitute sites that each person may have visited instead of this site, the quality of the recreational experience at the site, perceptions of environmental quality at the site, and characteristics of the site and other, substitute, sites. Economists have different opinions regarding how to handle multi-purpose and multi-destination trips- this may be the most controversial aspect of the travel cost method.

The travel cost method is advantageous for five reasons. First, the travel cost method closely mimics the empirical techniques that economists use to estimate economic values based on market prices. Second, the method is based on actual behavior, rather than what people say they would do in a hypothetical situation. Third, the method is relatively inexpensive to apply. Fourth, on-site surveys generally provide opportunities for representative samples if all visitors are questioned. Finally, the results are relatively easy to interpret and explain.

There are, however, limitations to this method. First, the travel cost method assumes that people will respond to changes in travel costs the same way that they would respond to changes in a market price. Second, if a trip has more than one destination or purpose, the value of the site may be overestimated. Third, how to define the opportunity cost of time spent traveling is not clear. Different measures of the opportunity costs can have a large effect on the benefit estimates. In fact, some people may enjoy the travel itself, and then the travel time becomes a benefit, not a cost. Fourth, the availability of substitute sites will affect values. If two people travel the same distance to get to a site,

they are assumed to place the same value on it. If one person, however, had many other alternatives and still chose this site because it is preferred, this person actually has a higher value for the site. The travel cost method is limited however, because it cannot be used to measure non-use values. Sites that have unique qualities that are valued by non-users will be undervalued (Tietenberg 2003).

Coupal et al. (2001) apply the travel cost method in order to estimate the economic benefits of snowmobiling to Wyoming residents. The researchers anticipated that the demand for snowmobiling trips is determined by the travel cost per trip (in terms of distance and time), the number of days spent snowmobiling, whether or not the site was a favorite of the individual, experience level, age, the number of different winter activities the individual participates in, and the quality of alternative snowmobiling sites. Travel costs were estimated by calculating mileage cost and the respondents' opportunity cost of travel time. The value of time in travel was based upon an estimate of the respondents' hourly wage rate. After estimating the demand function, consumer surplus estimates were calculated by estimating the area under the demand curve between the mean price and quantity and the price at which the quantity of trips demanded was predicted to be zero. Consumer surplus per trip across the sample averaged $68 per snowmobiler.

3.2.2 Hedonic Price Method

The hedonic approach is a methodology for ascertaining the value of or the pleasure felt from attributes of a good. In contrast to conventional economic valuation, where the value of a good is calculated for the whole of the good, the hedonic approach

regards a good as a set of attributes and considers the value of a good as a function of each attribute of that good.

The method is based on the assumption that people value the characteristics of a good, or the services it provides, rather than the good itself. Thus, prices will reflect the value of a set of characteristics, including environmental characteristics that people consider important when purchasing the good. It can be used to estimate the economic benefits or costs associated with environmental quality (air pollution, water pollution) and environmental amenities (aesthetic views, distance to recreational sites) (Tietenberg, 2003).

For example, the hedonic price method could be used to measure the benefits associated with an open space preservation program in a region where land is being developed rapidly. The first step would be to collect data on the selling prices and locations of residential properties, the property characteristics that affect selling prices (acres, number of bedrooms), neighborhood characteristics that affect selling prices (proximity to schools, crime rate), and environmental characteristics that affect selling prices (air quality, proximity to open space).

The next step would be to statistically estimate a function that relates property values to the property characteristics, including distance to open space. The resulting function measures the contribution of an incremental change in a characteristic to the total market value.

The hedonic price method is advantageous for several reasons. First, the method is based on actual behaviors and choices. Second, property markets are relatively efficient in responding to information, so prices can be good indications of value. Third, the

method can be adapted to consider several possible interactions between market goods and environmental quality.

The method, however, also has limitations. The relationship between price and characteristics may not be linear- prices may increase at an increasing or decreasing rate when characteristics change. In addition, many of the variables are likely to be correlated, so that their values change in similar ways. This can lead to imprecise estimates of some variables in the analysis. This method also assumes that people have the opportunity to select the combination of features they prefer, given their income. However, markets may be affected by outside influences like taxes or interest rates. Finally, applications of the hedonic price method depend on the availability and accessibility of data (Tietenberg 2003).

Cheshire and Sheppard (1995) apply the hedonic price method in the cities of Reading and Darlington, UK to show that housing values are determined not only by the physical characteristics of the house itself, but also by the location and characteristics of the neighborhood. The researchers estimated the coefficients on variables such as the number of bedrooms, bathrooms, parking, and central heat. In addition the effects of school quality, accessible transportation, altitude, open land, neighborhood ethnicity, and whether or not the neighborhood is blue collar were estimated. Estimating the hedonic prices yielded some interesting results. Of particular interest for planning policy are the estimated values of publicly accessible open spaces. In Reading there is abundant open space to which there is public access and in Darlington most of the open space is closed to the public. The estimated hedonic price of public access reflected this difference. In Reading the hedonic price of public access was £ 50 and in Darlington it was £83.

3.3 Stated Preference Methods

Stated preference methods are most commonly used to elicit passive-use value. Passive-use value is the economic value arising from a situational change in the environment that is not reflected in observable behavior. Consider, for example, the presence of rainforests in South America. While a person who lives in the United States may never recreate in the rainforest, that person may place a high value on knowing that the rainforest *exists*. An individual's actions do not reveal his or her existence values, so economists must use stated-preference methods to elicit these values. This method can also measure other values, including the recreational value of a particular site, use values (such as the value of breathing clean air), and the value of commodities or services (such as public transportation). Stated preference methods rely on survey responses to elicit individuals' preferences.

3.3.1 Contingent Valuation Method

The contingent valuation method (CVM) is used to estimate values for environmental amenities and other non-market goods and services. CVM involves the use of sample surveys or questionnaires to elicit the willingness of respondents to pay for generally hypothetical projects or programs. The name of the method refers to the fact that the values revealed by respondents are contingent upon the constructed or simulated market presented in the survey. CVM has received considerable acceptance by economists as a tool for measuring passive-use values associated with environmental situations. It was authorized for the valuation of outdoor recreation in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (U.S. Water Resources Council, 1983) (Bishop, Champ, and

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Mullarkey in Bromley, 1995, 564) The U.S. Army Corps of Engineers prepared its own manual for applying the method and it is accepted by the U.S. Fish and Wildlife Service. The U.S. Environmental Protection Agency lists CVM as one of the four basic methods for valuing the environmental benefits of proposed regulations in its Guidelines for Performing Regulatory Impact Analysis (Bishop, Champ, and Mullarkey, in Bromley, 1995).

Despite its widespread acceptance, the accuracy of CVM remains under debate. While other valuation methods, such as the travel cost method and the hedonic price method, rely on evidence and data observed in markets and actual behavior, CVM relies on the stated preferences of economic agents about how they would act under hypothetical circumstances. Issues concerning the credibility of stated preferences have brought forth the debate concerning the validity of CVM.

The following sections will discuss the background of CVM, the methodology of CVM, and the issues surrounding the use of CVM for environmental valuation.

3.3.2 The Origins of the Contingent Valuation Method

The first discussion of CVM took place in 1947 when Ciriacy-Wanthrup wrote about the benefits of preventing soil-erosion (Portney 1994). He observed that some of the favorable effects of preventing soil-erosion, such as flood control, were public goods, and suggested that one way to obtain information about the demand for these goods would be to ask individuals directly how much they would be willing to pay for successive increments. Then, by aggregating all of the responses the result corresponds to a market demand schedule (Mitchell and Carson, 1989).

This idea was not implemented until 1963, when Davis, in *The Value of Outdoor Recreation: An Economic Study of the Maine Woods*, applied CVM to determine the value of a particular wilderness area to hunters and recreational users (Portney 1994). Davis designed and implemented a contingent valuation survey and attempted to directly elicit these values. To validate his findings Davis compared the results from the survey with an estimate of willingness-to-pay based on the travel cost method. Davis found that the travel cost method provided results similar to his contingent valuation survey.

Portney (1994) argues that CVM took its largest leap in environmental economics when John Krutilla published "Conservation Reconsidered" in 1967. Krutilla identified the importance of the irreversible nature of natural environments. He suggested that people might place high values on preserving natural environments. Krutilla introduced the term "existence value," which became immediately important to the contingent valuation method. Existence value is the value that individuals place on merely knowing that species, biodiversity, and other natural wonders exist, even if they never plan on directly benefiting from their existence. Since then, hundreds of studies have made use of Krutilla's idea. For example, Duffield and Patterson (1996) use a CVM survey to determine individuals' nationwide willingness–to- pay for the reintroduction of wolves into Yellowstone National Park. Surveys have been used to elicit individuals' willingness-to-pay for open space preservation in Montana (Kadas, 1992), a project to remove abandoned roads in Grand Canyon National Park (Brown et al, 1996), to name a few among many CVM studies (Carson et al. 1996).

3.3.3 Contingent Valuation Methodology

Contingent valuation surveys generally contain three key elements: the valuation scenario, the payment mechanism, and questions regarding the demographic information of the respondent.

The valuation scenario provides a description of the hypothetical, or real, policy, program, or environmental change that the respondent is being asked to consider. The details of the scenario vary among surveys. The details may include a description of the effects of the program, a quantitative context for the expected changes, or possible outcomes if the program is not undertaken. For instance, Boxall, Englin, and Adamowicz (2003) provide a detailed description of a program that would protect pictographs in Nopiming Provincial Park, Manitoba. The respondents were asked to respond to the possible presence or discovery of rock paintings in the park. The survey included one photograph of a "pristine" pictograph, and a second photograph of a pictograph that had been defaced by vandals. The photographs showed respondents the current state of the pictographs and the expected effects of the restoration program.

Another survey described a program for the purchase of development rights to different types of open space (Swallow 1999). The valuation scenario described who would administer the program, how the purchase of development rights helps to preserve open space, and how the program would affect residents in surrounding areas.

The survey must also contain a payment mechanism for eliciting a value from the respondent. The choice of the payment mechanism can generally be divided into tow groups: voluntary contributions or taxes. The researchers must also choose the valuation question format. Valuation question formats can first be classified as open-ended

questions or closed-ended questions. Open-ended questions simply ask the respondent to state how much he or she would be willing to pay for the implementation of a program or environmental change. Closed-ended questions present the respondent with the cost of the program, and then ask if he or she would be willing to pay that cost (Would you pay $5 for...?). Closed-ended questions can take on several forms, including donations to a fund or non-profit agency, or referendum formats (The government would like to protect open space. Your annual tax bill would increase by $10. Would you vote to accept or reject this tax change?). Duffield and Patterson (1996) ask for donations to a trust fund for the reintroduction of wolves into Yellowstone National Park, while Kreiger (1999) asks people if they would be willing to accept a tax increase to preserve farmland in Chicago suburbs.

The questions in the last section of most contingent valuation surveys concern the respondents' socioeconomic characteristics and demographic information. This information can include age, sex, education, income, and number of children, among many others. This section can also include questions concerning the respondent's involvement in environmental organizations, or donations that they already make to non-profit agencies. These characteristics may be used as explanatory variables in the willingness-to-pay function.

3.3.4 Recent Significance of the Contingent Valuation Method

In the past twenty years, CVM has come into the political spotlight due to two laws and one unfortunate incident that resulted in government agencies bringing lawsuits against companies and other parties to recover money for damages, including the loss of

existence values resulting from natural resource damage. In these cases, CVM has been the technique used to measure the value lost due to the damages.

The first law is the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. This law, more generally known as the Superfund act, created a mechanism for identifying sites at which hazardous materials posed a threat to people and the environment. It also established procedures for identifying who is responsible for paying the cost of the cleanup, and gave government agencies the right to sue for damages to natural resources resulting from the discharge of hazardous waste. Congress made the Department of the Interior responsible for designing guidelines and methods for measuring the damage and the lost value of natural resources. In 1986, the Department of the Interior issued regulations for the application of the Superfund act. The regulations specified that compensation could only be granted under the Superfund act if the use values were not measurable, and sanctioned the use of the CVM to measure natural resource damages, excluding non-use values. Then in 1989, a federal court of appeals instructed the Department of the Interior to redraft the regulations, giving specific instructions to weight use and non-use values equally in damage assessment.

In 1989 the oil tanker Exxon *Valdez* spilled 11 million gallons of crude oil into Bligh Reef in Prince William Sound, Alaska. The damages to both the local economy and the environment were enormous.

The implications of the Department of the Interior's new regulations were immediately apparent. Although natural resource damage cases had been brought by individual states up to that time, none had the visibility or severity of the Exxon *Valdez* spill. Indeed, if in addition to the losses suffered by fishermen, resorts, recreationalists,

and others directly and indirectly affected by the spill, Exxon would be forced to pay also for lost nonuse and existence values, the implications for future litigation were substantial.

The oil spill prompted Congress to pass the Oil Pollution Act of 1990, which aimed to reduce future oil spills and provide for damage recovery. The Department of Commerce, acting through the National Oceanic and Atmospheric Administration (NOAA), was directed to write its own regulations regarding damage assessment. It was at this point that CVM was most highly scrutinized and guidelines regarding its implementation were set forth.

3.3.5 Recommendations from the NOAA Panel

Nobel laureates Kenneth Arrow and Robert Solow were asked to chair a panel of experts to provide advice to NOAA on the following question: "Is the contingent valuation method capable of providing estimates of lost nonuse or existence values that are reliable enough to be used in natural resource damage assessments?" (Portney, 1994, 8). Thus, the panel had to evaluate the reliability and validity of contingent valuation when used to measure the amount of money respondents would actually pay for a public good if the appropriate market for the good existed (or the amount of compensation demanded for the loss of the public good).

The reliability and validity of a contingent valuation survey can be easily compromised if careful consideration is not given to the design and implementation steps. In order for CVM to yield valid economic estimates, study participants must be both willing and able to reveal their values. They may be unwilling to reveal their values if there is no incentive to take the survey seriously or if they see strategic responses to be in

their best interest. Even if they are willing to respond, the unfamiliar task of predicting

how much they are willing to pay for a public good may be confusing. For these reasons,

and others, economists voice their reservations concerning CVM.

The NOAA panel established a set of guidelines to which it felt future

applications of the contingent valuation method should adhere if the studies are to

produce reliable estimates of lost existence values for the purposes of damage

assessment. The *Report of the NOAA Panel on Contingent Valuation* was published on

January 11, 1993. The authors included Kenneth Arrow, Robert Solow, Paul Portney,

Edward Leamer, Roy Radner, and Howard Schuman. While all of the guidelines cannot

be listed here, the most important points will be covered.

First, a contingent valuation survey should be presented as a hypothetical

referendum in which respondents vote on whether or not to tax themselves for a

particular purpose. The referendum method is preferred to open-ended CV questions for

two reasons: 1) scenarios in which respondents are asked to place a dollar value on a

public good are unrealistic in everyday life, and 2) an open-ended request for a maximum

willingness to pay invites strategic behavior- the more seriously a respondent takes the

question, the more likely it is that he or she will see the benefit of overstating his or her

willingness to pay.

The referendum format is advantageous because it is realistic: people are often

faced with referenda on the provision of public goods in real life. In addition, there are no

incentives to answer strategically. There are, however, two problems that could detract

from the reliability of CV responses: 1) a feeling that one's opinion will not be taken

seriously, leading to unconsidered responses, and 2) poor information about the public good or environmental program being considered.

The NOAA panel recommends providing enough information to allow respondents to accurately assess their willingness to pay, without providing information that has the possibility of biasing the response. In the panel's view, a conservative survey will provide the respondent with a description of the program or policy being valued, the expected effects of the program if it is implemented, the expected consequences if the program is not implemented, and other contextual information that will help the respondent make an informed decision. The panel suggests that for a CV survey to provide reliable results, it should motivate the respondent to take the survey seriously, provide enough information about the context and circumstances of the valuation scenario, and minimize any bias towards high or low responses due to outside pressure.

An additional advantage of CVM is that the results can be validated through real referenda. Real referenda are often decisions to purchase specific public goods with payment mechanisms such as an increase in property taxes. The willingness to pay information obtained through a CV study is similar enough to this type of referendum to predict the outcomes of real-world referenda and validate the CV method.

Other important recommendations by the NOAA panel include:

- The willingness –to- pay format should be used instead of the compensation required. This is because respondents are more likely to exaggerate the compensation they would require than their willingness to pay.

- Respondents must be reminded of substitute "commodities." For example, if respondents are being asked their willingness to pay to protect a particular

hunting area, they must be reminded of other hunting and wildlife areas that they could visit instead.

- Respondents should also be reminded of their limited income; their willingness to pay for the program or policy being considered will reduce the amount of money they are able to spend on other things.

- The CV survey should be pre-tested on a small but representative sample of the population. During the pretest, issues may arise that were not addressed in the design phase. This also gives the researcher the opportunity to assess the respondents' understanding of the valuation scenario.

- Minimizing non-response rates through the use of personal interviews with participants. The panel recognizes that conducting personal interviews may be very costly, however, and suggests that telephone interviews are the best alternative.

- Finally, including open-ended questions to assess the respondents' understanding of the survey and detect any possible biases.

3.3.6 Other Issues Regarding CVM

The contingent valuation method has been criticized for many reasons. Of the reasons that the NOAA panel found most compelling, several will be discussed here. These reasons are: 1) the contingent valuation method can produce results that appear inconsistent with the theory of rational choice; 2) responses to CV surveys sometimes seem implausibly large in view of the many programs for which individuals might be asked to contribute and the existence of possible substitutes for the public good being

considered; and 3) relatively few CV studies have reminded respondents of their budget constraints.

3.3.7 Irrational Responses

The NOAA panel observes that the results of some CV studies are inconsistent with the assumptions of rational choice. This phenomenon is called the "embedding effect." An assumption of rational choice is that usually more of a good thing is better as long as an individual is not satiated. Translated into a CV context, willingness to pay should increase as the quantity of the good provided increases. As the quantity of the good increases, the additional amount that an individual is willing to pay for each additional increment of the good should decrease. For example, on a hot day an individual may be willing to pay $6 for an ice cold drink. He or she may still be hot and thirsty and want a second drink. This drink, however, is not quite as satisfying as the first, and the individual may only be willing to pay $5 for the second drink. The individual will continue to buy drinks until another drink would be worth $0. This is called diminishing marginal utility.

The embedding effect is observed when different groups of respondents are asked their willingness to pay for programs that are identical except in their scale. The NOAA report uses the examples of different number of seabirds saved or different numbers of forest tracts preserved from logging. Embedding occurs when the average willingness to pay does not increase when the scale of the program increases. It appears that willingness to pay is independent of the quantity of the public good being valued.

One often cited example of the embedding effect is a CV study by Desvousges et al. (1992). In the study, respondents were asked to value preventing 2,000, 10,000, and

200,000 birds from being killed by waste-oil holding ponds in the U.S. Central Flyway. The results of the study indicate that the average willingness to pay to protect 2,000 birds is the same as protecting 10,000 and 200,000 birds. While diminishing marginal utility is expected to an extent, in this situation it dropped to zero for any quantity beyond 2,000.

Flaws in the study may explain the embedding phenomenon. The survey used by Desvousges et al. (1992) does not present the respondent with enough detail or a contextual framework to respond accurately. While the difference in the number of birds killed seems large, when the respondent finds out 8 million birds fly over the ponds each year, those numbers seem much smaller. While insufficient information can lead to irrational responses, the embedding effect still raises questions about the reliability of CVM.

Defenders of CV argue that the embedding problem can be avoided by describing valuation scenarios carefully and in context. Mitchell and Carson (1993) believe that amenity misspecifications are often the source of embedding problems. The authors explain that amenity misspecifications are improper explanations of the good that the respondent is asked to value. They then suggest several ways of avoiding these misspecifications. Their suggestions are consistent with the opinion of the NOAA panel, which recommends a "high standard of richness in context to achieve a realistic background," (Arrow et al., 1993, 42) in order to reduce the effects of embedding and provide reliable CV results

3.3.8 Implausible Responses

The second criticism that concerns the NOAA panel is that individuals may fail to seriously consider the possible substitutes for the public good that they are being asked to

value, and then their responses to willingness to pay questions may be unrealistically large. For example, Boxall et al. (1996) used CVM and another stated-preference method (the choice experiment, which asks respondents to chose between two or more alternate sites) to estimate the effect of environmental quality changes arising from forest management practices on recreational moose hunting values. Significant differences were found between the values derived from the two methods- in fact, the CVM estimate is over 20-times higher than the alternative stated preference (SP) experimental choice method.

The researchers suspected that the respondents might have ignored the substitution possibilities, that is, the option to visit a different hunting site. Boxall et al. investigated the substitution issue through the specification of alternate statistical models and found evidence that the individuals involved in the CV study did ignore substitute sites.

This study illustrates the NOAA panel's concern: the reliability of the CVM model depends on reminding respondents of all the possible substitutes for the public good they are being asked to consider.

3.3.9 Limited Budget Constraints

The absence of a budget constraint is a similar problem to the one discussed above. Even if respondents in CV surveys take the valuation scenario seriously, they may answer without considering what tradeoffs they will have to make, and therefore they will overstate their true willingness to pay. One way to address this problem is to remind respondents of their current and planned expenses, and of all the different ways in which they may want to allocate their incomes. For example, Kreiger (1999) informs respondents that their town can spend their tax dollars on schools, protecting open space,

improving and maintain roads, improving libraries, providing more recreational facilities, or improving law enforcement. The town cannot, however, provide more of all of these services without increasing taxes. The respondent is then asked to their opinion on whether the town should spend more or less on each service. This introduction to the CV survey reminds respondents that they would have to forgo some current for additional public goods.

3.3.10 Validating Contingent Valuation Studies

The NOAA panel concluded that under the conditions it specified for survey design, CV studies provide useful information. The panel recognized, however, that the most fundamental criticism of the CVM is that responses to hypothetical CV questions do not match responses in real situations. This criticism led the NOAA panel to call for external validation of the CV method.

The authors of the NOAA report concluded that a critically important contribution could come from experiments in which state-of-the-art CV studies are employed in a context where they can in fact be compared with "real" behavioral willingness to pay for goods that can actually be bought and sold (Arrow et al.1993, 38).

Economists have pursued external validation of CV studies through several methods. Three of the most common methods are 1) comparing the results of a CV survey with the results of an actual referendum; 2) simulating a market for the public good in questions by giving respondents the opportunity to actually engage in real transactions; and 3) comparing the results of a CV survey with the results from a similar revealed-preference method such as the hedonic price method or the travel cost method.

The following sections will discuss each method of validation and provide examples from the existing literature.

3.3.11.1 Comparing CVM and Actual Referenda

As discussed above, there are many advantages to using a hypothetical referendum question to elicit individuals' willingness to pay for a program that will provide a public good (see *NOAA Panel Recommendations* above). In addition to presenting a realistic and familiar scenario, the referendum format is advantageous because it can be compared to actual referendum outcomes.

This type of comparison has several advantages:

- First, thousands of communities regularly make referenda-based decisions about public goods.

- Second, the news media and public discussions usually provide extensive information on the referendum prior to the election. If respondents are already well informed from an outside source, the survey does not have to supply as much information, reducing the likelihood that the survey will bias respondents. By conducting the survey within a several weeks of an actual vote, the survey can present the issue directly and reducing any effects of bias.

- Third, the referendum has an explicit and well-known implementation rule. Typically, a simple majority of "yes" votes results in the passage of the referendum. Since the payment vehicle for a referendum is usually an increase in taxes, free rider issues associated with voluntary contributions are avoided.

- Fourth, the subject of a referendum typically involves a public good. The most common subjects of CV studies are public environmental goods.

Vossler and Kerkvliet (2003) tested the accuracy of voting intentions in an open space bond in Corvallis, Oregon in 1995. In a CV survey, conducted in the immediate weeks before the election, respondents were asked if they would be willing to pay 38 cents per thousand dollars of assessed property value for five years to purchase open space land. Respondents could answer "yes," "no," or "undecided." Those who were undecided were then asked if they would "tend to vote yes" or "tend to vote no." Out of the sample, 53.94 percent of the respondents agreed that they would be willing to pay the additional property tax.

In the actual election, the open space referendum was defeated by a 44.77 percent "yes" vote to 55.23 percent "no" vote. Vossler and Kerkvliet state that a possible reason for the difference in results is that "undecided" respondents were more likely to vote "no " in the election. When the "undecided" survey responses are treated as "no," the percent of "yes" votes in the survey falls to 43.21 percent. This prediction is similar to the actual election outcome.

3.3.11.2 Simulating a Market

The second way to test the validity of CV responses is to simulate a market. By simulating markets, economists can determine the difference between the amount that individuals say that they are willing to pay in a survey and what individuals would actually pay in a real transaction. Using private goods, such as small home appliances, Cummings, Harrison, and Rutstrom (1995) demonstrate that respondents are likely to change a hypothetical "yes, I'm willing to pay" response to "no, I'm not willing to pay" when faced with a real choice. The subjects were offered small household appliances at various prices. For one group it was a real sale and a second group was first offered a

hypothetical question- this item is not currently for sale, but it is were, would you buy it? After the respondent answered, the experimenter announced that he or she would indeed sell the item, and the respondent was free to change his or her answer. When juicers were the item, 11 percent actually bought them in the real sale; with the second treatment, 41 percent said they would buy it if it were on sale, but then only 16 percent actually did. Cummings et al. (1997) and Blackburn, Harrison, and Rutstrom (1994) also show a divergence between hypothetical and real willingness to pay using private goods. These studies raise the possibility of developing a calibration statistic, which would adjust hypothetical willingness-to-pay estimates to more closely reflect actual choices.

While the studies mentioned above reach pessimistic conclusions regarding convergence between hypothetical and real choices, other studies reach more optimistic conclusions. Bishop and Heberlein (1990) conducted a series of experiments with hunters who had applied for a deer-hunting permit in a favored game preserve run by the state of Wisconsin. In one experiment, two groups of hunters were offered permits at specified prices. In one case, this was a real offer; in the other, it was asked as a hypothetical question. Estimated willingness to pay was $31 in the real sale versus $35 in the hypothetical sale, a statistically insignificant difference (Hanemann, 1994).

Actual market prices would be ideal measures to use in assessing the convergence of CVM with actual willingness to pay values. Since markets do not usually exist for environmental public goods being valued by contingent valuation questions, simulated markets provide one way to establish criteria for judging the validity of CVM. In the application of simulated markets, the real and hypothetical situations should be parallel in every aspect except for the actual exchange of money. Since simulated markets involve

actual transactions, they should provide values that are more closely related to true willingness to pay than contingent values, and thus should be capable of serving as criteria for evaluating the validity of CVM results.

Carlsson and Martinsson (2000) conducted a test for the external validity of the choice experiment (a stated-preference method similar to CVM). In this experiment, respondents were asked their willingness to pay for the provision of three different environmental projects. Each respondent was presented with both hypothetical and real willingness to pay questions. From the data, Carlsson and Martinsson estimated the marginal willingness to pay for the actual donations and the hypothetical donations, and concluded that there was not a significant difference in actual and hypothetical marginal willingness to pay.

A different study reached a more pessimistic comparison between stated and actual choices. Brown et al. (1996) obtained independent sample estimates of willingness-to-pay in response to dichotomous choice (DC) and open-ended questions, and did so for actual as well as hypothetical payments. The experiment was divided into four response formats: an open-ended real question, an open-ended hypothetical question, a DC real question, and a DC hypothetical question. Each respondent received one of the questions and was asked about his or her willingness-to-pay for a project to remove abandoned unpaved roads along the North Rim of Grand Canyon National Park. The researchers compared the two question formats in the context of both real and hypothetical money payments. In response to the open-ended bids, 60 percent of the respondents answered $0 to the hypothetical question, while 82 percent answered $0 to

the actual question. Across all of the bid levels, a greater percentage of people answered "yes" to the hypothetical questions than to the actual payment questions.

Many simulated market studies now exist in the literature. Bishop, Champ, and Mullarkey (in Bromley, 1995) find the results, as a whole, encouraging for contingent willingness to pay. Contingent values for willingness to pay are consistently strong in predicting simulated market values, although contingent values are sometimes higher.

3.3.11.3 Comparing Stated Preference Methods and Revealed Preference Methods

The third way to assess the validity of contingent valuation results is to compare values estimated from a CVM study to values for the same amenity estimated using a travel cost model or a hedonic price model. If the estimates are not statistically similar one of the measures of value is wrong and the comparison would not support the validity of the contingent value. It would not immediately invalidate the CVM study because the travel cost model or hedonic price model could instead be invalid.

Brookshire et al. (1982) compared contingent values for an improvement in air quality at the respondent's residence in the Los Angeles area to a hedonic price analysis of the property value data of residence in the same area. Theory says that there should be a rent differential associated with homes in areas of different levels of air quality. According to the researchers, the rent differential must exceed household willingness to pay for air quality differentials, in order for the CVM to be validated. If the rent differential were not larger than willingness to pay for differential air quality, respondents would have moved to the neighborhood with a higher level of air quality. Therefore, if an individual's contingent value for air quality improvements exceeds the corresponding

property value differential from the hedonic price equation, the contingent value must be greater than the individual's hedonic value. For eleven comparisons, the property value price differential was higher than the contingent willingness to pay value in every case. This result establishes that the value of air quality improvements is greater using hedonic pricing than it is using CVM, but the "true" value that individuals place on air quality improvements is still unknown.

Carson et al. (1996) provide an extensive assessment of convergent validity between stated-preference estimates and revealed- preference estimates of willingness-to-pay for environmental goods. The assessment examined the estimates of over 80 studies containing 616 stated-preference/ revealed preference comparisons. Some studies in the assessment include: "Outdoor recreation of a forest area in northern Maine," (Knetsch and Davis, 1966), "Kootenai Falls Recreation in Montana," (Duffield 1984), "Cold water fishing in Idaho," (Loomis, Sorg, and Donnelly, 1986), and "Air pollution in the Haifa area, Israel," (Shechter, 1992). Carson et al. concluded that the stated-preference estimates are smaller, but not grossly smaller, than their revealed-preference counterparts- the contingent valuation estimates were about 80-90 percent of the magnitude of revealed preference estimates.

While these are examples of comparison studies that validated the contingent valuation method, there are many others that demonstrate that it is easy enough to conduct CVM studies that fail to meet theoretical expectations. While the CVM is the most commonly used form of passive-use valuation, it is not fool proof and there are no scientific studies that clearly support or discredit the validity of the CVM.

3.4 The Choice Experiment

While the CVM is the most common method used to elicit passive-use values, other stated preference methods are available. The choice experiment (CE) is an extension of the CVM, and it employs a series of questions with more than two alternatives. The questions are designed to elicit responses that allow the estimation of preferences over attributes of an environmental state.

The CE method presents respondents with multiple choice sets, each of which is made up of two or more scenarios. The scenarios are described by a number of attributes that reflect different states of the environment. The respondent is asked to evaluate the scenarios, and then to choose their preferred scenario. Like the CVM, CE is based on random utility theory, and the choice that each individual makes is a reflection of the tradeoff that he or she makes between the attributes of each scenario. When price is included in the choice set, it is possible to estimate the economic value associated with the other attributes.

To date, the applications of CE in the field of environmental and natural resource economics have been limited. Relative to CVM, the CE method, however, appears to have several advantages:

- First, because CEs are based on attributes, they allow the researcher to value attributes as well as situational changes.

- Second, valuing attributes is important because most environmental and natural resource management decisions are based on incremental changes in the various attributes of an environment, rather than losing or gaining an environment as a whole.

- Third, CE provides the opportunity to measure the marginal value of different attributes. This has the advantage of estimating compensating values of different attributes, rather than compensating amounts of money, should one attribute be damaged.

- Fourth, applications of CE may experience fewer problems with the embedding phenomenon because tests of scope can be built into CE surveys

The multi-attributed evaluation information that is measured by the choice experiment could be elicited using repeated CVM questions but a large number of CVM questions would be needed. Furthermore, while both CVM and CE are stated preference experiments, CVM attempts to gather information regarding an individual's choice of one precise scenario, while CE attempts to understand the respondent's preferences over the attributes of the scenario rather than the specific scenario.

3.4.1 Applications of the Choice Experiment

Although the choice experiment has been mostly applied to marketing and transportation economics, the field of environmental economics has recently begun to use the choice experiment more frequently to measure passive-use values. This section will summarize two of these studies.

Adamowicz et al. (1998) compared the application of the CE and the CVM used to measure passive-use values for a woodland caribou management program in Alberta, Canada. A CVM question was constructed by describing a change from current management in the region to a scenario under which a program is implemented to preserve old-growth forest and woodland caribou. The CE was constructed from the attributes of the scenario (caribou populations, wilderness area, employment, taxes paid

per household), and individuals were asked to choose between the current situation and two alternative situations.

The program used in the CVM question involved the removal of land from forestry uses, the restriction of recreational activities such as hunting and fishing, and the creation of a wilderness area. Also, the number of caribou was predicted to increase to a biologically viable population if the program were implemented. The researchers predicted that respondents would favor the increasing caribou populations, but that recreation restrictions and employment effects would be unattractive.

The CEs were based on the same information as the CVM scenario. The choice experiment questions were designed from five attributes of the scenario: wildlife populations, wilderness area, recreation restrictions, forest industry employment, and a change in provincial income taxes. Each attribute has four levels, spanning the levels used in the CVM question. The attribute levels also varied above and below the current level, allowing the researchers to estimate willingness to pay and willingness to accept for attribute changes. After varying the different attribute levels, there were 32 choice sets, which were divided into four versions of the questionnaire with eight choice scenarios presented to each respondent.

The first step was to estimate the change in individuals' welfare associated with the new, larger caribou population. The economists had hypothesized that the caribou protection program would increase the welfare of individuals who benefited from larger caribou populations and would decrease the welfare of individuals who experienced the loss of employment or recreation. To measure each individual's welfare change, the economists asked how much additional income each person would need to be as well of

after the implementation of the caribou improvement program as he or she is with the current situation. The economists estimated the welfare change using the CVM and the CE method. The estimates from each method were not significantly different. The CE approach did, however, have several apparent advantages over the CVM. One of these advantages was that the CE model was able to show that moving to the "sustainable" level of caribou was quite important to respondents, but movements beyond that level were not as important.

In another study the choice experiment is used to estimate the value that people place on public access to coastal areas in Rhode Island. Swallow and McGonagle (2002) anticipated that the optimal allocation of public funds for open space differs depending on personal interests in public access, and they found that the provision of public access may not unambiguously increase willingness to pay for coastal preservation.

The study asked respondents to evaluate the attributes presented for two parcels of coastal land, which were hypothetically available for preservation. Then, respondents were asked to choose between one of the two parcels, or the alternative of preserving neither parcel. Each parcel is described by twelve attributes including shore type, water type, location, development level nearby, unique scenic quality, unique ecological quality, access level, law enforcement, facilities proposed, and cost.

In addition to the parcel choice questions and general socio-economic variables, participants were also asked to respond to seventeen attitude statements. These statements addressed coastal themes, and from their answers respondents were classified as "pro-access" or "pro-environment."

Analysis of the results showed the marginal effects of changes in each of the attributes. For example, respondents showed that regular enforcement patrols, rest rooms, and walking trails all contributed positively and significantly to utility, and walking trails had about twice the impact of enforcement patrols and rest rooms. Swallow and McGonagle (2002) also predicts individuals' willingness to pay for coastal areas with different levels of public access based upon the individual's personal characteristics and attitudes. The model predicts that the willingness to pay for a base parcel ranges from $18 to $92, depending on the level of public access and the respondent's residency and attitudes. For example, a non-coastal resident, with average attitudes on the scales for pro-environment and pro-access, most prefers a parcel that is managed for a high level of public access, but a parcel without a provision for public access is valued second most highly. Coastal residents, however, most prefer sites with little or no public access and least prefer sites with high public access.

Predicting willingness to pay based on respondents' attitudes adds another dimension to the model. For example, a non-coastal, pro-environment respondent is predicted to value low access parcels the most and high access parcels the least. In willingness to pay terms, this respondent shows about a 75 percent increase in willingness to pay for the base parcel with no access, as compared to a respondent who is average on both scales. The base parcel had a sandy beach, surf, was not developed, located in a rural area, and was not ecologically or scenically unique. The access levels were then varied. A coastal resident who is average on both attitude scales is generally willing to pay about twice as much as a non-coastal resident for conservation of the base parcel; for example, the willingness to pay of a coastal resident, when averaged over four

access levels, is $70 compared to $38 for the non-coastal resident, when they each have average attitudes on both scales.

Determining the value of public access to coastal areas provides useful information for policy and decision makers. Swallow and McGonagle's model shows that some respondents prefer access, and adding public access to a site might increase their willingness to pay to protect that site by magnitudes of 50-200 percent. Others, however, feel that the provision of access to preserved land is inessential or inappropriate, and therefore prefer sites without provisions for public access. Their willingness to pay might decrease by magnitudes of 40–60 percent when public access is an attribute of the site. Knowing these preferences, a mixed policy strategy might be most highly valued by Rhode Island's constituents. For example, providing low capacity access to ecologically unique sites and higher access levels where ecological resources are not unique or as sensitive may offer agencies opportunities to serve both types of constituents and encourage broad support for open space programs.

3.5 Conclusion

Despite their increasing acceptance by the economics profession, experimental analytical techniques such as the contingent valuation method and the choice experiment have not gone without opposition. Proponents of these models claim that asking people directly has the potential to inform society about the nature, depth, and economic significance of passive-use values for public goods. Critics claim that the techniques are incapable of reliably estimating these values.

In the past, experimental economics, developed in a "laboratory" setting, has shown to be useful and applicable in real-world policy making. The allocation of airport

landing slots by the Civil Aeronautics Board, the auction of T-bills by the Department of the Treasury, the sale of air pollution emission permits by the Environmental Protection Agency, and the design of natural gas contracts by the Federal Energy Regulatory Commission, are all examples of policies developed through the use of experimental economics (Portney 1994).

To date, stated preference models appear to be the only method of estimating passive-use values. Some environmental benefits can be estimated through revealed preference models. The value of air quality improvements reveal themselves in real estate price differentials, workplace safety is reflected in wage differentials, and the benefits of outdoor recreation can be determined through the travel cost method. But stated preference models, contingent valuation in particular, are the only methods available for estimating existence values. The choice experiment has the additional benefit of being able to estimate the value that people place on the attributes of a program or environmental change.

Chapter 4: Existing Research

4.1 Introduction

Open space is recently a widely discussed political, economic, and biological topic. State and local ballots offered 200 open-space and conservation initiatives in 1998, and voters passed more than seventy percent of those measures and approved $7 billion for initiatives to preserve open space (Babbitt 1999). This open space movement and the possible funding resources that it could generate provide an opportunity for communities to protect valuable land from residential or commercial development. Successful open space preservation programs require the cooperation of local officials, biologists, land-use planners, and economists. If programs are backed by a united constituency they are more likely to generate financial support. Recently, economists have attempted to understand the factors affecting the public value of parcels of land preserved or conserved.

This chapter will address the related literature as it pertains to measuring the value that the public associates with public goods. The most commonly used measurement tools among environmental economists are stated-preference methods, specifically the contingent valuation method (CVM). While the CVM is widely accepted among environmental economists, there continues to be debate concerning the validity of the technique (Swallow, Anderson, and Philo 2003). This chapter will review the applications of two different stated-preference methods: the contingent valuation method and the choice experiment method.

4.2 Why do economists estimate environmental values?

One must ask why economists want to measure the value of environmental goods such as open space. How is information from stated-preference methods used in a "real world" setting?

One possible advantage that comes from knowing the economic value that people place on a certain environmental situation is the efficient use of public funds for different programs. Consider farmland preservation programs. The conversion of farmland to residential sites and other nonagricultural uses has been a significant public policy issue for the past three decades. Since the mid 1970's the U.S. Department of Agriculture has advocated the preservation of prime agricultural land, writing the following: " USDA should take a major, defined, and well-promoted role in the national questions of utilization, enhancement, and retention of agricultural lands as an advocate of retaining the maximum possible base for the production of food, fiber, and timber products, and minimizing actions that will diminish the nation's capacity to produce these essential commodities" (USDA 1975, *Recommendations on Prime Land*, p. 17). More recently, as a subtitle to the 1981 Farm Bill, Congress enacted the Farmland Protection Policy Act. The purpose of the law is to "minimize the extent to which Federal Programs contribute to the unnecessary conversion of farmland to nonagricultural uses" (P.L. 97-98, Sec. 1539-1549; 7 U.S.C. 4201, et. Seq). It is not only the federal government that agitates for farmland preservation. The Farmland Preservation Act (1988) of the State of Rhode Island[1] creates a program through which public funds can be used to purchase the

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[1] "It is in the best interest of the people that the state identify and acquire the development rights to the remaining land, most endangered by development so as to maintain farming, productive open spaces, and ground water recharge areas." General Laws of Rhode Island, Chapter 82, Farmland Preservation Act, 1988 Reenactment.

development rights to farmland properties, thus protecting the land from future development. The statute lists several reasons for protecting farmland: to maintain farming, preserve open spaces, and protect groundwater recharge areas.

Not all of Rhode Island's objectives, however, are exclusive to farmland protection. Among the reasons listed above, the public also values open space and farmland for recreation, aesthetic, and quality of life purposes. Since most of these reasons are not unique to farmland, is farmland preservation the most appropriate policy? If this is the case, should public funds be directed to programs that most closely meet the objectives of the public?

Gardner (1977) argues that farmland preservation is not an appropriate public policy because agricultural resources are already allocated efficiently through existing markets for agricultural land. Open space preservation programs, however, are necessary because the benefits and amenities derived from open space are public goods, and therefore are not exchanged in markets. Therefore, Gardner concludes, the only rationale for publicly funded farmland protection programs is that existing markets do not take into account the non-market amenities associated with farmland. These amenities include aesthetics, a greater quality of life associated with less congestion, and wildlife value; these amenities do not have well-established economic values. Identifying which amenities people value, and quantifying the benefit derived from those amenities would aid in deciding how to target protection programs. Examining the motivations behind public support for different types of programs can determine the true goal.

Swallow (1999) also argues that the public's desire for farmland and open space preservation arises from a demand for aesthetic, ecological, and other non-market values

which may or may not be related to commodity production. And, while conservation biologists have developed guidelines and recommendations for ecological management, Swallow notes that economists have not provided guidelines on policies or incentives to implement ecosystem management on a large scale. Swallow suggests that economic measurement tools can be used to develop conservation incentives at the local level. Using the choice experiment method Swallow shows that the public does not value all types of open space equally, and identifies the source of the variation in land's value. He then suggests a policy strategy that would allow communities to encourage development on the land that is least valued by the public and promote the preservation of highly valued land parcels. The policy relies on two principles: the "polluter pays principle" and the "beneficiaries pay principle." The first principle implies that developers would pay an impact fee for the conversion of open space. The second principle implies that residents would pay for the benefits that they derive from preserved open spaces through municipal tax policies.

Swallow hypothesizes that the recent increase in development pressure has stimulated a demand for conserving rural attributes and ecosystems. This demand has caused the public's historically laissez-faire attitude towards property rights to shift, as people demand municipal action to slow and control development and protect rural character. Town officials and planners typically use comprehensive plans and zoning restrictions to meets their constituents' demands for the aesthetic, environmental, and recreational benefits of preserving open spaces.

Citing Bromley and Hodge (1990), Swallow suggests that this evolution of property rights has opened the door to alternative policy strategies. Swallow suggests

using open space valuation to support a mixed strategy employing the "polluter pays" and the "beneficiary pays" principles. In this case, developers would pay impact fees for converting land, and municipalities, acting as representatives of the resident-beneficiaries, would use valuation methods to assess priorities for tax revenues in support of open space conservation.

Swallow then demonstrates how the choice experiment can help municipalities determine how to allocate public funds among land type choices and assess impact fees that are proportional to the value that the public places on the land being converted. Using the choice experiment, Swallow estimates the amount that location, land type, ecological and scenic uniqueness, access level, and taxpayer cost increase or decrease the value of a parcel of land. He considers a farm that is ecologically unique, not scenically unique, and adjacent to a river, to which there will not be any public access. The willingness-to-pay for this parcel would be $29 per year for five years. If the town, however, were able to secure an easement and allow public access the willingness-to-pay would increase to $36. This analysis shows that the publics' willingness-to-pay changes as the attributes of the land change. Swallow suggests that local governments could serve their constituents' interests better by allocating public funds to those land parcels that the public values the highest. Other conservation institutions, such as local land trusts or conservation agencies, could also benefit from considering which land attributes are the most highly valued. By offering preservation opportunities that include the attributes that the public values highly, organizations may be able to increase their public financial support.

Willingness-to-pay can also be used to determine impact fees that developers pay for converting open space to other uses. Swallow suggests that the fee could be determined according to the variation in open space value associated with the attributes of the land. The variation in fees could be tied to the physical and ecological features of the land so that landowners-developers with similarly situated properties would face similar fees. In Swallow's study, parcels adjacent to rivers would carry higher impact fees and parcels without ecological or scenic uniqueness would probably not require any impact fee, since those parcels are not likely to generate a positive willingness-to-pay for preservation. Swallow suggests that one advantage of using economic valuation to determine impact fees is that the fees would meet the constitutional standard for "rough proportionality" necessary to avoid government takings.

4.3 Applications of Stated-Preference Methods

4.3.1 Applying CVM to Open Space and Farmland

Krieger (1999) applies the contingent valuation method to open space and farmland issues in the Chicago area. The objective of this study was to examine the types of benefits people derive from two different types of land and quantify the value that residents place on a farmland preservation program.

Kreiger's research consisted of two phases: a qualitative phase used to identify which aspects of open space and farmland people enjoy and a quantitative survey designed to measure how much residents were willing to spend to protect the amenities that they value.

The qualitative phase consisted of a series of focus groups. The focus groups defined open space, identified the amenities associated with farmland and open space,

and identified unique characteristics of farmland. The most important aspect of open space, according to participants, was its role in slowing growth and controlling development. Open space prevents the negative impacts commonly associated with rapid growth, such as congestion, increases in crime, loss of community, loss of scenic beauty and habitat, and increases in air and water pollution.

Many participants thought that protecting farmland was synonymous with protecting other types of open space, but several amenities unique to farmland were identified. For example, residents saw farmland as a productive resource that contributes to a certain way of life. Others felt a responsibility to future generations to provide the resources for an adequate food supply. Conversely, respondents identified negative impacts of farmland, such as odors and dust. Participants also named amenities unique to other types of open space. Public access is one amenity usually provided by open space, but not available on farmland.

The objective of the quantitative phase of this project was to measure how much money the residents of different counties were willing to pay for a farmland protection program. Kreiger used the most common form of stated-preference methods, contingent valuation, to assess willingness-to-pay. Respondents were presented with a referendum-style question and were asked to consider a new tax for farmland preservation. Each respondent was told how much he or she would have to pay in additional taxes if the program was approved. The farmland would be protected through the purchase of development rights, and the number of acres to be protected and the amount of the new tax varied from survey to survey; Kreiger used three different acreage figures and ten different program costs, which resulted in thirty different valuation scenarios. Finally, the

respondents were asked if they would vote for or against the referendum. Analysis of the CV survey indicated that the average willingness to pay for a farmland protection program was $57 per year for 30 years.

The results of this study indicate that the main motivation for supporting farmland protection, in three counties surrounding Chicago, is a desire to protect amenities associated with a high quality of life. The results, however, also show that both farmland and other types of open space provide those amenities. The study did not address whether public money is best spent on farmland protection or on preserving other types of open space. Identifying the perceived degree of substitutability between farmland and open space would aid in targeting programs to be consistent with public support.

The study also failed to identify a significant response to the level of protection described in the valuation scenario. During the focus group sessions participants mentioned that some of the benefits associated with open space depend on the amount of open space protected. For example, the quality of drinking water depends on the entire watershed being protected, as opposed to only protecting a small portion of the watershed. Because some of the benefits depend on the amount of open space protected, according to the theory of stated-preference, respondents' willingness-to-pay should be sensitive to the number of acres being protected. Krieger notes that it is likely that respondents did not perceive the difference between protecting 2 percent, 8 percent, or 15 percent of remaining farmland to be significant in terms of impacts on their lives.

Kwak , Yoo, and Han (2003) also applied the contingent valuation method to open space issues. In this case CVM was used to estimate the public's value for urban forest in the Seoul Metropolitan Area of Korea. According to the researchers, urban

forests have various environmental benefits that contribute to the quality of urban life in the Seoul area. These benefits include: protection against soil erosion and natural hazards, ground-water protection, pleasant landscape, and recreational opportunities. Until this study these values had been underestimated or had never been reflected in urban development planning in Seoul. As a result, many forests in urban areas were destroyed without the forests' value to the public being assessed. These forests were replaced with more than 300,000 new houses and numerous factories. This rapid development incurred various social costs, including encroachment on superior farmland, environmental pollution, and impairment of the landscape.

The objective of Kwak, Yoo, and Han's study was to estimate the value attached by the public to Kwanggyo Mountain in the Seoul Metropolitan Area of Korea using a contingent valuation survey, aimed at providing policy-makers with useful information to make an informed public decision in urban planning development. The survey consisted of descriptions of Kwanggyo Mountain and the proposed program to be valued, the situation in which the respondent should imagine himself, and the willingness-to-pay question for the proposed program. Other mountains were also suggested as possible substitute recreation sites.

The researchers reported that the overall results indicated that the respondents received the hypothetical scenario well. Ninety-five percent of the respondents viewed urban forest preservation as being equally important with other environmental concerns, such as clean air and water. Only 2.3 percent of the respondents had ever visited Kwanggyo Mountain and among non-visitors, only 14 percent planned on visiting the mountain within the next two years. The majority of the non-visitors (66 percent) said

that they had never heard of the mountain. Regardless, the willingness-to-pay per household was between 1,000 and 12,000 Korean won per year for the proposed program of conserving the mountain. When willingness to pay was aggregated across the total population it was 3.77 billion won per year for five years, (roughly $2.6 million). Since most of the respondents were unfamiliar with Kwyanggo Mountain, the respondents' willingness-to-pay for the conservation program seems to place more weight on non-use values than on recreational values, according to the researchers.

4.3.2 Determining the Objectives of Public Support for Conservation

Kline and Wichlens (1998) conducted a similar study in Pennsylvania and Rhode Island. Instead of gathering primary data through a survey, Kline and Wichlens used referendum data to examine whether public support for farmland preservation is limited to agricultural objectives or if support includes environmental and municipal objectives.

Following generally accepted theory, the study assumes that the benefits derived from farmland are public goods. Therefore, farmland protection programs would increase individuals' well-being. A voter's decision is assumed to be based on variables describing current land use in the area and on the importance the voter places on agriculture. In addition, the authors hypothesized that the marginal impact of a change in farmland area should impact the proportion of residents "for" or "against" a referendum for a farmland protection program. As the existing level of farmland decreases, the marginal social loss of converting farmland to another use increases. Kline and Wichlens hypothesized that a region with large amounts of existing farmland would have a smaller proportion of residents voting for a protection program than a region that has already experienced fast growth and development.

Kline and Wichlens' data comes from the results of four state-wide elections in Rhode Island from 1982, 1985, 1988, and 1990, and the results of a 1987 Municipal Election in Pennsylvania. They also selected land use variables to represent agricultural, municipal, and environmental factors likely to influence voters' decisions in each region.

The results from the Rhode Island referenda indicate that the public is more likely to support farmland preservation in towns with the greatest amount of farmland lost from 1975-1990. Towns with faster increases in housing value or with higher rates of population growth are also more likely to support funding. In addition, programs for the purchase of development rights (PDR) receive greater support in towns that have a greater proportion of land with resource-sensitive characteristics.

In their discussion section, Kline and Wichlens explain these results. The positive correlation between population change and support for a PDR program is consistent with the public belief that farmland preservation provides growth control. Rapid housing and land values raise the opportunity cost of holding farmland and open space. Therefore, residents of regions that are experiencing increasing housing and land values may recognize that the existing open space is likely to be developed soon. Support for PDR programs may indicate public interest in slowing the growth implied by rising land values. Since previous research indicates that a large proportion of the public support for farmland preservation comes from the desire to slow and control development, Kline and Wichlens suggest that land-use planning policies may be better suited than farmland preservation to achieve those objectives

4.4 Applying the Choice Experiment Method

An alternative stated-preference method for measuring the benefit that people derive from open space preservation is the choice experiment. Swallow (1999) and Swallow and McGonagle (2002) were mentioned in Chapter 3 because they have applied the choice experiment method to open space issues in Rhode Island. In the former paper, Swallow estimates the value of open space attributes in Richmond, RI and in the latter paper, Swallow and McGonagle estimate the marginal value of public access in coastal areas. Other researchers have also used the contingent choice experiment with varying success. Hanley et al. (1998, 2002) has used this stated preference variation to model recreational demand in Scotland and forest landscape change in the United Kingdom.

In their paper, Hanley, Wright, and Koop (2002) estimate rock climbers' preferences for different recreational sites based on site characteristics and climber characteristics. Climbing areas were described by the length of the climbs, approach time, crowding on the climb, overall quality of the climb, scenic quality, and how far the area was from one's home. Distance was a proxy for cost. After the questionnaires were completed distance was converted into a travel cost.

This paper is also interesting because Hanley, Wright, and Koop test for the effects of choice complexity and rationality. The researchers wanted to find out whether the complexity of the survey matters. They hypothesized that a long questionnaire with many choice questions could either improve the model because respondents learn how to better complete the questions as the number of questions increases, or that respondents become fatigued and pay less attention to accurately completing the questions as the number of questions increases. Two variations of the questionnaire were administered;

one version had 4 choice questions and the other version had 8 choice questions. A likelihood ratio test was used to test the hypothesis that the parameters between the four choice and the eight choice models were not statistically different. Hanley, Wright, and Koop found only weak evidence that the number of choices has a significant effect on preferences.

Next, the researchers tested for rationality. One criticism of the choice experiment model is that respondents' preferences are transitive- that is, a respondent may prefer A to B, and B to C, but then prefer C to A. To test for preference stability, Hanley, Wright, and Koop included a choice question in which the two climbing sites were identical in every respect except price. According to the theory of the marginal utility of income, rational respondents would choose the less expensive site. Forty-two responses were returned for this question and only one respondent chose the more expensive site. Another group of respondents was asked to answer two questionnaires in which the same choice question was asked twice. If preferences are stable, respondents should choose the same climbing site in both questions. Only twenty-two responses were returned for this question and again, only one respondent changed his choice when the identical question was presented twice. Because the sample size was very small for each question (forty-two responses and twenty-two responses), the researchers could not conclude that the study was or was not significantly affected by instable preferences.

4.5 Comparing CVM and CE

In the second paper, Hanley, Wright, and Adamowicz (1998) examined forest landscape changes using the choice experiment model. The study was commissioned by the Forestry Commission in the United Kingdom to estimate the external benefits of

possible changes in landscape elements in public forests due to changes in management. The CE design asked respondents to choose between alternate forest designs, each bearing a price. Each forest design was described by three attributes set at two levels. Photographs were altered to show the forest in different states. Hanley, Wright, and Adamowicz also conducted a standard CVM survey in order to compare the results to the CE survey. In the CVM survey, respondents were asked to state their preference between each photograph in a pair or triplet, and then state their maximum willingness-to-pay to move from their least preferred to the most preferred photo.

The results of the two survey types overlapped and the attribute values estimated by the two methods were found to be similar. This study, however, compared CE results with open-ended CVM data; this does not share the same random utility basis as dichotomous choice CVM, and therefore cannot be treated as theoretically equivalent.

Boxall et al. (1996) reported the results of a CE applied to recreational moose hunting in the province of Alberta. This study also collected CVM responses to allow welfare estimates from the two techniques to be compared. Respondents to the CE questionnaire were asked to choose between hunting areas that were described by varying attributes. The attributes included were sightings and auditory evidence of moose, access within the hunting area, levels of congestion, the quality of roads used to travel to the hunting areas, the distance from one's home, and the presence of forest industry operations. Varying these attributes resulted in 32 choice sets, which were divided into two sets of 16. In each of the surveys, one set of 16 choices was presented.

The CVM question was also presented to each respondent. The question was structured such that an individual chose between hunting in a specific wildlife

management unit given an improvement in moose population or not hunting there. Hunters were then asked if they would be willing to travel an additional distance to get to the wildlife management unit. The distances were converted into travel costs. The CE and CVM questions were presented to a sample of hunters in Alberta.

The willingness-to-pay per trip for an increased moose population was much lower for the CE data than for the CVM data. The CVM estimate was over twenty-times higher than the CE estimate. One explanation for the disparity is that the CVM instrument was flawed and respondents did not understand the scenario. The researchers were disinclined to accept this explanation, however, because they conducted lengthy focus groups. The focus groups were made up of representative hunters, and the purpose of the meetings was to make sure that the hunters understood the language and questions in the survey.

The most probable explanation is that respondents may have ignored the substitution possibilities. Respondents may have chosen "yes" in the CV question, ignoring the possibility of hunting in alternative areas. The researchers explored this issue through the specification of alternate statistical models and found evidence that the individuals involved in the CVM approach may have ignored substitute recreation sites.

4.6 Using CE to Develop Public Policy

In a more controversial setting, Opaluch et al. (1993) used the choice experiment to rank potential sites for noxious facilities in terms of their social impacts. Their paper developed a method for evaluating the social tradeoffs associated with noxious facility siting, specifically in the context of siting solid waste landfills, which is an immediate concern to many communities, as the existing landfills begin to fill up and close. There

are significant tradeoffs associated with landfill siting, such as woodlands versus farmland, or a high-density neighborhood versus a far-off site that would require high transportation costs. The impact of landfill siting will reach beyond the immediate vicinity as well. A larger, regional population may have concerns about environmental integrity or the cost of their garbage collection, for example.

Opaluch et al. chose the choice experiment method rather than the traditional contingent valuation method for this analysis because the CV method is not recommended for highly controversial topics, since strongly emotive subjects may bias responses to willingness to pay questions. The choice experiment diffuses emotions by focusing attention on the tradeoffs between two or more sites, rather than asking people "how much they would be willing to pay to keep a landfill out of their own backyard," (Opaluch et al. 1993, p. 42).

Traditionally, economists have focused on auction mechanisms to determine landfill siting. Auction mechanisms identify which community requires the least compensation to accept a landfill. This approach has been met with severe opposition from policymakers. The arguments against the auction mechanism include perceived inequity, since wealthy communities can afford to forgo the compensation associated with the landfill, while poorer communities are more likely to accept the compensation and the landfill. Much of the public often finds this trade socially unacceptable. Communities may also accept the compensation as a way of dealing with short-term problems, without a clear understanding of the possible long-term effects of the landfill. A second shortcoming of the auction method is that not all members of a community are similarly affected by the landfill. Residents in the vicinity of the landfill may be much

more adversely affected than those living farther away. Given these, and other reasons, policymakers have generally relied on a scoring mechanism for landfill siting. This system assigns points, based on technical criteria, to different sites, while largely ignoring social considerations.

Opaluch et al. link the scoring mechanism used by policy makers with revealed public preferences for acceptable tradeoffs regarding site attributes. This approach incorporates the publics' preferences regarding the social impacts of landfill site selection, basing the preferences on site attributes, rather than willingness to accept compensation.

The approach is implemented using the choice experiment method. Respondents chose between two hypothetical landfill sites, described in terms of on-site acreage of wetlands, woodlands, and farmland, quality of underlying groundwater, wildlife habitat, number of houses in the vicinity, presence of schools in the vicinity, and cost to each household, among other attributes. In some cases only two attribute levels differed across sites, while in other comparisons up to six attribute levels differed. In the end, 308 different pair-wise combinations were developed and divided into 28 booklets, each containing 11 paired comparisons.

According to Opaluch et al., the principle advantage of using the choice experiment method is that respondents find that choosing among alternative commodities is among the most natural and frequently experienced decision environment, compared to directly evaluating individual characteristics. People often have to choose between two market goods that are similar, but not identical.

By observing a large number of selections among paired attributes, coefficients were estimated that indicted the relative importance of attributes. Opaluch et al. used these coefficients to develop a site scoring mechanism that ranks sites in a manner consistent with approaches previously used by policymakers. The site scores were estimated with the Logit model, and represented a utility index for an average voter and could be used to predict the outcome of a hypothetical referendum that is based on the generic attributes of the sites.

4.7 Conclusion

This chapter provides a brief look at a few applications of stated-preference methods to environmental issues. The cornerstone economic principle in assessing the public's value of a proposed program for preventing environmental damage is the concept of 'willingness-to-pay.' This concept represents the amount that people would be willing to pay for avoiding specified environmental damage. In this chapter, this type of damage includes the development of open spaces and farmland, the loss of recreational sites, and the construction of a toxic waste facility. The willingness to pay concept makes intuitive sense: if the development of an open space area, for example, reduces a person's well-being, then that person would normally be willing to pay some amount of money to avoid the development.

The most common application of stated-preference methods is contingent valuation. This method involves constructing a hypothetical market referendum scenario in a survey. The proposed program and its effects are described in the survey, as well as the cost of the program. The provision rule states that if respondents chose to pay the program will be implemented, and if respondents do not chose to pay the environment

will remain in its current state or be developed. Respondents use the hypothetical market to state their willingness to pay or vote for or against the program.

The choice experiment is another stated-preference method that is becoming increasingly popular in the field of environmental economics. This method has the advantage of being able to estimate the public's value for the different components of the environment. Both contingent valuation and the choice experiment have been successfully applied to many different environmental situations.

Chapter 5: Survey Design

5.1 Introduction

The final survey instrument is modeled after the choice experiment. The choice experiment method for measuring passive-use values was chosen over contingent valuation because the choice experiment permits estimation of the value of attributes of different open space parcels. Data gained from a contingent valuation survey only allows willingness-to-pay for a particular situation to be estimated, but using the choice experiment provides the opportunity to estimate the variation in individuals' willingness-to-pay for the individual attributes of the environment.

5.2 The Preliminary Survey

Developing the survey instrument was a two-step process. First, a preliminary survey was administered, and then, using information collected from the preliminary survey, the final survey was created. The preliminary survey had two objectives: 1) to establish bid levels for the choice experiment survey instrument, and 2) to determine if any of the questions were confusing.

The preliminary survey had four sections: introductory questions, a series of attitude statements, open-ended valuation questions, and general demographic questions (See Appendix B). The introductory questions assess the general importance of open space on Conanicut Island to the respondent. The purpose of these two questions is to familiarize the respondent with the type of questions that follow. These questions also direct the respondent's thinking towards the issue being discussed.

The attitude statement section was included in the survey to identify how respondents differ in their attitudes and qualitative values toward open space

preservation. This section contains ten attitude statements, which respondents rate on a five-point Likert scale, varying from "strongly disagree" to "strongly agree." This attitude and values scale was adapted from Purdy and Decker's (1989) Wildlife Attitudes and Values Scale (WAVS). Purdy and Decker developed the scale for the purpose of understanding the values that people place on wildlife. Knowing the reasons why people value wildlife would be useful in creating more effective wildlife programs. Purdy and Decker classified wildlife values into six categories (recreational, aesthetic, educational, biological, and commercial), and then compiled a list of the ways wildlife are valued in those categories. Respondents were asked to rate the importance of each attitude statement on a 5-point summative scale, and then, using factor analysis data, identified three broad groups of attitudes. The authors found that this information was most useful when used to supplement other information gained from surveys. The attitude and value scale data can provide planners with a clearer picture of their constituents' desires. The attitude and value scale used in this survey adapts the statements to reflect the reasons why people may value open space preservation. The attitude statements are divided into two categories: "pro-access" and "pro-environment." The objective of the attitude and value scale is to determine whether a respondent's willingness-to-pay for a certain open space attribute is correlated to their attitude and values responses.

The third section is the crux of the preliminary survey. The purpose of the open-ended contingent valuation questions was to evaluate residents' willingness-to-pay for two different parcels of open space. There are two scenarios presented in this section. The first scenario presents respondents with a parcel of farmland, describes the parcel by its attributes, and asks the respondent to indicate how much he or she would be willing to

pay in additional taxes each year for five years to protect the parcel in perpetuity. The second scenario is the same, but the parcel is a wooded area. Although the literature, such as the NOAA statements on survey design, discourages the use of open-ended willingness-to-pay questions, the objective of the open space scenarios was to establish the bid levels to be used in the final choice experiment survey instrument.

The final section of the preliminary survey asked for demographic information including: gender, age, income, ages of children, and the respondent's level of education. Two additional questions were asked concerning the respondent's membership in any conservation or environmental groups and the number of years that the respondent has lived on Conanicut Island. Because respondents' sensitivity or reluctance to answer the demographic questions may potentially stop them from completing the survey, these questions were put last in the survey instrument.

Space was left at the end of the survey for respondents to comment on the questions. The comments indicated which questions might be confusing and difficult to answer, as well as obtain a general understanding of residents' attitudes towards open space preservation.

5.3 Application of the Preliminary Survey

The preliminary survey was mailed to a systematic random sample of fifty households on Conanicut Island on September 27, 2003. A number tracked each survey by corresponding to a number on the mailing list. In mid-October, those households that had not returned the survey were telephoned. If a member of the household could not be reached, a message was left on the answering machine. The households were reminded of the survey and asked to complete and return the survey if they still had it. Another copy

of the survey was then mailed to each household that had not yet returned one. By the beginning of November, forty-one households had received a survey and twenty-five households had returned completed surveys. Nine surveys had been returned undeliverable.

5.4 Results of the Preliminary Survey

The average willingness-to-pay to protect Parcel A (a farmland parcel with limited public access) was $89.81 and the average willingness-to-pay to protect Parcel B (a wooded, accessible parcel) was $71.73. The median amount to protect either parcel was $75.00. In calculating the median dollar amount, the highest response was omitted. The following table summarizes the results of the preliminary survey:

Table 5.1 Demographics of Preliminary Respondents

Survey Responses	Percent of Respondents
Age	
30-39 years	11.5
40-49 years	11.5
50-59 years	26.9
60-69 years	11.5
70 and older	26.9
Gender	
Male	34.6
Female	57.7
Children	
No children	19.2
Children under 5 years	3.8
Children 5-18 years	15.4
Grown children	26.9
Grandchildren	23.1
Education	
Some high school	7.6
High school	19.2
Vocational school	15.4
Some college	11.5
College	26.9
Graduate school	30.7
Income	
$0-$19,999	7.6
$20,000-$39,999	19.2
$40,000-$59,999	15.4
$60,000-$79,999	11.5
$80,000-$99,999	3.8
$100,000+	30.7
Membership in a Conservation Organization	
Yes	46.2
No	53.8
Average length of full-time residency	16.5 years
Average length of part-time residency	1.4 years

The main objective of the preliminary survey was to establish the bid levels for the final survey. The chart below shows the frequency of each response in the preliminary survey:

Table 5.2 Open-ended Bid Responses

Dollars	Number of Responses
$0	12
$10	2
$50	4
$80	1
$100	15
$150	1
$175	2
$200	4
$300	1
$500	1

5.5 Bid Selection

While there are formulas and algorithms for determining the individual bid amounts for a CV survey, bid selection is more guess work than science. Problems do occur if the bid design is inadequate. Cooper (1991) cites an example of these problems: Kriesel and Randall conducted a dichotomous choice contingent valuation study for an increase in air quality in which the bids turned out to be too low. Sixty percent of the respondents were willing to pay the highest posted bid, yielding an underestimate of willingness-to-pay (Kriesel and Randall, 1990). If the bid amounts are too low the willingness to pay will be underestimated because many respondents will answer "yes" to the highest bid level offered. If the bids are designed appropriately most respondents will accept the lowest and few will accept the highest bids. Because of the relatively large

number of $0 responses in the preliminary survey, the bid levels were skewed toward zero. The bid levels chosen for the final survey were: $5, $10, $35, $50, $75, $100, and $200.

5.6 Final Survey

The final choice experiment survey was similar to the preliminary survey in all areas except for the valuation scenarios (See Appendix E). The introductory questions and the attitude-value statement scale remained unchanged, but the valuation questions, referred to as the parcel choice questions, are closed-ended trichotomous scenarios. The parcel choice questions ask each respondent to evaluate two hypothetical land parcels. The survey explains that the Town of Jamestown is considering protecting one of these parcels and the funding would come from an additional tax on each household for a five-year period. Respondents are asked to evaluate the two hypothetical land parcels for possible protection and the alternative of not preserving either parcel.

The parcels are described by their attributes, including physical characteristics and the proposed management. The attributes describing the parcels are land type, surrounding land use, the type of protection, level of public access, scenic uniqueness, and the cost to each household in the form of additional taxes. In other choice experiment models, economists have chosen to vary all of the descriptive attributes. Varying the attributes allows the researchers to estimate the value that the respondents place on each attribute. Conanicut Island, however, is not large enough to realistically provide all of the possible land–type/ land-use combinations. Not wanting to propose options that are not realistic, in this survey several of the attributes do not vary. Land type, the type of protection, the level of public access, and scenic uniqueness are held constant. This

exception allows for more realistic land protection options. For example, the most affordable and probable method of preserving farmland is through the purchase of development rights. The landowner, however, would retain ownership of the property, and therefore, public access could not be guaranteed. Additionally, it is not common, nor safe, to allow public access on farmland. Other types of open space offer different management possibilities, however. The Town of Jamestown could realistically purchase a wooded parcel of land outright. The fee-simple purchase would allow the Town to maintain hiking trails and provide a parking area, thus allowing safe public access. In this survey, public access is always restricted on farmland parcels and always allowed on wooded parcels.

The island does offer the possibility of some different land protection options, however. Surrounding land use and parcel size do vary across the parcel choice questions. The objective of varying the surrounding land use attribute is to determine whether island residents place a higher value on protecting land when it is surrounded by currently undeveloped land or surrounded by residential development. Similarly, varying the parcel size will allow the estimation of the value that residents place on protecting large parcels or small parcels.

Varying the parcel size also addresses the problem of embedding. Embedding issues generally occur when the quantity or size of the environmental good that respondents are asked to value is not specified. Respondents' willingness-to-pay is not consistent with the magnitude of the good offered. While varying the acreage of the parcels does not guarantee that the size attribute will not have a significant value, it does allow one to investigate embedding. In the final survey, there are three values for the size

of the parcels (20, 60, and 120 acres). To draw attention to the attributes that vary, surrounding land use, parcel size, and cost are printed in bold type. The introduction also includes a description of the parcel sizes in relation to a football field.

In each parcel choice question, the respondent is asked to choose between paying additional taxes to protect either Parcel A or Parcel B, or saving his or her money and not protecting any land. Parcel A is consistently presented as farmland that would be protected through the purchase of development rights, and Parcel B is presented as a wooded area that would be protected through a fee-simple purchase by the Town of Jamestown. The surrounding land use, size, and cost vary across the questions. Each survey presents the respondent with three parcel choice questions.

Following the parcel choice questions is one contingent valuation question. This question asks the respondent if he or she would be willing to donate a certain dollar amount to a non-profit conservation agency for the purpose of protecting open space.

5.7 Public Awareness of the Survey

Often, when economists administer surveys through the mail, a tracking method is employed. Tracking the surveys allows the researcher to monitor which surveys have not been returned. Then, if the sample of returned surveys is not representative of the population, follow-up can be targeted to households that did not return the survey. While recognizing the importance of tracking the surveys, CILT was concerned about confidentiality and anonymity. Rather than track the surveys, measures were taken to raise public awareness regarding the survey. On January 7, 2004 an article was printed in *02835*, one of the two local newspapers (See Appendix F). The article described the purpose of the survey, the methodology, and how the information would be used. The

article also featured a picture and encouraged people to return their survey quickly. A second article was printed on January 8, 2004 in *The Jamestown Press* (See Appendix G). On January 14th and 15th a press release was printed in both papers on (See Appendix H). Dorsey Beard, a Conanicut Island Land Trust member, wrote the press release.

5.8 Mailing the Surveys

Mary Hutchinson, another member of the Conanicut Island Land Trust, created the mailing list for this project. Ms. Hutchinson compiled the mailing list by editing Jamestown's tax rolls. The editing involved removing duplicates wherever an individual owned more than one piece of property. A mailing house was hired to conduct the actual mailings. The surveys were originally scheduled to be mailed at the beginning of December 2003. Because of the holiday season, however, the mailing was postponed until after the New Year.

The surveys were mailed in two rounds. The first mailing was precautionary- two hundred surveys were sent out ahead of time, on December 17, in order to catch any problems with the survey. If respondents appeared confused or had had difficulty answering any of the questions, the survey would be changed before the rest were mailed out. Five weeks after the first mailing, the rest of the surveys arrived at individuals' homes. 2,767 surveys were mailed on January 18 and 12 of these surveys were returned as un-deliverable. Including the 200 surveys mailed in December, the total number of surveys delivered was 2,955. The surveys began arriving on Tuesday January 20.

5.9 Survey Presentation

Each household received an envelope containing one survey and a cover letter, printed on CILT letterhead (See Appendix E). Jack Hubbard, president of the Conanicut Island Land Trust, wrote the cover letter. In the letter, Mr. Hubbard explained the objectives of the survey, who was conducting the survey, and why each person's participation was important. The letter also assured people that their participation would be confidential and anonymous. Mr. Hubbard also included his telephone number and email address and encouraged people to contact him with questions. Each household also received a return envelope, also printed with the CILT logo and addressed to the CILT post office box in Jamestown. As is common for non-profit organizations, respondents were asked to provide a stamp for the return envelope.

5.10 Follow-up

A follow-up post-card was mailed one week after the surveys had been mailed (See Appendix I). Every household that had received a survey also received a reminder postcard. The postcard encouraged people to complete the survey and return it in the provided envelope as quickly as possible. In case someone lost the survey, the postcard provided a telephone number in order to get a replacement survey. When people requested a replacement survey, their mailing address was recorded in order to verify that it was on the original mailing list and to make sure that no one requested more than one replacement survey. By the middle of February, eighteen replacement surveys had been sent out.

On February 4th and 5th a letter to the editor was printed in *02835* and The *Jamestown Press* (See Appendix J). This letter addressed two issues that appeared

frequently in the space provided for comments at the end of the survey. First, many people asked about the three parcel choice questions and commented that they would prefer to choose both Parcel A and Parcel B. The letter explained that it is important to choose only one of the three options, remembering budget constraints; when one agrees to pay additional taxes he or she must give up spending money on something else. Second, several people noticed that all of the surveys were different. The letter explained that varying the level of the attributes in the parcel choice scenarios would increase the statistical accuracy of the final data. Not only did the letter help clarify some of the questions that respondents had, but it also served as a reminder to those who had not returned their survey yet.

5.11 The Response

During the week that the surveys were mailed, approximately sixty surveys were returned. At the beginning of the following week just over four hundred surveys were returned, and another one hundred arrived at the end of the week. Surveys continued to arrive steadily (roughly forty to eighty surveys every four days) until the last week in February. By the last week in February, eight hundred and four surveys had been returned. This represents a 27 percent response rate. Below is the response schedule:

Table 5.3 Survey Response Dates

Date:	Number of Responses:
Pre-January 27	65
January 27	362
January 28	60
January 30	33
February 2	84
February 5	50
February 9	61
February 13	58
February 17	19
February 25	12
Total	804

5.12 Demographic and Socio-Economic Characteristics of Respondents

This section compares the demographic and socio-economic characteristics of the respondents to the population of Jamestown.

Table 5.4 Age Distribution

Age Distribution		
Age	**Number of Respondents**	**Percent of Respondents**
No response	3	0.30%
18-29 years	4	0.49
30-39 years	49	6.09
40-49 years	170	21.1
50-59 years	265	32.9
60-69 years	162	20.1
70+	149	18.5
Average Age of Survey Respondent: 55.9		
Average Age of Jamestown Population over 18: 49.8*		
*(Calculated from U.S. Census Bureau Data)		

Table 5.5 Gender Distribution

Gender Distribution			
Gender	**Number of Respondents**	**Percent of Respondents**	**Jamestown's Population**
No response	5	0.62%	
Female	404	50.2%	51.4%
Male	392	48.7%	48.6%

Table 5.6 Children

Children in Household		
Children	**Number of Respondents**	**Percent of Respondents**
No response	3	0.4%
No children	162	20.1
Children under 5	32	4.0
Children 6-18	136	16.9
Grown children	225	27.9
Grandchildren	246	30.6

Table 5.7 Education

Educational Attainment			
Education	**Number of Respondents**	**Percent of Respondents**	**Jamestown's Population**
No response	66	8.2%	
Grade school or some high school	28	3.48	6.8%
High school or GED	45	5.59	19.6%
Vocational, technical, or some college	97	12.0	27.8%
College or Graduate School	645	80.2	45.6%

Table 5.8 Income

Income		
Income	**Number of Respondents**	**Percent of Respondents**
No response	66	8.2%
$0-$19,999	28	3.4
$20,000-$39,999	65	8.0
$40,000-$59,999	96	11.9
$60,000-$79,999	106	13.2
$80,000-$99,999	107	13.3
$100,000+	329	40.9

Average Income of Survey Respondents: $77,948

Average Income of Jamestown Population: $76,767*
*(calculated from U.S. Census Bureau Data)

Table 5.9 Conservation Organization Membership

Membership in any Conservation Organizations		
Number of Organizations	**Number of Respondents**	**Percent of Respondents**
No response	3	0.4%
0 organizations	328	40.7
1 organization	169	1.1
2 organizations	145	18.0
3 organizations	80	9.9
4 organizations	34	4.2
5 organizations	20	2.4
6 organizations	3	0.4
7-10 organizations	16	1.9
11-20 organizations	2	0.2

Table 5.10 Fulltime Residency

Fulltime Residency		
Years as a Fulltime Resident	**Number of Respondents**	**Percent of Respondents**
No response	9	1.1%
0 years	178	22.1
1-4 years	22	2.7
5-9 years	98	12.1
10-14 years	123	15.2
15-19 years	80	9.9
20-24 years	75	9.3
25-29 years	51	6.3
30-49 years	67	8.3
50-69 years	65	8.0
70+ years	31	3.8

Table 5.11 Part-time Residency

Part-time Residency		
Years as a Part-time Resident	Number of Respondents	Percent of Respondents
No response	15	1.8%
0 years	518	64.4
1-4 years	9	1.1
5-9 years	46	5.7
10-14 years	31	3.8
15-19 years	24	2.9
20-24 years	31	3.8
25-29 years	16	1.9
30-49 years	19	2.3
50-69 years	53	6.5
70+ years	41	5.1

Several important comments can be made regarding the demographic and socio-economic characteristics of the survey respondents. First, the average age of the survey respondents (55.9 years) is only slightly greater than the average age of Jamestown's population over the age of 18 (49.8 years). While there had been an overrepresentation of elderly respondents (70+) in the preliminary survey, this does not appear to be a problem in the final survey. Second, the gender distribution of the survey respondents is not greatly different than Jamestown's distribution, and the average income of survey households ($77,948) is only slightly higher than the average income of all Jamestown households ($76,767). There is one striking difference between education level of the survey respondents and the Town's population: college and graduate school graduates are greatly over-represented while high school graduates and those who attended some college or vocational school are underrepresented. The sample used for this study seems

fairly representative of Jamestown's population except that it is skewed toward the most educated population.

Information was also collected on respondents' membership in conservation or environmental organizations and on respondents' length of residency. Most respondents belong to 0-2 conservation organizations. One may hypothesize that membership in such an organization is positively correlated to willingness to pay for open space preservation programs. Since Jamestown is a popular summer vacation area respondents were asked how long they had resided on the island both part-time and full-time. Interestingly, 22.1 percent of the respondents have never lived in Jamestown full-time. It is probably not surprising that such a large group of solely part-time residents responded to the survey. Part-time residents are probably "amenity-driven" and they have a stake in the survey outcome. In addition, 64.5 percent of the respondents have never lived in Jamestown part-time. The remaining 13.4 percent have, at one time or another, lived in Jamestown both part-time and full-time. One explanation could be that many people move to Jamestown permanently after having vacationed on the island for many years. One could hypothesize that fulltime residents would be more willing to pay to preserve open space on Conanicut Island because the issue is "closer to home," and also hypothesize that length of residency is positively correlated to willingness to pay.

5.13 Responses to the Attitude Statements

The second section of the survey asked respondents to rank their level of agreement with ten attitude statements. This section had two objectives: first, to assess how residents use open space that is currently available, and second, why or why not protecting open space is important to each respondent. Judging from the relatively small

number of non-responses, respondents seemed comfortable completing this section. There were, however, several comments regarding the terminology used in the attitude statements. Several respondents commented that the phrase "island character" was ambiguous and had difficultly responding to that statement. For example, one respondent wrote: "What is "island character?" Is it Nantucket-like? It made these questions impossible to answer accurately." Another wrote, "What exactly is 'island character?' Does that mean anti-development, anti-business, anti-progress??" These issues failed to emerge in the pre-testing.

Some people also commented on statement #10, which read: "It is important to me personally that development of land is controlled so everyone can use it." Those who commented on this statement believed that the phrase "everyone" should have been more clearly defined, i.e. does this include all of the residents of Jamestown, all residents of Rhode Island, etc. The tables below list the responses to each attitude statement (respondents ranked their agreement on a 1-5 scale, 1 indicating strong agreement and 5 indicating strong disagreement):

It is important to me personally that.....

Statement 1
development is controlled to protect wildlife habitat.

Response	Number of Responses	Percent of Responses
No response	19	2.3
1	455	56.6
2	201	25.0
3	89	11.0
4	27	3.3
5	13	1.6

Statement 2

all people have access to open space.

Response	Number of Responses	Percent of Responses
No response	25	3.1
1	399	49.6
2	187	23.2
3	118	14.6
4	43	5.3
5	29	3.6

Statement 3

I observe or photograph scenic landscapes.

Response	Number of Responses	Percent of Responses
No response	22	2.7
1	297	36.9
2	200	24.8
3	218	27.1
4	28	3.4
5	35	4.3

Statement 4

environmentally sensitive areas are protected.

Response	Number of Responses	Percent of Responses
No response	13	1.6
1	563	70.0
2	164	20.3
3	41	5.0
4	10	1.2
5	11	1.3

Statement 5

I have access to additional recreation areas.

Response	Number of Responses	Percent of Responses
No response	28	3.4
1	246	30.5
2	204	25.0
3	244	30.3
4	46	5.7
5	33	4.1

Statement 6
farms are protected from development.

Response	Number of Responses	Percent of Responses
No response	13	1.6
1	555	69.0
2	156	19.4
3	58	7.2
4	9	1.1
5	13	1.6

Statement 7
development is controlled to preserve "island character."

Response	Number of Responses	Percent of Responses
No response	14	1.7
1	593	73.7
2	125	15.5
3	37	4.6
4	10	1.2
5	25	3.1

Statement 8
areas of unique scenic beauty are protected.

Response	Number of Responses	Percent of Responses
No response	17	2.1
1	621	77.2
2	115	14.3
3	34	4.2
4	3	0.37
5	12	1.5

Statement 9
the town's water supply and quality are protected.

Response	Number of Responses	Percent of Responses
No response	11	1.3
1	672	83.5
2	87	10.8
3	21	2.6
4	4	0.49
5	9	1.1

Statement 10
development of land is controlled so everyone can use it.

Response	Number of Responses	Percent of Responses
No response	26	3.2
1	352	43.7
2	208	25.8
3	134	16.6
4	48	5.9
5	34	4.2

Several results from the attitude statement section stand out, but the most striking

is the response to Statement 9. A very large majority (83 percent) of the respondents

reported that they felt strongly that the town's water supply and quality be protected. This

response, however, is not unexpected. Jamestown has experienced severe water shortages

in recent years, resulting in summer water bans and fines. Many respondents commented

on the water shortage in Jamestown. For example, one respondent wrote, "I am

concerned about the development of these large homes with numerous bathrooms. Do

you really think a person with 4 or 5 bathrooms is concerned with water conservation? I

do not." Another wrote, "Jamestown is fast becoming too overbuilt, especially with the

water situation. This is a huge problem that no one seems able to solve. There should

definitely be a restriction on how many houses are permitted per year."

Even though some people commented that "island character" was not defined

clearly enough to reply to Statement 7, it appears that a large majority (73.7 percent) of

the respondents are very concerned about controlling development to preserve the

character of Jamestown. One respondent wrote, concerned about saving Jamestown, "I

lived on a beautiful island in New Jersey as a child. I played on the tall dunes and rolled

till I was dizzy down the dunes. Today Long Beach Island is nothing but houses. I miss

seeing the fishermen pull the boats ashore and unload their catch. But I do have the

memory. Children today could never envision what I saw, sad to say. I want to preserve Jamestown." Another respondent expressed his frustration with the changing nature of the island: "I believe that controlling development is too little and too late to preserve 'island character.' Growing up in Jamestown 40 to 50 years ago was 'real home.' Preserving what little property we have left should be a number one priority now and in the years ahead."

The response to other attitude statements was more evenly distributed among levels of agreement. Only 30 percent of the respondents selected 1 (strongly agree) when answering Statement 5 (It is important to me personally that I have access to additional recreational areas). This response indicates that perhaps respondents are satisfied with the current level of recreational areas and opportunities. One respondent wrote, "For a small island we have enough public hiking trails, parks, picnic areas, and parking. Our parks are special and uniquely gorgeous and much appreciated, we are proud to have them." Even though it appears that most of the respondents do not feel strongly about having additional recreational areas, two of the five recreation policies listed in Jamestown's Comprehensive Community Plan for 2002 call for improving and expanding existing passive and active recreational facilities.

Statements 2 and 10 (all people have access to open space and development of land is controlled so everyone can use it) also did not receive an overwhelming response of strong agreement. The comments indicated two possible reasons for this response. First, respondents appeared to be concerned with impacts on the environment caused by high traffic, especially an abundance of litter in public access areas. One respondent concerned with environmental impacts wrote, "[In regards to Statement 10] I would be

able to have an opinion if I had a better definition of that- snowmobiles, jet skis, ATVs, any motorized vehicles would not be an acceptable use of open space for me." Another respondent suggested surrounding open spaces with an electronic gate that could only be opened by Jamestown residents. Still others worried that hunting would be allowed on open spaces if the land were accessible to the public, and conversely, some respondents reported that they would only support public access if hunting was not prohibited. Second, many respondents commented that they were satisfied with the current level of access and did not place a high value on public access. Some comments indicative of this attitude include:

> "I don't think pubic access should be an essential criterion. We could leave wooded areas just as wooded areas- no parking lots, hiking trails, or picnic tables;"
> "Personally, I don't place much value on public access to open space. If it were up to me, I would lock up as much open space as possible NOW and worry about hiking trails later. Money and resources spent on such trails is misplaced until the fate of every parcel in danger of development is sealed;"
> "It's important to preserve land even if I don't have access to it- that is, I'm in favor of conservation easements, especially for the working farms."

5.14 Response to the Parcel Choice Questions

Since each questionnaire presented the respondent with three parcel choice questions, each respondent was treated as three separate observations. In some cases respondents did not answer any or all of the parcel choice questions and in other cases the respondent checked the box for Parcel A and Parcel B. These observations were discarded from the data analysis. Thus, the total number of parcel choice questions answered was 2181. The respondents expressed several difficulties with the survey, but the two most common complaints were, 1) the option to purchase both parcels was not

given, and 2) the parcel choice questions were confusing and difficult to compare. These issues did not arise in pre-testing.

Respondents chose both Parcel A and Parcel B in approximately 25 parcel choice questions and many respondents commented that they would have chosen both if the option had been given. For example, one respondent said, "I understand that I am supposed to choose one of the two parcels (and check one box), but I would rather raise the taxes and protect both the farmland and the hiking trails." Another respondent wrote, "In answering your three questions: I would like to pay to support protection for both the farm and the woodland. I didn't like having to choose. I feel both the farm and woodland are what Jamestown is all about- the best of Jamestown! Both need protection and I'm willing to pay for this." Since several respondents who returned the survey early on had made comments such as these, a letter was printed in two Jamestown newspapers addressing respondents' questions. The letter explained that it is important to choose only one of the three options because the questions are intended to reveal the tradeoffs that respondents are willing to make. When one agrees to pay additional taxes to preserve Parcel A (or B) he or she must give up spending that money on something else. The format of the parcel choice questions is designed to estimate which parcel provides a *greater* benefit to the respondent, and therefore, which parcel the respondent is most likely to choose for preservation.

Some respondents also found the parcel choice questions confusing and difficult to answer. Others found it puzzling that all of the surveys contained different parcel choice questions. One respondent wrote, "This survey is very confusing and I have a Master's degree. I compared this survey with seven other people and all the surveys were

different. How can you come up with statistics when there are so many different variables?" Another wrote, "Why are the choices, including surrounding use, acres, and cost to household so very different on my blue sheets versus the yellow sheets? The choices available had too many variables to be able to compare adequately and make good decisions." The same letter –to- the- editor addressed these issues. It explained that all of the surveys were identical, except for the three parcel choice questions. The survey was designed with many different combinations of the three primary attributes (acres, surrounding land use, and cost) in order to estimate the effect that each of these attributes has on respondents' willingness to pay. The format is designed to estimate a willingness to pay for every possible combination of attributes.

The final concern that many respondents seemed to have was the payment vehicle. While some respondents commented that they would be willing to pay additional taxes to preserve as much land as possible, many others were concerned with increasing taxes. Below are some comments reflecting respondents' tax concerns:

> "Taxes have already gone up at least three times since I moved here seven years ago. I see constant building going on. Seems to me, with such an increase in the tax base that more land preservation could be done without increasing taxes again;"

> "I am willing to pay increased taxes as indicated only if the current tax rate remains reasonable (sic) stable;"

> "Was it wise to put this questionnaire out during a property re-evaluation year? People are nervous about their taxes going up anyway;"

> "I think the Trust should prepare a more detailed discussion of how open space can be acquired in RI. Is there state money, bond referendum, other private resources (Champlin Foundation)? How many households? Is there no way tax revenues can be found in the existing budget? People are paying tens of thousands of dollars each for minimal public service- is there no money at all available without a surcharge?"

Expecting that some respondents may be averse to paying additional taxes, a question regarding a donation to a not-for-profit conservation organization was included in the survey, following the parcel choice questions. This question should capture the willingness to pay of those individuals who value open space preservation but are reluctant to pay additional taxes.

It is also relevant to note that the circumstances and conditions under which the survey was conducted, and the population to which it was directed, are unusual. The opportunity for the researcher and the subjects to engage in a sort of public methodological dialogue, via the local newspaper, is quite rare. Additionally, the degree of sophistication in the respondents' comments is unusual.

Chapter 6 Estimating a Model for the Choice Experiment

6.1 The Utility Function

The purpose of the data analysis was to determine the value that respondents place on the individual attributes of the hypothetical open space parcels presented in the survey as well as calculate the average willingness-to-pay for each scenario. Random utility theory is the basis for estimation in a choice experiment model. Utility is the satisfaction that one option yields. Thus, utility is the basis of choice. As one makes choices, one effectively weighs the utilities he or she would receive from all the possible alternatives. This analysis assumes that survey respondents evaluate each choice question and choose between the two parcels and the "Neither" option by identifying the choice that, if implemented, would give the respondent the highest personal satisfaction or utility. To quantify this process it is assumed that each respondent acts as if he or she has a utility function that ranks the available choices based on their attributes, such that:

$$U_i = U(Z_n) \qquad\qquad (1)$$

This function states that individual i's utility from alternative n depends on the attributes (Z_n) of the alternative.

Hanemann (1984) explains the two components of the utility function. While it is assumed that households know their utility function with certainty, Hanemann suggests that it contains components that are unobservable to the econometric investigator and should thus be treated as stochastic components. v_i represents the deterministic or objective component of the utility function, and ε_i represents the random error, or unobservable component. This function is also known as a conditional indirect utility function since it is conditional on the choice of alternative n (Boxall et al. 1996). The

indirect utility function takes the value of the maximum utility that can be achieved by spending one's budget on certain goods with given prices. Equation (1) can then be rewritten as:

$$U_{in} = v_i (Z_n) + \varepsilon_{im} \qquad (2)$$

Selection of one alternative over another suggests that that the utility of alternative A (U_{iA}) is greater than the utility of alternative B (U_{iB}). Therefore the utility of two choices, A and B, would look like the following:

Utility of choice A: $\quad U_{iA} = v_i(Z_A) + \varepsilon_{iA}$ $\qquad (3)$

Utility of choice B: $\quad U_{iB} = v_i(Z_B) + \varepsilon_{iB}$ $\qquad (4)$

If an individual chooses A that would imply that the utility of choice A was greater than the utility of choice B, or:

$$U_{iA} > U_{iB} \qquad (5)$$

Then, substituting equations (3) and (4) into equation (5) yields the following expression:

$$v_i(Z_A) + \varepsilon_{iA} > v_i(Z_B) + \varepsilon_{iB} \qquad (6)$$

so therefore,

$$v_i(Z_A) - v_i(Z_B) > \varepsilon_{iB} - \varepsilon_{iA}. \qquad (7)$$

Thus the probability of choosing alternative A is represented by:

$$Prob(A|Z) = Pr\{[(v_i(Z_A) - v_i(Z_B)] > [\varepsilon_{iB} - \varepsilon_{iA}]\}. \qquad (8)$$

In order to estimate equation (8), researchers assume that the errors are Gumbel-distributed and independently and identically distributed (McFadden 1974). When there are three choices, as there are in this study, the probability of selecting choice A would be represented by the following equation:

$$\Pr ob(A_i \mid Z_n) = \frac{e^{IA}}{e^{IA} + e^{IB} + e^{IN}} \qquad (9)$$

where $I_A = \beta Z_A$; $I_B = \beta Z_B$; and $I_N = 0$. This equation can be estimated using a conditional

logit model. When using the choice experiment, one assumes that the choices are

consistent with the Independence from Irrelevant Alternatives property (IIA) wherein the

estimation of the utility model is assumed to be unaffected by the inclusion or exclusion

of one the irrelevant alternatives from the respondent's choice set.

6.2 The Econometric Model

The model used in this study states that the utility of a parcel depends on the

surrounding land use, the parcel's size, whether it is Parcel A or Parcel B, and finally, the

cost of protecting the parcel. Each respondent's indirect utility function looks like the

following:

$$V_{in} = \beta_r(\text{Surrounding land use}_n) + \beta_a(\text{Acres}_n * \text{Parcel}_n) + \beta_C(\text{Cost}_n) + e_i \qquad (10)$$

Here, V_{in} is the deterministic component of utility of respondent i for alternative n

(choice set C is comprised of {A,B,N} for Parcel A, Parcel B, or Neither), and the β's

represent coefficients that measure the contribution of each of the parcel attributes to the

respondent's utility.

Surrounding land use describes whether the parcel in question is surrounded by

undeveloped farmland or is located in a developed, residential area. In the data set,

surrounding land use is entered as one variable called *Resfarm*. *Resfarm* is a two-level

effects coded variable. This means that *Resfarm* equals 1 whenever the surrounding land

is undeveloped farmland, *Resfarm* equals -1 whenever the surrounding land is developed,

and *Resfarm* equals 0 whenever the alternative in question is the "Neither" option. This

type of coding was used instead of traditional dummy variable coding because it is

impossible to code the "Neither" option as a dummy variable. Two-level effects coding

was also used by Swallow and McGonagle (2002). Adamowicz, Louviere, and Williams

(1994) state that effects coding is commonly used in the analysis of designed experiments

for three reasons:

> "a) 0-1 dummy variables confound the alternative-specific constant with the
> effects of interest; whereas effects codes orthogonalize the attribute effects to the
> constant, b) effects codes simply contrast the parameter estimates with one of the
> levels, whereas 0-1 dummies contrast the estimates with the constant, and (c)
> interactions defined from effects coded columns are orthogonal to their respective
> main effects and other estimable interaction effects, whereas 0-1 dummies are
> not" (p.280).

Acres*Parcel is one of six interaction terms between the size of the parcel and the

parcel type. The six interaction terms are labeled A20, B20, A60, B60, A120, and B120.

The interaction terms are dummy variables; for example, A20 is equal to one if the parcel

in question is Parcel A and is 20 acres, and equals zero in all other cases. This interaction

term also accounts for the differences between Parcel A and Parcel B. There are several

characteristics of each parcel that are held constant throughout the survey. Parcel A is

always a farmland parcel, has limited public access, and has unique scenic beauty. Parcel

A would be protected through a "purchase of development rights" (PDR) program.

Hypothetically, the Town of Jamestown would purchase the rights to develop the land

from the landowner. Thus, the land could never be developed, but the landowner would

still own the land. Parcel B is always a wooded area with unlimited public access and

hiking trails, a picnic area, and a parking lot. Parcel B would be protected through an

outright "fee-simple" purchase. In this hypothetical situation the Town of Jamestown

would purchase the parcel of land and it could never be developed. Thus, by including

the interaction term, it is possible to estimate the effects on utility of changing both the

type of parcel and the size of the parcel. For example, one may hypothesize that even if

respondents prefer a 20-acre Parcel A to a 20-acre Parcel B if the size of Parcel B were to

increase, at some size respondents would prefer the larger Parcel B to the small Parcel A.

Cost describes the amount of the new tax that households would have to pay

annually for five years to preserve the parcel in question in perpetuity. In the data set,

Cost is a continuous variable.

6.3 Results and Discussion

Table 6.1 lists the descriptive statistics of the parcel attributes in the utility

function.

Table 6.1. Descriptive Statistics for Independent Variables

Parcel Attribute Variable	Mean	Minimum	Maximum	Number of Observations*
Cost	$46.14 (61.1)**	$0	$200	6606
Acres	44.73 (46.21)	0	200	6606
Resfarm	-0.007 (0.816)	-1	1	6606
A20	0.109(0.312)	0	1	6606
B20	0.110(0.313)	0	1	6606
A60	0.109(0.312)	0	1	6606
B60	0.112(0.315)	0	1	6606
A120	0.114(0.318)	0	1	6606
B120	0.110(0.313)	0	1	6606

*Parcel choice questions in which the respondent did not provide an answer were discarded from the data analysis, as well as those questions in which both parcels were chosen. Each choice scenario generated 3 observations, 1 for Part A, 1 for Part B and 1 for Neither.
** Standard deviations.

The model was estimated using maximum likelihood estimation in LIMDEP

Version 6.0. Table 6.2 provides a description of the parcel attribute variables, as well as

the estimated coefficients and the statistical significance. The LIMDEP program

commands used to estimate the model are in Appendix K.

Table 6.2. Maximum Likelihood Estimation Results

Parcel Attribute Variable	Description	Coefficient	St. Error	Asymptotic t value (β/std.error)	p value<
Cost	Continuous	-0.005049	0.000543	-9.3946	0.0001
A20	Dummy	1.76581	0.101128	17.4612	0.0001
B20	Dummy	0.92659	0.113336	8.17564	0.0001
A60	Dummy	2.14115	0.104091	20.570	0.0001
B60	Dummy	1.29642	0.106564	12.1656	0.0001
A120	Dummy	2.30179	0.103365	22.2685	0.0001
B120	Dummy	1.70940	0.104743	16.320	0.0001
Resfarm	Farmland=1 Residential=-1 Neither=0	0.04761	0.0323	1.4710	0.1000
n= 2202	Loglikelihood= -1916.897				

The model performed reasonably well, (McFadden r^2=0.206, n=6606). The parameter estimates yield the expected sign and are statistically significant at the 5 percent level, with one exception.

6.5 Prediction Success

Table 6.3 Prediction Success for the Discrete Choice Model

	Predicted			
Actual	Parcel A	Parcel B	Neither	Percent Correct
Parcel A	818	360	139	62%
Parcel B	357	220	72	33%
Neither	142	68	26	11%

Table 6.4 presents the prediction success of the discrete choice model. The table illustrates the predicting power of the model. The model correctly classified 62 percent of those people who actually chose Parcel A, 33 percent of those who chose Parcel B, and 11 percent of those who actually chose Neither.

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The parameter on *Cost* is negative and statistically significant. This implies that as the cost of preserving a parcel increased, the likelihood of a respondent choosing that parcel decreased. β_c is the estimated marginal utility of income and is interpreted as the opportunity cost of spending one's money to preserve a particular parcel. An opportunity cost is the forgone benefit that one would have received from spending his or her money on something else. β_c measures the trade-offs that individuals are willing to make between paying additional taxes to preserve a parcel and spending their money on other things.

The statistical coefficients of the *Acres*Parcel* interaction terms are all positive and statistically significant. At all acreage levels, the coefficients for Parcel A are larger than the coefficients for Parcel B, when acreage is held constant. This indicates that Parcel A is preferred to Parcel B. In addition, the statistical coefficients for the interaction terms also show that increasing the size of a parcel, holding parcel-type constant, increases the utility of that parcel. Even more so, the coefficients show that respondents are willing to pay the same amount to protect a 20-acre Parcel A as they would to protect a 120-acre Parcel B. This indicates that respondents would prefer to protect a small Parcel A rather than a large Parcel B. The utility derived from the fixed attributes of Parcel A outweighs the utility derived from protecting very large amounts of land.

The data analysis cannot separate the attributes that do not vary, and therefore cannot reveal respondents' preferences over those attributes. The respondents' comments, however, give some insight as to their preference for Parcel A. Many respondents commented that they were satisfied with the current level of public access and recreation areas and were more interested in conserving open space, regardless of the level of public

access. For example, one respondent wrote: "Jamestown has ample land set aside for parks now." Other comments indicated that the scenic beauty that was characteristic of Parcel A was important. One respondent wrote, " Regarding the questions about Parcel A and parcel B: I would be willing to pay additional taxes to preserve both parcels, but I checked "Parcel A" because it was described as providing unique scenic views, and the views are more important to me than hiking trails and picnic areas." Finally, a small number of respondents commented that they worried about the Town's role as a land steward and preferred the idea of a purchase of development rights program, more than outright purchases of land.

The statistical coefficient for *Resfarm* is positive and insignificant. This implies that respondents prefer parcels that are surrounded by farmland more than parcels that are located within a residential neighborhood. Nearby open space often increases the value of one's own property, which would indicate that respondents would prefer parcels that are adjacent or close to residential areas. Conversely, large open spaces are often more conducive to becoming wildlife habitat or protecting natural resources, such as a watershed. In this case, however, respondents would have had to assume that the surrounding land would already be protected, or was not likely to be developed soon. This parameter estimate is statistically insignificant, however, showing that its effect is not estimated precisely and may not be very important.

6.4 Marginal Effects

Table 6.4

Marginal Effects			
Protecting:	**Increases Willingness to Pay by:**	**Protecting:**	**Increases Willingness to Pay by:**
20-Acre Parcel A instead of 20-Acre Parcel B	$166.22	60-Acre Parcel A instead of 20-Acre Parcel A	$74.34 ($1.86 per acre)
60-Acre Parcel A instead of 60-Acre Parcel B	$167.31	120-Acre Parcel A instead of 60-Acre Parcel A	$31.82 ($0.53 per acre)
120-Acre Parcel A insetad of 120-Acre Parcel B	$117.33	120-Acre Parcel A instead of 20-Acre Parcel A	$106.00 ($1.06 per acre)
20-Acre Parcel A instead of 60-Acre Parcel B	$92.97	60-Acre Parcel B instead of 20-Acre Parcel B	$73.25 ($1.83 per acre)
20-Acre Parcel A instead of 120-Acre Parcel B	$11.17	120-Acre Parcel B instead of 60-Acre Parcel B	$81.80 ($1.36 per acre)
Parcels surrounded by farmland rather than parcels in a residential area	$18.86	120-Acre Parcel B instead of 20-Acre Parcel B	$155.04 (1.55 per acre)

Table 6.3 demonstrates the marginal effects of changing the size, surrounding land use, or characteristics of a parcel on respondents' willingness to pay (WTP). The marginal effects are calculated by the marginal utility of an attribute divided by the marginal utility of income. This table shows that increasing the size of a parcel, holding the parcel-type constant, increases respondents' willingness-to-pay to protect that parcel. As the size of the parcel increases, however, the additional amount respondents are willing to pay to protect the parcel decreases. For example, increasing the size of Parcel A from 20 acres to 60 acres increases WTP by $74.34, but increasing the size of Parcel A from 60 acres to 120 acres only adds $31.82 to respondents' WTP. The table also shows that protecting Parcel A rather than Parcel B, at any size, increases respondents' WTP. While one might expect that respondents would prefer a 120-acre Parcel B to a 20-acre Parcel A because the former parcel is much larger, this is not the case. In fact,

respondents are willing to pay $11.17 more for a 20-acre Parcel A than for a 120-acre Parcel B. Respondents are willing to make a trade-off between protecting Parcel A and protecting Parcel B, even if it is much larger than Parcel A. There are several possible reasons for this phenomenon. First, respondents may feel that there is currently an adequate amount of land set aside for recreation, and therefore respondents do not derive much utility from additional hiking trails and picnic areas. Second, respondents may feel strongly about protecting working farms. And lastly, respondents may benefit more from protecting scenic views, even if they do not have access to the land, than they benefit from protecting accessible wooded areas.

Respondents are willing to pay $18.86 more to protect parcels surrounded by open space than they are willing to pay to protect parcels surrounded by houses. Here, respondents are willing to trade $18.86 to get undeveloped surrounding land, rather than have developed surrounding land.

6.6 Willingness-to-Pay Estimation

Willingness-to-pay (WTP) can be estimated using Equation (10), the indirect utility function, and the estimated coefficients listed in Table 6.2. To calculate WTP, the dollar value of an individual's utility from characteristics of a particular parcel is divided by the opportunity cost of spending his or her money on preserving open space attributes. This represents the trade-off that individuals are willing to make between paying additional taxes to preserve open space attributes and spending his or her money on other things. Thus, respondents' willingness to pay is calculated using the following equation:

$$\text{WTP} = [\beta_r(\text{Surrounding land use}_n) + \beta_a(\text{Acres}_n * \text{Parcel}_n)] / (-1 * \beta_C). \qquad (11)$$

For example, the WTP for a 60 acre Parcel A surrounded by undeveloped farmland would be calculated by the following equation:

WTP=[(0.04732)(1) + (2.141)(1) + (0.91239)(0)]/ (-0.005049)   (12)

WTP= $433.41

WTP is interpreted as a willingness to pay $433.41 per year for five years. The following table lists WTP for Parcel A and Parcel B land use/ acres combinations.

Table 6.5 Willingness-to-Pay for Parcel A and Parcel B

Parcel A			**Parcel B**		
Acres	**Surrounding Land Use**		**Acres**	**Surrounding Land Use**	
	Farmland	**Residential**		**Farmland**	**Residential**
20	$359.16	$340.30	**20**	$192.94	$174.08
60	$433.50	$414.64	**60**	$266.19	$247.33
120	$465.31	$446.46	**120**	$347.99	$329.13

6.7 Total Payout for Parcel A and Parcel B

According to the 2000 Census there are 2,359 households in Jamestown, Rhode Island (U.S. Census Bureau, Census 2000). The total value of the hypothetical open space preservation program can be calculated by multiplying the average willingness-to-pay estimate for each acres/ surrounding land use combination by the number of households. This payout represents the amount of revenue that would be collected if the constituents approved an additional tax equal to mean willingness to pay for open space preservation. In the following table, the willingness-to-pay estimates from Table 6.5 are used in the calculations. However, these numbers are primarily illustrative because, given the long-

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tailed distribution, the mean willingness to pay is likely to be far above the median

willingness to pay. Hence, such a referendum is not likely to pass at the mean price.

Table 6.6 Annual and total payout for different land types

	Parcel A			
	Annual Payout		**Total payout over 5 years**	
Acres	**Surrounding Land Use**		**Surrounding Land Use**	
	Farmland	**Residential**	**Farmland**	**Residential**
20	$847,268	$802,779	$4,236,342	$4,013,898
60	$1,022,635	$1,053,201	$5,113,176	$4,890,732
120	$1,097,690	$1,053,201	$5,488,448	$5,266,004

	Parcel B			
	Annual Payout		**Total payout over 5 years**	
Acres	**Surrounding Land Use**		**Surrounding Land Use**	
	Farmland	**Residential**	**Farmland**	**Residential**
20	$455,166	$410,678	$2,275,835	$2,053,391
60	$627,959	$583,470	$3,139,797	$2,917,353
120	$820,912	$776,423	$4,104,562	$3,882,118

6.8 Including *Residency* in the Model

A second model that specified whether each respondent was a fulltime resident of

Jamestown was also estimated. This model is called a mixed multinomial logit model

because it combines the attributes of the choices and the characteristics of the respondent.

A new variable was created from the data set called *Residency*. *Residency* equals one if

the respondent has ever lived in Jamestown fulltime and *Residency* equals zero if the

respondent is only a part-time resident. Then, the *Residency* variable was incorporated

into the model by using the equivalent of dummy variables. These dummy variables are called *Ares* and *Bres*. Table 6.7 shows the descriptive statistics for the *Residency*, *Ares*, and *Bres* variables.

Table 6.7 Descriptive Statistics for Residency variables

Variable	Mean (standard deviation)	Minimum	Maximum	Number of Observations
Residency	0.024 (0.156)*	0	1	6606
Ares	0.008(0.090)	0	1	6606
Bres	0.008(0.090)	0	1	6606

* Standard deviation

Table 6.8 provides a description of the independent variables in the mixed model as well as the parameter estimates and standard errors. This model does not estimate, however, if residents are more or less likely than non-residents to choose one parcel over another when presented with a choice between Parcel A and Parcel B.

Table 6.8 Maximum Likelihood Estimation Results for the Mixed Model

Parcel Attribute Variable	Description	Coefficient	St. Error	t value (β/std.error)	p value<
Cost	Continuous	-0.005099	0.000543	-9.3946	0.0001
Resfarm	Farmland=1 Residential=-1 Neither=0	0.046733	0.0323	1.463	0.1000
A20	Dummy	1.76089	0.1016	17.31	0.0001
B20	Dummy	0.90388	0.1140	7.922	0.0001
A60	Dummy	2.13505	0.1045	20.42	0.0001
B60	Dummy	1.26740	0.1072	11.81	0.0001
A120	Dummy	2.29785	0.1039	22.10	0.0001
B120	Dummy	1.68514	0.1053	15.997	0.0001
Ares	Ares=1 if Parcel=1 and Res=1	1.21015	0.7411	1.633	0.1000
Bres	Bres=1 if Parcel=2 and Res=1	1.62672	0.7460	2.180	0.0001
n=2202	Loglikelihood= -1911.049				

Residents' willingness-to-pay and non-residents' willingness-to-pay was

calculated by incorporating the new estimated parameters and the Ares and Bres

parameter estimate into the willing to pay equation (11). Table 6.9 compares residents'

and non-residents' willingness-to-pay for Parcel A and Parcel B. It is important to

remember, however, that the willingness-to-pay figures in this table represent

respondents' willingness to pay when presented with only Parcel A or Parcel B, not both.

Table 6.9 Willingness-to-Pay: Residents and Non-Residents

Parcel A				
	Residents		**Non-Residents**	
Acres	**Surrounding Land Use**		**Surrounding Land Use**	
	Farmland	**Residential**	**Farmland**	**Residential**
20	$597.58	$579.27	$357.91	$339.60
60	$671.69	$653.37	$432.02	$413.70
120	$703.94	$685.62	$464.26	$445.95

Parcel B				
	Residents		**Non-Residents**	
Acres	**Surrounding Land Use**		**Surrounding Land Use**	
	Farmland	**Residential**	**Farmland**	**Residential**
20	$510.36	$492.04	$188.17	$169.86
60	$582.36	$564.04	$260.17	$241.86
120	$665.09	$646.78	$342.91	$324.59

6.9 Problems with WTP Estimates

The willingness-to-pay figures calculated in this study are almost twice as large as those reported in similar studies conducted in Rhode Island (Swallow 1999 and Swallow and McGonagle 2002). Swallow and McGonagle (2002) estimates that Rhode Island residents are willing to pay between $45.83 and $87.05 per household for coastal areas with not public access and between $32.74 and $92.15 per household for coastal areas

with a high level of public access. These WTP figures are lower than the figures reported in this study because the marginal utility of income (β_c) was 0.009 in Swallow and McGonagle's study, compared to 0.005 in this study. This indicates that the respondents in Swallow and McGonagles' study are less willing to make a trade-off between spending money to protect open space parcels and spending money on other things. One possible explanation is that the highest bid level ($200) was too low. When respondents were asked if they would be willing to pay $200 to protect a parcel 45.7 percent said "yes" for Parcel A and 17.9 percent said "yes" for Parcel B. It is more common for the number of "yes" responses to decrease as the bid level increases, until very few respondents agree to the highest bid. In the present case, respondents' willingness-to-pay was not very sensitive to the cost of the parcel, and this may explain why the statistical coefficient for *Cost* is smaller than expected. In fact, 45.7 percent of the respondents who were asked if they would pay $200 to protect Parcel A agreed and 17.9 percent of those asked to pay $200 to protect Parcel B agreed. Table 6.10 presents the percentage of respondents who answered "yes" and "no" at each bid level.

Table 6.10 Percent of "Yes" and "No" Responses at Each Bid Level

		Parcel A			
Bid	# of "No"	# of "Yes"	No Answer	% "Yes"	% "No"
$5	98	225	24	69.6	30.3
$10	106	189	21	64.1	35.9
$35	106	222	30	67.6	32.3
$50	123	184	27	59.9	40.0
$75	134	175	23	56.6	43.3
$100	149	179	36	54.5	45.4
$200	178	150	17	45.7	54.2
		Parcel B			
Bid	# of "No"	# of "Yes"	No Answer	% "Yes"	% "No"
$5	198	106	21	34.8	65.1
$10	201	115	28	36.3	63.6
$35	211	108	19	33.8	66.1
$50	201	99	30	33.0	67.0
$75	231	100	22	30.2	69.7
$100	242	61	27	20.1	79.8
$200	279	61	20	17.9	80.2

In a more typical study very few respondents would have agreed to pay the highest price. If one were to graph the "yes" responses at each price it looks like the following:

Graph 6.1

"Yes" Responses

Percent "Yes" Responses

Theory ----

Actual ——

Bid Level
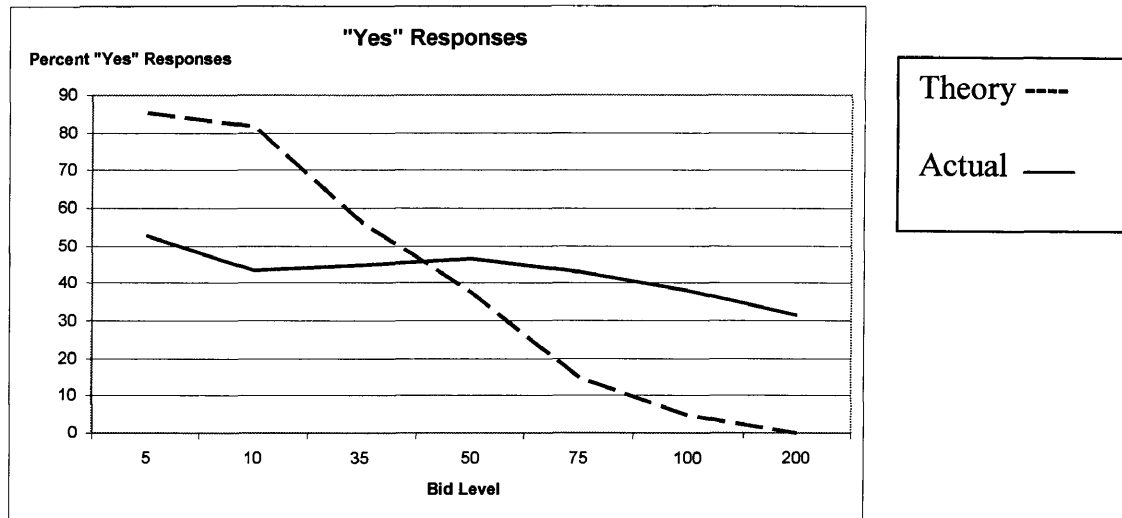
When we try to identify the mean of this distribution of yes responses, the wide

tail pushes the mean far to the right. Although the socio-economic and demographic

characteristics of the sample respondents closely match the characteristics of

Jamestown's population, given the high percentage of "yes" responses to high bid levels,

it is reasonable to hypothesize that the residents that returned the survey have strong

feelings regarding open space. It is possible that a large group of residents who do not

have strong feelings and most likely would not be willing to pay $200 annually for open

space did not respond to the survey. If this is true, the results are biased.

6.10 The Duffield and Ward Factor

One final adjustment can be made to the willingness-to-pay estimates derived

above. Ward and Duffield (1994) hypothesized that individuals' responses to

hypothetical surveys may not reflect their actual behavior. The researchers addressed this

issue and found that people would actually pay only 28 percent of their estimated

willingness-to-pay to a trust fund for the reintroduction of wolves in certain areas. This

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scaling factor is based on voluntary contributions, not a tax. Applying this percentage to

the original willingness-to-pay estimates listed in Table 6.8 yields the following figures:

Table 6.11 Willingness-to-Pay with the Duffield and Ward (1994) Factor

	Parcel A			
Acres	Surrounding Land Use		Duffield & Ward's Estimate (28%)	
	Farmland	Residential	Farmland	Residential
20	$359.16	$340.30	$100.56	$95.28
60	$433.50	$414.64	$121.38	$116.09
120	$465.31	$446.46	$130.28	$130.60
	Parcel B			
Acres	Surrounding Land Use		Duffield & Ward's Estimate (28%)	
	Farmland	Residential	Farmland	Residential
20	$192.94	$174.08	$54.02	$48.74
60	$266.19	$247.33	$74.53	$69.25
120	$347.99	$329.13	$97.43	$92.15

Chapter 7 Implications and Conclusion

When this study originated it had three primary objectives: 1) to establish the extent of Jamestown residents' support for open space conservation, 2) to identify priority lands from residents' points of view, and 3) to establish residents' willingness-to-pay for open space conservation programs. I hypothesized that the choice experiment method would allow policy makers to rank land parcels by placing utility weights on physical features and management attributes. Consistent with this hypothesis the results do support programs that favor land parcels with certain physical attributes, size, and location. Moreover, the results of this choice experiment analysis indicate that the beneficiaries of open space may be willing to pay differing amounts depending on a variety of parcel attributes. Contrary to my expectation, however, the cost of the parcel produced a very small effect on respondents' choices. An untested hypothesis remains beyond the scope of this study: if the bid levels had been higher, would respondents have exhibited more sensitivity to the cost, thereby producing lower average willingness-to-pay estimates? What is clear from this study, however, is that through the choice experiment the attributes of an environmental good can be used to understand the trade-offs that individuals are willing to make.

Originally I hypothesized that increasing the size of a parcel would increase respondents' support for protecting that parcel. As a result of this study, I must place conditions on this hypothesis. The discrete choice model shows that respondents prefer Parcel A to Parcel B even when Parcel B is much larger than Parcel A. Even though respondents prefer Parcel A to Parcel B, I hypothesized that if the size of Parcel B increased, holding the size of Parcel A constant, at some point respondents would prefer

to protect Parcel B because it was much larger than Parcel A. I did not expect, for example, that respondents would be willing to pay the same amount to protect a 20-acre Parcel A as to protect a 120-acre Parcel B. This expectation was not confirmed. The results of the data analysis show that respondents derive more utility from Parcel A than from Parcel B at all sizes. In fact, respondents are willing to pay $11 more to protect a 20-acre Parcel A than a 120-acre Parcel B.

This result has several implications. First, it is evident that for most respondents the provision of public access does not increase their support for land preservation. Respondents may not feel that additional public access is necessary or even appropriate. Second, respondents may derive greater utility from protecting working farms, even when access is limited, than from protecting other accessible areas. Third, respondents place a high value on scenic vistas. These results suggest that policy toward open space on Conanicut Island will serve a constituency in which the majority desires open space for purposes of land preservation, rather than for recreation and accessibility. The results also suggest that some policy mechanisms, such as purchase of development rights, may serve Conanicut Island well, since the constituents benefit from land preservation without access.

Moreover, the results suggest that respondents are more likely to support the preservation prefer parcels that are currently surrounded by farmland rather than parcels located in residential areas, although the effect was not statistically significant.

These results can be used to direct and focus the goals and actions of the Town of Jamestown as well as provide direction to other conservation agencies. As it stands, the Town has three goals regarding open space conservation, the most detailed of which is to,

"develop a comprehensive Land Acquisition Action Plan to raise funds through bonding and grants to acquire and/or protect a substantial portion of the remaining undeveloped land in Jamestown for the preservation of water and coastal resources, access to the shore, scenic vistas, and open space..." (Jamestown Community Comprehensive Plan-Action Plan, pg.255). To reach this goal, the Town intends to create a priority list of significant open space parcels and determine the willingness of taxpayers to float bonds to provide matching funds for acquisition. While this study did not reach a definitive willingness-to-pay value for each combination of land attributes, information about trade-offs that individuals are willing to make can be used to rank parcels. This study showed that individuals are willing to pay more additional taxes for large contiguous farmland parcels than they are willing to pay for smaller parcels located in residential areas. Combined with the information collected from the attitude statements, this information can be used to identify priority parcels. For example, 83 percent of the respondents indicated that they felt very strongly about protecting the Town's water supply and quality. Thus, the Town, or another conservation agency, may be highly successful in raising financial support for a large farmland parcel located within the Town's watershed. Since only 30 percent of the respondents indicated that they desired additional recreational areas, smaller parcels to be purchased outright may be given lower priority. The willingness-to-pay estimates reported in this study are not conclusive and should not be the basis of any policy decisions. The estimates do, however, indicate that there is strong support for open space preservation in Jamestown, and a substantial population willing to pay more than $200 annually for land preservation.

In the past, the Town has successfully allocated tax dollars to open space and natural resource protection. In 1987 a bond was passed, not to exceed 5 million dollars, for the purpose of purchasing and developing open space and recreational land. These funds have only been used once thus far to purchase the Conanicut Island Sanctuary, a thirty-two acre parcel containing hiking trails and bird-watching blinds. In 1999, voters authorized $100,000 for water resource protection and in 2000 authorized $110,000 for natural resource protection. The results of this study suggest that these funds may be best spent protecting large, contiguous parcels of land located within the watershed, rather than parcels similar to the Conanicut Island Sanctuary.

One issue regarding land assessment may arise if open space is purchased for protection, and it is a problem that would most likely be worked out during negotiations between the land seller and the buyer. Consider a landowner who owns one hundred acres and wishes to sell ninety-nine acres for preservation and keep one acre. The total one hundred acres may be worth $1 million. When the one acre, however, is separated from the remaining ninety-nine acres the value of the single acre increases considerably because it is now surrounded by protected land. The one acre parcel may now be worth close to $1 million on its own. By purchasing ninety-nine acres from the landowner, the conservation agency has inadvertently bestowed considerable land value to the seller. The issue is how this type of sale might be negotiated. One might argue that the single acre is not for sale, and therefore is not a matter of concern in the negotiation. Whatever happens to the value of the single acre is out of the buyer's control. Others might argue that the land seller and the buyer should agree on a price (for the ninety-nine acres) that is lower than the market value because the value of the single acre will increase. In this case, the

seller might agree to sell ninety-nine acres for $500,000 (hypothetically), knowing that the sale will have increased the value of his one acre parcel from roughly $10,000 to $1 million. This problem is not a legal issue, however, but an issue that would be faced during negotiation.

There is concern about bias in this study. First, individuals with graduate degrees are highly over-represented in the sample. Over 80 percent of the respondents indicated that they hold a graduate degree, while only 45 percent of Jamestown's population holds graduate degrees. Second, 22 percent of the respondents are not full-time residents of Jamestown. While the implications of this are not known, it should be kept in mind when reviewing the analysis.

The first direction for future research would be to implement the choice experiment survey again using higher bid levels. While the appropriate bid level distribution could not be determined in this study, it is clear that the highest bid level is greater (and possibly much greater) than $500. Another direction for further research would be the determination of attribute substitutability. This type of information would show the compensating amounts of different amenities should one amenity be damaged or destroyed.

Appendix A
Cover letter for Preliminary Survey

Abigail Anthony
University of Montana
Economics Department
Missoula, MT 59801

Dear Conanicut Island resident,

I am writing to you because I would like to know your opinions about preserving open space on Conanicut Island. As the population of Conanicut Island grows, the pressure to develop open space increases.

I am a graduate student at the University of Montana, but I grew up on Conanicut Island. I am conducting this study to learn about the opinions of other Island residents regarding land use. I will use the information for my graduate work, and also share those results with local government officials who make decisions about land use on Conanicut Island. The study will given them the information they need to make decisions that are consistent with the kind of land use you want.

Your response to this survey is important no matter what views you have on preserving open space. To accurately describe the opinions of Island residents I need to hear from all kinds of people, those who think preserving open space is important as well as those who do not. The questionnaire should be filled out by the person in charge of making decisions for the household. It should not take more than 10 minutes to complete.

Your participation is completely voluntary. Your answers will be completely confidential. I will never make available information about who returned questionnaires. Your name and address will not be made available to anyone else and you will not be put on any mailing lists.

Thank you for your help with this study.

Sincerely,

Abigail Anthony

Your Opinion on Open Space on Conanicut Island

1. Given all the challenges facing Conanicut Island, how important is the preservation of open space on Conanicut Island to you?

Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know/ No Opinion

2. How important is the existence of open space to preserving "island character" on Conanicut Island?

Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know/ No Opinion

3. The following are some reasons other people have given for preserving open space and farmland. How important are each of these reasons to you personally?

It is important to me personally	Strongly Agree		Neutral		Strongly Disagree
1...that development is controlled to protect wildlife habitat	1	2	3	4	5
2...that all people have access to open space	1	2	3	4	5
3...that I observe or photograph scenic landscapes	1	2	3	4	5
4...that environmentally sensitive areas are protected	1	2	3	4	5
5...that I have access to additional recreational areas	1	2	3	4	5
6...that family farms are protected from development	1	2	3	4	5
7...that development is controlled to preserve "island character"	1	2	3	4	5
8...that areas of unique scenic beauty are protected	1	2	3	4	5
9...that the town's water supply and quality are protected	1	2	3	4	5
10.. that development of land is controlled so everyone can use it	1	2	3	4	5

4. Suppose the Town of Jamestown is considering protecting parcel A, described below, and to purchase parcel A **you will have to pay additional taxes.**

    Please consider Parcel A...

Parcel A
*   This parcel is currently farmland surrounded by land that is already protected from development This land provides locally grown produce and livestock for consumers.
*   This parcel is located within the town's watershed.

- This parcel is ecologically and scenically unique and provides scenic views of the island.
- If purchased, the current farmer would remain on the land, and this parcel will remain as farmland.
- This farmland would have limited public access. Access may be limited to supervised visitor hours.
- The land could never be developed for any uses other than farmland or open space.
- This parcel is sixty (60) acres.

In order to preserve parcel A, you will have to pay additional taxes **each year for the next five years.**

5. How much would you be willing to pay in additional taxes each year to preserve parcel A?_____

6. What is your age?
   1. 18-29
   2. 30-39
   3. 40-49
   4. 50-59
   5. 60-69
   6. 70+

7. Are you male or female?
   1. male
   2. female

8. Do you have children of the following ages?
   1. no children   2. children ages 5 and under
   3. children ages 5-18   4. grown children
   5. grandchildren

9. What is the highest grade of school that you have completed?
   1. grade school
   2. some high school
   3. high school or GED
   4. vocational or technical school
   5. some college
   6. college graduate (BA or BS)
   7. graduate degree

10. What is your expected household income (before taxes) from all sources for 2004?
    1. $0-$19,999   4. $60,000-$79,999
    2. $20,000-$39,999   5. $80,000-$99,999
    3. $40,000-$59,999   6. $100,000+

11. How many, if any, environmental or conservation organizations that you are a member of? _____

12. For how many years have you lived in Jamestown? Full-time _____

                                                     Part-time_____

Preliminary Survey Version B
Your Opinion on Open Space on Conanicut Island

1. Given all the challenges facing Conanicut Island, how important is the preservation of open space on Conanicut Island to you?

Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know/ No Opinion

2. How important is the existence of open space to preserving "island character" on Conanicut Island?

Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know/ No Opinion

3. The following are some reasons other people have given for preserving open space and farmland. How important are each of these reasons to you personally?

It is important to me personally ….	Strongly Agree		Neutral		Strongly Disagree
1…that development is controlled to protect wildlife habitat	1	2	3	4	5
2…that all people have access to open space	1	2	3	4	5
3…that I observe or photograph scenic landscapes	1	2	3	4	5
4…that environmentally sensitive areas are protected	1	2	3	4	5
5…that I have access to additional recreational areas	1	2	3	4	5
6…that family farms are protected from development	1	2	3	4	5
7…that development is controlled to preserve "island character"	1	2	3	4	5
8…that areas of unique scenic beauty are protected	1	2	3	4	5
9…that the town's water supply and quality are protected	1	2	3	4	5
10.. that development of land is controlled so everyone can use it	1	2	3	4	5

4. Suppose the Town of Jamestown is considering protecting parcel B, described below, and to protect parcel B **you will have to pay additional taxes**.

    Please consider Parcel B…

Parcel B
- This parcel is currently an undeveloped wooded area located in a low-density residential area.
- This parcel provides wildlife habitat, but has no unique scenic qualities.
- If purchased, this parcel will be managed for low to medium capacity access. Access will include a parking area, walking trails, and a picnic area. This parcel will be regularly maintained by conservation patrols.

- If purchased this land could not be developed for residential or commercial use in the future.
- This parcel is roughly forty (40) acres.

In order for the Town of Jamestown to purchase parcel B **you will have to pay additional taxes each year for the next five years.**

5. How much would you be willing to pay in additional taxes each year to protect parcel B?_____

6. What is your age?
    1. 18-29
    2. 30-39
    3. 40-49
    4. 50-59
    5. 60-69
    6. 70+

7. Are you male or female?
    1. male
    2. female

8. Do you have children of the following ages?
    1. no children   2. children ages 5 and under
    3. children ages 5-18   4. grown children
    5. grandchildren

9. What is the highest grade of school that you have completed?
    1. grade school
    2. some high school
    3. high school or GED
    4. vocational or technical school
    5. some college
    6. college graduate (BA or BS)
    7. graduate degree

10. What is your expected household income (before taxes) from all sources for 2004?
    1. $0-$19,999   4. $60,000-$79,999
    2. $20,000-$39,999   5. $80,000-$99,999
    3. $40,000-$59,999   6. $100,000+

11. How many, if any, environmental or conservation organizations that you are a member of? _____

12. For how many years have you lived in Jamestown? Full-time _____

                                                Part-time_____

Appendix C
Letter to the Jamestown Town Council from CILT

CONANICUT ISLAND
L A N D   T R U S T

December 9, 2003

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MARY WEBSTER

To: Town Council
        Planning Commission
        Town Administrator
        Town Planner
        Town Solicitor

From: Conanicut Island Land Trust

Re: Open Space Survey

In keeping with our mission of promoting for the benefit of the general public the preservation of natural resources and the rural character of the island, the Conanicut Island Land Trust is conducting a survey of opinion regarding land protection and open space on the island. The survey will be conducted by mail in December and January. Enclosed is a copy of the survey along with the cover letter that explains the project.

We hope that this survey will give us a better understanding of island-wide opinion about open space so that we can plan our efforts in a manner that best supports the goals of the community.

Please visit our web site at www.conanicutlandtrust.org, and feel free to call me if you have any questions.

Sincerely,

Jack Hubbard
President

enclosures

Appendix D
Cover letter for the final survey

CONANICUT ISLAND
L A N D T R U S T

January 2004

Dear Member of the Jamestown Community,

The Conanicut Island Land Trust is sponsoring the enclosed survey about open space and land preservation. Your participation in this survey is critical to our understanding of opinion about protection of land on the island, and to our ability to serve the community's needs and interests in the future.

The goals of this survey are:

1. To establish our community's interest in land protection.
2. To assess opinions and priorities relative to open space preservation.
3. To determine willingness to support land preservation financially.

The survey is being conducted on our behalf during the months of December and January by Abigail Anthony, a resident of the island and a graduate student at the University of Montana. The project is part of Abigail's work towards her masters degree in Economics. Approximately 3,000 households will be surveyed, representing the entire property tax base of the island and other members of the island community.

Your response to this survey is important no matter what views you have on preserving land. To accurately describe the opinions of island residents, Abigail needs to hear from everyone, whether or not they believe preserving open space on the island is important to our community. The survey should be filled out by an adult who is involved in decision-making for the household. It should not take more than 10 minutes to complete.

Participation is entirely voluntary, and your answers are completely confidential. We will not be able to identify the source of any given survey returned to us. I urge you to take ten minutes to think carefully about your interests and priorities for Jamestown, and to complete the survey as soon as possible. The more people who respond, the more accurate our results will be and the better we will be able to meet the interests of our community.

Please contact me at 423-2473 or jackhub@aol.com if you have any questions about this project, and thanks in advance for your participation.

Sincerely,

Jack Hubbard
President

P.S. Please return this survey as soon as possible in the envelope provided!

CONANICUT ISLAND
L A N D T R U S T

> **Land Conservation on Conanicut Island: What is Your Opinion???**

The questions below will help us understand how you use open space and your basic expectations of what Conanicut Island's natural areas should be. Please circle your responses, and remember, your answers will remain completely anonymous and confidential. Your opinion is important!

1. Given all the challenges facing Conanicut Island, how important is the preservation of open space on Conanicut Island to you?

| Very Important | Somewhat Important | Not too Important | Not at all Important | Don't Know/ No Opinion |

2. How important is the existence of open space to preserving "island character" on Conanicut Island?

| Very Important | Somewhat Important | Not too Important | Not at all Important | Don't Know/ No Opinion |

3. The following are some reasons other people have given for preserving open space and farmland. How important are each of these reasons to you personally?

It is important to me personally that...   Strongly Agree   Neutral   Strongly Disagree

		SA		N		SD
1.	development is controlled to protect wildlife habitat.	1	2	3	4	5
2.	all people have access to open space.	1	2	3	4	5
3.	I observe or photograph scenic landscapes.	1	2	3	4	5
4.	environmentally sensitive areas are protected.	1	2	3	4	5
5.	I have access to additional recreational areas.	1	2	3	4	5
6.	farms are protected from development.	1	2	3	4	5
7.	development is controlled to preserve "island character."	1	2	3	4	5
8.	areas of unique scenic beauty are protected.	1	2	3	4	5
9.	the town's water supply and quality are protected.	1	2	3	4	5
10.	development of land is controlled so everyone can use it.	1	2	3	4	5

Farmland on Conanicut Island

Farmland on Conanicut Island

Photo: Chris Powell

Your Task:

Each of the following questions describes two land parcels, indicating ways in which the parcels may differ. Assume that the Town of Jamestown is deciding whether to preserve **one or neither** of the land parcels and that you have the opportunity to decide whether you will have to pay additional taxes to preserve a parcel. Please keep in mind that the tax payments will be made for a period of **5 years.**

Please be aware that the town of Jamestown may preserve land through one of the following ways:

1) Outright purchase: the Town would own the land and the development rights; or
2) Purchase of development rights: the landowner would still own the land, but give up his/her rights to ever develop the land.

Carefully review the descriptions of each parcel and then answer the question **based on the descriptions given. Please be aware of the following:**

> 20 acres = 15.2 football fields
> 60 acres = 45.5 football fields
> 120 acres =90.0 football fields

	Parcel A	**Parcel B**
Land Type ⇨ Surrounding Use ⇨ Type of Protection ⇨	Farmland: provides produce and livestock «USE1» Farmer retains ownership but gives up rights to develop the land forever	Wooded area «USE2» Town ownership- land could never be developed
Access Level ⇨ Scenically Unique ⇨ Acres ⇨ Cost to your household	Public access is restricted to visiting hours Provides unique scenic views of the island «ACRES1» $«BID1» per year for 5 years	Hiking trails, picnic area, parking area Not scenically unique «ACRES2» $«BID2» per year for 5 years

I prefer to…(check one box below)

☐ **Pay additional taxes and preserve Parcel A**   ☐ **Save my tax costs and preserve neither Parcel A nor Parcel B**   ☐ **Pay additional taxes and preserve Parcel B**

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☆ Now assume that none of the previous parcels were purchased. ☆ Suppose that the Town of Jamestown is considering preserving either Parcel A or Parcel B, described below as **open space**. To preserve either, you will have to pay additional taxes over a 5-year period. Which parcel, if any, would you like to see preserved?

Parcel A   Parcel B

Land Type ▭⟩
Surrounding Use ▭⟩
Type of Protection ▭⟩

Access Level ▭⟩
Scenically Unique ▭⟩
Acres ▭⟩
Cost to your household

Parcel A	Parcel B
Farmland: provides produce and livestock «USE3» Farmer retains ownership but gives up rights to develop the land forever Public access is restricted to visiting hours Provides unique scenic views of the island «ACRES3» $«BID3» per year for 5 years	Wooded area «USE4» Town ownership- land could never be developed Hiking trails, picnic area, parking area Not scenically unique «ACRES4» $«BID4» per year for 5 years

I prefer to…(check **one** box below)

☐ Pay additional taxes   ☐ <u>Save</u> my tax costs and preserve   ☐ Pay additional taxes
   and preserve Parcel A   <u>neither</u> Parcel A nor Parcel B   and preserve Parcel B

Land Type ▭⟩
Surrounding Use ▭⟩
Type of Protection ▭⟩

Access Level ▭⟩
Scenically Unique ▭⟩
Acres ▭⟩
Cost to your household

Parcel A	Parcel B
Farmland: provides produce and livestock «USE5» Farmer retains ownership but gives up rights to develop the land forever Public access is restricted to visiting hours Provides unique scenic views of the island «ACRES5» $«BID5» per year for 5 years	Wooded area «USE6» Town ownership- land could never be developed Hiking trails, picnic area, parking area Not scenically unique «ACRES6» $«BID6» per year for 5 years

I prefer to…(check **one** box below)

☐ Pay additional taxes   ☐ <u>Save</u> my tax costs and preserve   ☐ Pay additional taxes
   and preserve Parcel A   <u>neither</u> Parcel A nor Parcel B   and preserve Parcel B

Last section: The following questions ask about you, please remember that your responses are anonymous and confidential!

5. Rather than pay additional taxes, would you be willing to pay $«BID7» for open space preservation to a **non-profit conservation agency?**

                        YES   NO

6. What is your age?
   a. 18-29
   b. 30-39
   c. 40-49
   d. 50-59
   e. 60-69
   f. 70+

7. Are you male or female?
   a. male
   b. female

8. Do you have any children?
   a. no children
   b. children ages 5 and under
   c. children ages 6-18
   d. grown children
   e. grandchildren

9. What is the highest grade of school that you have completed?
   a. grade school or some high school
   b. high school or GED
   c. vocationa/technical school or some college
   d. college graduate or graduate school

10. What is your expected household income (before taxes) from all sources for 2004?
    a. $0-$19,999
    b. $20,000-$39,999
    c. $40,000-$59,999
    d. $60,000-$79,999
    e. $80,000-$99,999
    f. $100,000+

11. Of how many, if any, environmental or conservation organizations are you a member?

    _____

12. For how many years have you lived in Jamestown? Full-time _____

                                                       Part-time _____

Thank you for your participation! Your response is very important! The results of this study will be available from the Conanicut Island Land Trust. You can contact CILT by mail, email, or phone at:

<div align="center">

Conanicut Island Land Trust
PO BOX 106
Jamestown, RI 02835
or info@conanicutlandtrust.org
Jack Hubbard, President: (401) 423-2475

</div>

Do you have any comments regarding this survey? Please add your opinion in the space below....

Appendix F
Article printed in *02835* on January 7, 2004

By the middle of January, every Jamestown household will have received a survey from the Conanicut Island Land Trust. Please take a moment to look over the questions, think about your vision of Jamestown, and answer thoughtfully. Your answers are important and will play a vital role in the way the Land Trust approaches future land protection.

With the support of the Land Trust, I have developed this survey as part of my graduate program in resource economics. Resource economics studies the allocation of scarce natural resources over long periods of time. For example, in New England, resource economists study the optimal catch rate for the dwindling population of cod fish. Resource economists study the rate at which we should use nonrenewable natural resources such as oil, balancing current needs with the needs of future generations. They also measure the value of the benefits of environmental situations, such as clean air or clean water.

It is hard to ignore the fact that the American landscape is irrevocably changing at a mind-boggling pace. Wherever Americans travel, they are confronted with relentless development and associated loss of farmland and forest. The American Farmland Trust reports that Rhode Island lost 6,200 acres of farmland between 1982 and 1997. If this figure has little significance, a quick trip through South County or Middletown will help give it meaning. In a very real sense, the loss of the amenities associated with farms, fields, and forests is not unlike the loss of clean air. I thought the measurement tools and techniques used in resource and environmental economics could be applied to land use issues. I proposed my idea to the Land Trust, and the directors agreed to support the project.

For most goods, it is easy to determine their value because they are bought and sold in markets. When shopping for new shoes, you are faced with a price tag. Environmental goods, however, are not as easy to value because they are not purchased in markets. You cannot purchase clean air at the store, even though you might place a high value on breathing clean air. Notwithstanding, knowing how much the public values environmental goods, such as clean air, can have important implications for policy and decision makers. One way to measure these values is through surveys that elicit the value of environmental goods by asking people how much they are willing to pay for a given environmental situation. The main objective of my survey is to measure Island residents' willingness to pay for the protection of different hypothetical parcels of open space and farmland.

The economic method that the survey employs is called the "choice experiment." The choice experiment is relatively new to environmental economics, and it is unique because it allows economists to measure the value of the individual amenities that make up an environmental situation, rather than the situation as a whole. Let's look at Jamestown. Some people may enjoy open space for hiking or walking their dogs. Other people may value that the watershed will remain protected. Some may value open space because of the associated scenic landscape. Others may derive personal satisfaction from protecting small family farms. Still others may appreciate the wildlife habitat value. My

survey is designed to identify what amenities of open space, if any, people value, and determine the willingness to pay for the different amenities.

The questions in the survey present the reader with hypothetical situations in a format similar to a referendum. The reader must choose between paying additional taxes to preserve a particular parcel of unprotected land and not protecting the same parcel. Here is an example of one of the questions:

	Parcel A	**Parcel B**
Land Type **Surrounding Use** **Type of Protection** **Access Level** **Scenically Unique** **Acres** **Cost to your household**	Farmland: provides produce and livestock **Farmland** Farmer retains ownership but gives up rights to develop the land forever Public access is restricted to visiting hours Provides unique scenic views **20** **$10 per year for 5 years**	Wooded area **Farmland** Town ownership-land could never be developed Hiking trails, picnic area, parking, Not scenically unique **120** **$75 per year for 5 years**

I prefer to....(check ONE box below)

☐ **Pay additional taxes**   ☐ **Save my tax costs and preserve**   ☐ **Pay additional taxes**
   and preserve Parcel A   **neither Parcel A nor Parcel B**   **and preserve Parcel B**

This type of question is repeated three times in the survey. While this may seem redundant and repetitive, various attributes of the open space parcels change from question to question. The surrounding land use, the size of the parcel, and the cost to your household change in each scenario. It is important that the reader pay attention to each description and keep his/her own budget in mind when answering.

The information from this survey will provide the Land Trust with valuable information about the public's interest in land protection, what kinds of land and amenities the public values, how much the public is willing to pay to protect open space, and the most effective method of raising that money. For example, the survey might indicated that Island residents are more interested in preserving large parcels of land that are surrounded by existing undeveloped land, rather than smaller parcels scattered about the Island. All of this information will be used to direct planning and conservation measures on Conanicut Island.

Finally, I would like to repeat the importance of taking time to read and answer the survey thoughtfully and return it to the Land Trust. Everyone's response is important, regardless of his or her opinion on open space preservation- the survey will only be successful if I collect a wide range of opinions! Your participation is completely anonymous and greatly appreciated. If you misplace your survey, call 401-423-2475 to request another.

Land trust survey asks islanders to give a value to preservation efforts

By Donna K. Drago

The Conanicut Island Land Trust will soon mail to every home on Jamestown a survey that asks property owners to help determine how much value they place on the preservation of different types of open space.

Abigail Anthony, 22, a master's degree candidate at the University of Montana who was raised in Jamestown, has designed the survey as part of her master's thesis in resource economics.

The surveys will be out next week and include 13 questions that Anthony estimates will take about 10 minutes to answer.

On three different questions, respondents will be given detailed descriptions of two hypothetical parcels of land and then asked if they would be willing to spend tax dollars to preserve either or neither of the parcels. Anthony said that people should consider their own budgets when deciding whether to spend their dollars on the projects or not. The survey is designed to identify what amenities of open space, if any, people value, and to determine their willingness to pay for the different amenities, Anthony said. Some types of landscapes that the survey seeks to place value on are open space for hiking or walking dogs, watershed protection, scenic landscapes, small family farms, and wildlife habitat,

Anthony said.

Anthony said that she is hopi for a large and quick response the survey so the results will be accurate as possible. Respons from a broad spectrum of the pc ulation will also give a better res than if just one demographic gro responds, Anthony added.

She is using the principals resource economics, which stu ies the allocation of scarce natur resources over long periods time, and specifically employir an economic tool called tl "choice experiment," which unique because it allows econ mists to measure the value of tl individual amenities that make u an environmental situation, rath than the situation as a whol Anthony said.

"The answers are importar and will play a vital role in th way the land trust approache future land protection efforts, Anthony said.

The surveys can be returned t the land trust as soon as they ar filled out, but Anthony said tha she will continue to compile th data through March. There is a return address on the survey Anthony noted.

The daughter of Quentin anc Emily Anthony of Bayview Drive, she received a bachelor's degree in economics from the University of Montana in 2001 and in addition to working on her master's, she is a teaching assistant in introductory macroeconomics at the university, Anthony said. She has worked for the Conanicut Island Land Trust and the state Department of Environmental Management in its land acquisition department.

Conanicut Island Land Trust survey on the way
By Abigail Anthony

In last week's issue of *02835*, Abigail Anthony shared her vision for the Conanicut Island Land Trust Survey. This week we present an overview of the project provided by the Land Trust.

The Conanicut Island Land Trust is sponsoring a survey of community opinion about land protection on the island. The survey was outlined in *02835* last week.

According to Jack Hubbard, President of the Land Trust, "Open space preservation and land conservation are top priorities for the Land Trust. In order to fulfill our mission effectively and serve the island properly it is essential that the Land Trust have an accurate understanding of the community's interests and priorities relative to open space on the Island."

Jamestown is under development pressure from both residential and commercial interests. In contrast, the Land Trust believes that a significant factor in the island's appeal is the quantity and quality of open space. While the Land Trust has legal interests in 138 acres for protection, 1,620 acres are still vulnerable. According to the Comprehensive Community Plan development of these properties would add 1,100 housing units and 2,700 residents. The Land Trust is concerned that these remaining lands will be developed and the survey is one step in helping the Land Trust address the problem.

The survey has three primary goals: to identify the community's

interest in the protection of natural resources, open space conservation opinions and priorities relative to open space conservation and to measure the community's willingness to financially support land preservation.

"The survey has been developed and is being conducted by Abigail Anthony, an island resident and current graduate student in resource economics at the University of Montana.

The survey is a major component of her thesis, and it applies measurement tools that have been traditionally used in environmental economics to the subject of land protection. Anthony explained," Studies or surveys measuring the value of non-market goods have been typically done in connection with clean air and water. I thought the testing method could be applied to the subject of open space, which is another non-market good. The survey should provide important information to the Land Trust, as long as enough surveys are returned."

The survey will help to determine community interest in many aspects of land protection, including preferences for farmland, wildlife habitat, public watershed, public access, recreation, scenic vistas, island character, and contiguous parcels. The survey will also study how land preservation should be funded, identify the types of land islanders want to protect, and determine how much they are willing to pay.

This survey will help the Land Trust make decisions about future efforts to preserve open space on the island, how to set priorities, and how to fund preservation activities that best serve the interests of the community.

The survey is being mailed to the entire property tax base of the

island, approximately 3,800 households, as well as other members of the community. It should take about 10 minutes to complete the survey.

Surveys will be anonymous, the Land Trust will have no ability to identify the respondents. Recipients are encouraged to complete and return the survey as quickly as possible so that the results may be tabulated and a report may be produced that is complete, timely, and fully representative of community opinion. The Conanicut Island Land Trust is a 501 (c)(3) not-for-profit corporation whose mission is to promote for the benefit of the general public, the preservation of natural resources in Jamestown, to assist in efforts to preserve the rural character of the island, and to promote study and education regarding natural resources.

For additional information go to www.conanicutlandtrust.org or e-mail info@conanicutlandtrust.org

Abigail and her dog Sandy

Abigail received her bachelor's degree in economics in 2001 from the University of Montana in Missoula, Montana. She currently is a graduate student in economics at the University of Montana and expects to receive her Master's degree in economics in May 2004.

Abigail currently is a teaching assistant for introductory macroeconomics. In the recent past she worked for the Conanicut Island Land Trust and the Land Acquisition Department at the Rhode Island Department of Environmental Management. She researched farm viability for (CILT), and worked for Lisa Primiano at (DEM).

In her free time she enjoys participating in triathlons and rock climbing.

Her parents are Emily and Quentin Anthony, of Jamestown.

Appendix I
Follow-up postcard

CONANICUT ISLAND
L A N D   T R U S T

Your Feedback Is Important To Us!

Recently, we mailed an **Open Space Survey** to you. If you have already returned your completed questionnaire, we thank you for taking the time to do so.

Your opinions are important to us. If you have not yet returned the survey, please take a few minutes to dig it out, complete it, and drop it in the mail. We need your input in order to determine how to plan for what is best for our island community.

If you have any questions about the survey, or if you have misplaced your copy, please call the Land Trust at 401-423-2475.

www.conanicutlandtrust.org

CONANICUT ISLAND
L A N D   T R U S T
P.O. Box 106
Jamestown, RI 02835

Non-Profit Org.
U.S. Postage
PAID
Direct Mail Mgr.

OPEN SPACE SURVEY REMINDER!

Appendix J
Letter-to-the Editor printed in *02835* and *The Jamestown Press*

January 27, 2004

To the Editor,

By now each household on the island should have received a survey from the Conanicut Island Land Trust. First, I would like to thank those residents who have completed and returned their survey. So far I have received just over four hundred responses! This is a fantastic early rate of return and suggests that the survey will provide meaningful results.

Some questions about the survey have been posed to me that I would like to take this opportunity answer.

First, some people have asked about the three "parcel choice" questions. These questions present the reader with hypothetical situations in a format similar to a referendum. The reader must choose between paying additional taxes to preserve **one** of the two open space parcels (Parcel A or Parcel B) or not protecting either parcel. In each parcel choice question, three of the attributes change: the surrounding land use, the size of the parcel, and the cost to each household. Many people have said that they would choose *both* parcels. It is important, however, to only choose **one** of the three options. In real life people have limited budgets and when one agrees to pay additional taxes he or she must give up spending money on something else.

Second, a number of you have noticed that not all the surveys are the same. In fact, all the surveys are identical except for the three "parcel choice" questions. The survey was designed with many different combinations of the three primary attributes. Although different people answer different questions, there will in the end be a high degree of statistical accuracy to the final data.

Third, the results of the survey will available to the newspaper once the project is complete, hopefully by the end of April.

From the survey, I hope to be able to determine several things. First, how important is open space to the residents of Jamestown. Second, how much would the public be willing to spend to protect open space in Jamestown. Third, what types of open spaces are important to people in Jamestown. I might determine, for example, that Jamestown residents would be willing to spend more to protect an accessible wooded park with hiking trails than a large farmland parcel with restricted access. This information will help the Conanicut Island Land Trust direct their planning and conservation measures.

Finally, I would like to thank those who have already returned their survey and encourage others to complete the survey and return it as quickly as possible. Everyone's response is important, regardless of his or her opinion on open space preservation. The survey will only be most successful if I collect a wide range of opinions! If you have lost your survey or did not receive one, please call (401) 423-2475 to request another.

```
reset$
Title; February 26 Trial 3$
read;file=limdepdata.csv;nobs=7137;nvar=10;names=3$

$This is the program that I used for my results!!!$

reject;new;y<0$
dstat; rhs=*$
histo;rhs=y$

?Throwing out all of the non-responses$
reject;y<0$

create;if(use=1)resfarm=1;if(use=0)resfarm=-1;if(use=3)resfarm=0$
create;if(cost=0)ndum=1;(else)ndum=0$
create;if(parcel=2)bdum=1;(else)bdum=0$
create;if(parcel=1)adum=1;(else)adum=0$
dstat;rhs=y,cost,acres,resfarm,adum,bdum$

create; if (parcel=1 & acres=20)a20=1;(else)a20=0;
      if (parcel=2 & acres=20)b20=1;(else)b20=0;
if (parcel=1 & acres=60)a60=1;(else)a60=0;
      if (parcel=2 & acres=60)b60=1;(else)b60=0;
if (parcel=1 & acres=120)a120=1;(else)a120=0;
      if (parcel=2 & acres=120)b120=1;(else)b120=0$
reject; new; y<0$
dstat;rhs=y,cost,a20,b20,a60,b60,a120,b120,resfarm$

discrete choice;lhs=y;rhs=cost,a20,b20,a60,b60,a120,b120,resfarm
;choices=parcela,parcelb,neither
;crosstab$
;list$

create;chk=a20+a60+a120-adum$
dstat;rhs=chk$

reject; chk=0$


dstat;rhs=*$
```

Appendix L
LIMDEP Program for *Residency* Model

```
LIMDEP Program for Mix Multinomial Model

reset$
Title; residencywithApril26$
read;file=april26.csv;nobs=7137;nvar=8;names=3$
reject;new;y<0$
create;if(fulltime=1)res=1;(else)res=0$

create;if(parcel=1)adum=1;(else)adum=0;
if(parcel=2)bdum=1;(else)bdum=0$

create;if(res=1&parcel=1)ares=1;(else)ares=0;
if(res=1&parcel=2)bres=1;(else)bres=0$

create;if(use=1)resfarm=1;if(use=0)resfarm=-1;if(use=3)resfarm=0$


create; if (parcel=1 & acres=20)a20=1;(else)a20=0;
     if (parcel=2 & acres=20)b20=1;(else)b20=0;
if (parcel=1 & acres=60)a60=1;(else)a60=0;
     if (parcel=2 & acres=60)b60=1;(else)b60=0;
if (parcel=1 & acres=120)a120=1;(else)a120=0;
     if (parcel=2 & acres=120)b120=1;(else)b120=0$
reject; new; y<0$


dstat;rhs=*$
reject;y<0$

discrete
choice;lhs=y;rhs=cost,resfarm,a20,b20,a60,b60,a120,b120,ares,bres
;choices=parcela,parcelb,neither$
```

"Not sure what the difference between the 3 questions inside is....other than $. Very confusing."

"Please publish survey results in Jamestown Press, or if not possible, in CILT newsletter."

"I am very concerned about the rural character of Jamestown being preserved; however, if the Town purchases land for public use, then the Town must levy use fees to out-of-towners in order to maintain the land, keep it free of litter, etc. A small fee may also provide a summer job for one of our local kids."

"I would like to see land preserved and used for recreational purposes by the town, access to beaches, and waterfront- be able to wander on town land to enjoy the beauty of Jamestown to feel that we own a piece of this Island."

"In section 3, questions 2 and 10 were confusing. We believe all people should have access to some open space, but not all open space. What does it mean to control development so everyone can use land? Use it how?"

"I am concerned about development of lese large homes with numerous bathrooms. Do you really think a person of means with 4-5 bathrooms is concerned with water conservation? I do not. Also the "elite" and wealthy that are grabbing up properties are not the type of people that you, generally, see volunteering their time for public offices, fire, rescue, etc. Its not what it used to be."

"I feel the Island is all messed up- too late to do anything to many large homes, and not being responsible to the community building on land making it not accessible to the water, and wells and sewers on Island in terrible situation."

"Keep up the great work!"

"Schools should educate students against litter."

"Great survey and much needed. Good luck!"

"Would have been nice to be able to complete survey on line."

"Overall I would prefer to see tax credit to those individuals who want to donate rights or land- no town purchase!"

"I believe that controlling development is too little and too late, to preserve "island character." Growing up in Jamestown 40-50 years ago was "real" home. Preserving

what little property we have left should be a number 1 priority now and in the years ahead."

"I'm big on private owners' rights!"

"Leave well enough alone."

"Of the 3 scenarios given, why wasn't the option to buy both parcels given? I would have opted for that. Any plans for a bike path?"

"I would like wildlife and open space preserved. It is very important to preserve the beauty of Jamestown. It is a very different and peaceful place to live. Animals, also, are important!"

"I would have liked you to flip-flop farm/woods boxes just to avoid "first-look" preferences. Also, I found question 5 difficult as it didn't have similar time frame (5 years, forever, etc.) Obviously, if farm were poorly run pig or ostrich farm with run-off that would change answers. Thank you."

"Item 5. The Jamestown Town Council changes often and has shown a reckless enthusiasm to change longstanding planning and zoning goals. Their opportunistic approach to undeveloped land flies in the face of a custodial attitude toward Jamestown's precious few resources."

"Yes- To obtain land on an annual basis to be protected from all human interaction. Yes- Dig out and preserve and protect our water supply."

"Instead of spending time and money on open space we should be solving the water problem and housing for our teachers (if which very few young teachers live on-island and town employees. We are becoming a real snob island."

"Communication is a key element of this effort."

"I understand that I am supposed to choose of the two parcels (and check one box); but I would rather raise the taxes and protect both the farmland and the hiking trails."

"I think the more land we can conserve on Jamestown the better. And the increase in taxes to keep the island beautiful is a small price."

"Town should purchase some house lots, (acreage) in the Jamestown Shores area to prevent further development. (also- North Main Road area near Rt. 138). Thanks! Keep up the good work!"

"Dear Sirs, I am an environmentalist wholeheartedly. However, my lot on Steamboat Rd. is in The Remington Trust. I have seven children and my lot is part

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of their inheritance. One son is physically disabled from a fall off a roof into a six foot drainage hole. I know this information is going to disappoint you- I am sorry. I know how you feel. In Barrington builders are buying up small, historical houses and bull dozing them to rubble and building huge houses to sell. They look awful: I wish I were a millionaire!"

"Certainly the most important issue facing the Island."

"This survey is very confusing and I have a Masters degree. I compared this survey with 7 other people and all the surveys were different. How can you come up with statistics when there are so many different variables? I would like to see as much land and water conservation as possible. To choose parcel A or B was difficult- I'd like to see them both preserved. Will the results of the survey be printed in the Press? Can the town have a moratorium on building (because of the water situation)?"

"Jamestown is fast becoming too overbuilt with water a huge problem which no one seems able to solve. There should definitely be a restriction of how many houses are permitted per year."

"I have a problem with the barriers put in place to stop the development of lots originally set-up for residences. If a plat was once developed for houses.....the town should let them be built or buy the properties instead of making it difficult to obtain permits."

"1) On Question 3- It's important to preserve land even if I don't have access to it- that it, I'm in favor of conservation easements, especially for the working farms.
2) Questions on Pages 2&3- My answers should be interpreted to mean that I think preservation of existing farms is 1st priority. Preservation of large wooded parcels is also important. And preservation of small lots is also important, although lower priority than the farms.
3) Let's spend the money and save as much land as we can now!"

"Very important that we deal with the water supply!"

"My only concern with either option in choices above is that all monies be used for land preservation and that no development can be done no matter who buys the land or the development rights."

"Open Space= Island Character. Restricting future growth will establish parameters to support an attainable plan for the future."

"Very important, and timely survey. Must be considered an integral part of any master plan for Jamestown. As with any survey, and in particular, as this survey has been requested from 3000 households, it is very important to provide

feedback re the results, conclusions from the results, and the intended influence or use for the survey conclusions. Must be considered as a "priority" survey to influence the future of Jamestown."

"Overall a reasonable "extra" tax would be acceptable; with emphasis on private ownership banning "development rights," P.S. Your 3 scenarios are confusing also non-stamped envelopes is a huge turn-off for many people!"

"Stop the house building!"

"Part 3- Line Four- Too often carried to the extreme! i.e. wildflowers growing in space needed for Town use.
Line Eight- Unique scenic water views already destroyed. i.e. road to beavertail. Views of water disappeared with overgrowth of trees and brush. Same problem on North Road from creek to North End."

"Fine ideas."

"To be honest with you I would gladly pay additional taxes to preserve a & b but I am a senior with a fixed income."

"In answering your three questions: I would like to pay to support protection for both the farm and the woodland. I didn't like having to choose. I feel both the farm and woodland are what Jamestown is all about. i.e. the best of Jamestown! Both need protection and I'm willing to pay for this. Thank you."

"There were no questions about how the open space is used. There should be areas set aside that allow bow hunting at the appropriate times of the year. As environmentalists, you would know the importance of environmental control of wildlife populations which hunters provide. The deer explosion on this island is dangerous to motorists and others with the prevalence of lime disease."

"Taxes have already gone up at least three times since I moved here 7 years ago. I see constant building going on. Seems to me with such an increase in the tax base that more land preservation could be done without increasing taxes again."

"[Visiting hours] need to be frequent and convenient such as Sat. & Sun. dawn to dusk, etc. 20 acres is not an adequate purchase to ensure open space."

"Conservation easements to Hulls Cove should be looked at. Trash is terrible and they aren't taking care to clean it up."

"Question #5 asks about a $75 payment to a non profit conservation but doesn't state how often this would be paid!"

"The Conanicut Island Land Trust is doing a fabulous job! Keep up the good work!"

"Thanks for your work for a worthy cause."

"Jamestown has given up unlimited access to too much already- e.g. West and East Ferry areas."

"I am not entirely clear why we were given such choices. The bottom line is ANY open space on Jamestown is irreplaceable. Personally, I don't place much value on public access to open space. If it were up to me, I would lock up as much open space as possible NOW and worry about hiking trails later. Money and resources spent on such trails is misplaced until the fate of every parcel in danger of development is sealed."

"Survey is somewhat confusing. Basically, I would pay $200 per year to protect open space- farm land , wooded areas, as well as, build able lots not yet sold."

"Schools are even more important to fund!!!"

"We moved here because of the private rural atmosphere and to be on the water. I would not like the island to become overdeveloped or commercialized. I would like to see the farms and recreation areas preserved. I would also like to see some restraint put on building large homes on tiny lots."

"How can we beat the real estate and builder's lobby to get a land conservation tax on real estate transactions- they have it in Little Compton and we should have it also."

"Jamestown, obviously, is an island, yet emphasis is on farmland/wooded areas. The maritime ( ) of the island are ignored, such as protection of transitional habitats between shoreline and inland. Also, the conservation issue is very much () to our water supply. In local efforts to protect a".... *I can't read the rest of this comment*

"Farmland has often, historically, included wooded areas either wet, rocky, or saved for fuel or lumber. Some farmers I know consider forestry as "slow speed" agriculture."

"My wife and I moved to Jamestown for the open space. In reality, we would be willing to pay- taxes or non-profit org.- to preserve both parcels in your survey - and more."

"I, with other relatives, own a very small piece of land on Jamestown which I hope, eventually to give to the land trust."

"You made no mention of eliminating hunting rights on these parcels of land that would be town owned- it is an important issue to many of us in Jamestown."

"What is "island character"? Is it Nantucket-like? It made these questions impossible to answer accurately."

" Keep up the good work. I support what you are doing."

"The Town is a poor steward of open space land. Does not have resources to take care of what we already own. Against any programs where Town would acquire more property."

"For a small island we have enough public hiking trails, parks, picnic areas and parking. Our parks are special and uniquely gorgeous and much appreciated, we are proud to have them. However we need to preserve open space for the dynamics of the Island in it's state and to preserve flora and fauna. We should do all that we can to preserve and protect them along with preserving and protecting our historic and scenic farms. I would vote to preserve both parcels."

"1) Leading questions- bias toward promoting open space.

2) People that want to promote open space will answer survey. Those who don't, won't. Therefore your response will be very much in favor of promoting open space.

3) I believe Jamestown and Land Trust have done a great job at preserving open space.

4) I would be willing to pay more in taxes to preserve Dutra Farm, Neale Farm, Stearns Farm."

"I actually think that trying to preserve both tracts of land would be best. Parcels of land that are already subdivided should be (unfortunately) allowed to be developed, but large tracts of land (farms and woodlands) should be preserved."

"Was is wise to put this questionnaire out during a property re-evaluation year? People are nervous about their taxes going up anyway."

" I found it very difficult to differentiate between the three Parcel A and Parcel B scenarios- decision was mostly based on cost- so I wouldn't attach any weight to the other factors you list."

"Where are the individual lots in the Shores area included in this survey?"

"We found this survey convoluted. We would rather pay additional $200.00 annually with our taxes to buy land use (development) or outright to stop the way this island is being developed. The Shores area is really a sad case of over development."

" 1) Survey should have designated where on the island the land parcels were located.

2) No option was given for purchasing individual lots in the Shores area where there are sever problems. Maintaining the rural character of the island in the Shores area will only occur if undeveloped lots are purchased."

"I would be willing to pay more taxes to preserve all the land on the island. I choose Parcel B only because of the amount of land. I love the farms and would pay for that also. All I can say to the town council is please stop the building."

"Why is one of your board members operating a "landfill" that is encroaching on wetlands on Southwest Ave? There was a pond on that land that no longer exists! Conservation?"

" Please keep open land or land trust stuff away from the town, whenever they handle something one of their friends get something. Town is not a town I trust-town council has their hands in the town pocket."

"Develop bike/ hiking path between Mackerel Cove and Beavertail Point."

"Keep up the good work. You may have gotten more surveys returned if the postage was prepaid."

"If a tax could be added to real estate transfers we would favor that!"

"As a non-resident, non-taxpayer, perhaps I should not have received this survey, or at least should not have answered questions 4. However, I care very much about the island and would willingly support measures to preserve farmland/ open space. Thanks!"

" The CILT has done an excellent job, all things being equal."

"No New Taxes. We are overtaxed as it is- Jamestown is not Beverly Hills."

"I believe in the power of a few who can motivate. Because of 17 dedicated islanders, Jamestown did not become an oil refinery. Read "Dismissed with Prejudice." (available at Stearns Farm Realty) I lived on a beautiful island in N.J. as a child. I played on the tall dunes and rolled till I was dizzy down its dunes. Today Long Beach Island is nothing but houses. I miss seeing the fishermen pull the boats ashore and unload their catch. But I do have the memory. Children today could never envision what I saw, sad to say. I want to preserve Jamestown."

"All people to have access to open space or additional recreation area- I would be able to have opinion if I had better definition of that- snowmobiles, jet skis, ATVs, any motorized vehicles would not be an acceptable use for open space for me."

"Percentage points from sale of property as in Nantucket. Would be a start."

"Willing to pay increased taxes as indicated only if current tax rate remains reasonably stable."

"Jamestown is a great place to live. Overpopulation would make it like Newport in the summer."

"Too many wealthy people for the rest of us to even hang on to our own property but alone help others save theirs."

" Multiple people in the same family have a difference of opinions! How do you propose handling that with 1 survey?"

"Instead of worrying about open spaces we need better water and lower income housing!"

"It's very difficult to choose from the options provided because the scenarios are invented dilemmas. I'd love to know the logic behind the design of the questions."

"'Land trusts' can help in the long run, short term impacts are not as great. Jamestown is an expensive place to live and a very difficult place to start and stay (my children had to move off the island). "Additional taxes" are a bitter pill and very tough to sell. Proper public work projects must be supported and completed on time and on cost. Not PWD barn in locations that do not make sense, water treatment plant that treats water from north and south pond (last treatment plan 1989 was engineered, but not applied properly). Sewer plant that will have future (proper room to expand). Public works projects that are done once and done right. Support also of these issues will have a positive impact on the community and the tax rate."

" I believe land conservation is important on the island, but I also feel that it should be in areas where the public has reasonable access, for instance, a walking path around the perimeter of a property with a fence to protect the privacy of a farm property might work. That would allow everyone to enjoy the scenic beauty, (like the Cliff Walk in Newport). If development of the path is totally funded by Jamestowners, why not create a parking area that requires a small card-system to gain entry past a rustic, wooded, electronically-controlled, gate? This would keep the traffic on the path down to a number small enough not to disturb the landowners. People pay for access to fold or country clubs- perhaps there are enough people willing to pay for such a project in Jamestown so that all Islanders whether or not they can afford to contribute can enjoy!"

"Yes, I want to preserve both farm and woods and pay taxes."

"The only part to me that's confusing is TYPE OF PROTECTION- if the owner of a farm retains ownership what does the giving up his rights to development mean? Does this mean his rights to further develop his own land for his farming

business? Or can the town come in and say they want some of the land for their development? Which I would not approve of ."

"Yes! Once upon a time, Jamestown felt like Brigadoon- it was magical. I remember it, through I am in my 40s and it was not so long ago. Development should be stopped dead in its tracks. Little Compton does a good job with their 6 % impact tax on every real estate transaction, which goes to land conservation. Why can't we do the same? It's time to get tough, What incentives can we give to keep operational farms on the island?"

"Instead of giving so much of my tax dollars to the school dept I'd like to see some of it go to all Parcel A and Parcel B."

"I hope others chose both parcels and you keep track of those. I don't think public access should be an essential criterion, we could leave wooded areas just as wooded areas- no parking lost, hiking trails, or picnic tables."

"It was a challenge to understand."

"I think the Trust should prepare a more detailed discussion of how open space can be acquired in RI. Is there state money, bond referendum, other private sources (Champlin Foundation)? How many households? Is there no way tax revenues can be found in the existing budget? People are paying tens of thousands of dollars each for minimal public service- is there no money at all available without a surcharge?"

"I would be open to the establishment of a funded land bank based on the selling of real estate. I believe Nantucket has something like this but I'm not sure of the details."

suggested a website :www.law.pace.edu/landuse/

"A definition of "open space" should have been included. Certainly a gold course or a farm is a lot different type of open space than natural, forested areas- for many environmental reasons- open space and natural areas are not synonymous."

" Please include a question about a proposed cross-island canal that could be developed into a swanky restaurant and marina area. We could tax the heck out of it and buy up all the remaining land on the island at a premium."

"I kept passing over "farmland" choice- if you had said "we as a community could develop it (like Dr. Ceppi's land) by farming and giving food to the needy. That would have been my choice."

"Open space is also important with the building of homes on a 60 by 120 lot. When do you think this could be addressed, or better still stopped."

"Thank you for all that you do!"

"I don't like green paper."

"We love living here the way it is and would love to see any/ all open space p reserved."

"You should make a strong effort to participate in affordable housing- your effort has been to control development- which is totally unfair for young people to live or remain in Jamestown. As you can see I came to Jamestown in 1970- most of you were not here."

"Poorly written!"

" I would be willing to pay the $275 to town or land trust to preserve both parcels."

"The survey starts on a somewhat negative bent – "given all the challenges"... These should be defined- most people who live here, do so rather comfortably and with great security. Also, what exactly is "island character"? does that mean anti-development, anti-business, anti-progress?? Our taxes are already going out of control with little accountability towards spending, seems a non-profit conservancy would also have little accountability."

"Generally speaking continued grazing and/or agriculture will keep the land open (as it has been since the last ice age) and thus retain present scenic value. I support that. If the Town were to own the land, it would simply allow it to grow-up into a snarl of poison ivy, bitter sweet, multiflora rose, etc. on the grounds that this is a "natural " process (i.e. no sullied by the evil hand of man). Such a condition has never existed in the last 5,000 years on Conanicut Island. The state, e.g. Is allowing Beavertail to become over grown on environmental grounds."

"You did not offer the option of purchasing both parcels in your scenarios. I would, in all scenarios, vote to purchase and preserve the farmlands and the wooded areas. The CILT has been doing an extraordinary job in this regard."

"Jamestown has ample land set aside for parks now. Land acquisitions by the Conanicut Island Land Trust should be financed by voluntary contributions, not higher taxes. Let's keep Jamestown affordable, not let it turn into an over-cute, high tax, "NIMBY" exclusive island."

" The idea of sustaining, working farms on Jamestown appeals to us the most."

" My problem with open space in Jamestown it that 1) its not well publicized, so its only nominally public, 2) there's little parking, and 3) its costs too much! If there are 3,000 homes in Jamestown, at $35 per household that's $100,000 per year- there is no way you'd by a developable 20 acre property in Jamestown for $500,000."

"If forced to choose, I'd save the farmland, but only if zoning is not effective to prevent development. [The] survey design is difficult to understand. I don't understand the differences in your questions other than $ amount."

"The survey is leading. I have been a market researcher for 40 years. Whoever developed the flow is using a 'leading intro.' This is bias."

"Why are the choices, including surrounding use, acres, and cost to household, so very different on my blue sheets versus yellow sheets (sent to a summer resident)? The choices available had too many variables to be able to compare adequately, to make good decisions. I would like to see open space preserved for wildlife habitats, farms, nature, and to maintain water adequacy and quality."

" The reason why I said no to a lot of questions is because to do no clearing of environment land only brings extinction to sun loving plants."

"Regarding the questions about Parcel A and parcel B: I would be willing to pay additional taxes to preserve both parcels, but I checked "Parcel A" because it was described as providing unique scenic views, and the views are more important to me than hiking trails and picnic areas."

"There should have been choices for both A and B instead of A or B."

"Why are there so many different choices between this yellow form and the blue form mailed out to approximately 3,000 households? How can you get a reasonably accurate survey when using diversified questionnaires?"

"Difficult choices!"

"Not enough information is given for me to make a decision. For example: In scenario 1, if the farmer gives up the right to develop the land, will that mean the town would be able to develop it?"

"Regarding the donation to the not-for-profit agency: Is the $75 fee to the non-profit organization one time only? What is their goal? Not enough information given to us."

"The task questions are not clear and tend to have a vague intent. What is the relevance of questions #6-12 when it comes to land conservation? Question 5 depends on who and what the agency is."

"Hiking trails may have limited benefits due to extended tick seasons and also mosquito populations, so I opt for keeping farmland."

"Anyone who owns land should be able to do as he or she wishes with the land. Whether it be sell, develop, or preserve. It is the landowner's right to make the decision, not some conservation group!"

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"I know I sound like a tight old miser, but I believe that all this 'good' should be done through volunteer efforts- not through taxes. Look at the 'mess' in our state and national capitals caused by 'doing good.'"

"I think you are doing the best you can. Good luck to you."

"This is an important issue for this island and should not be resolved by dollars and cents issues. It is a quality of life issue for us and for those to come. Also the water issue here should be number 1 for everyone on well or town water!"

"Should establish a conservation assessment for real estate transfers on the island of parcels."

" Would like to see farming expand on the island and some of the open space used for farming."

"We think the idea of a flat fee that goes towards preserving open space would be great! Even as an optional tax payment to the Town (the way political money can be given on a federal tax bill). well at all. Too hard to decide; why not answer 'both.' Sounds rigged, or slanted in some cryptic way as to conceal its true purpose."

"Interesting survey Abigail, made me realize that I care about raw acreage left open more than use for parks or recreation. Thus we should buy development rights to get lowest $/acre open where possible."

"A little hard to distinguish the difference between the two "pay more taxes" boxes to check- easier to say Yes preserve as much as possible and of course it will be more taxes to do so- I appreciate that you are working on this issue to keep our island healthy."

"Hope Jamestown benefits from this survey! Thanks!"

"Might have included a parcel where all access was restricted, thereby reserved not for humans' recreation, but for wildlife and the maintenance of natural ecosystems. I opted to pay additional taxes for Parcel B in Scenario #3- this based on the hope that the 120 acres including hiking trails, parking, and picnic areas will be will maintained and governed by a knowledgeable steward."

"Good luck to Abigail! I did a similar study through Boston College for an Urban Development class."

"The town won't give us town water and we only get 4 gallons per minute."

"I didn't see the point in the Parcel A/Parcel B questions. The point is, I would pay extra taxes for land conservation. I would not support any special interest."

"We have tried for over 57 years to preserve the rural character of the Island. When the refinery was anticipated, our taxes increased dramatically due to the rezoning of the area, and we were forced to sell a large portion of our farm. Now, with assessments climbing again, we will have to rethink our options. If we sell our property, up to three more homes could be added to the Island landscape. So much for zoning to reflect adherence to the Comprehensive Plan for Jamestown."

"No hunting allowed! No new taxes! Thank you for all your work and time!"

"It would have been helpful if some of the terms used were defined, like 'island character' and 'open space.'

"Protection of farmland and open space is a foremost necessity. Too much public use for recreation may be detrimental to that property. Primary focus should be center area of island and contiguous farmland. Unprotected and unpreserved farmland could become subject to large scale development having negative effects on resources, services, not to mention scenic vistas that all enjoy."

"I love the island- it certainly is the gem of Narragansett Bay. Lets keep it that way."

"Survey parcel questions a little confusing. At the present time I feel that outrageous assessment and taxes are an attempt at eliminating part time residents from Jamestown. Therefore I cannot honestly fill out his questionnaire."

"Preserve as much open land as possible. Keep Jamestown from becoming the next Newport/ Middletown/ Portsmouth- it is heading this way, and it must be stopped. Thanks for all you do."

"All federal incentives should be pursued before any type of local assessment."

"Survey too difficult to understand- keep it simple."

"The survey is somewhat confusing, especially question #5. We have not been told what the conservation plans to do with funds collected."

"I cannot respond to the sequence regarding choice contained therein. It makes no sense to me whatsoever. I cannot conceive of how response to such a sequence of choices could be helpful to CILT or any other interested body. Sorry you have wasted time and money on it."

"I received the survey recently sent out by the land trust which I will fill out and return. A couple of comments follow:

1. I would be against spending any town money to acquire additional land until the town water system is improved to the point where there are no restrictions on the use of water except during periods of extreme drought. It pains me to see my lawn deteriorate over the years for lack of water.

2. We don't need additional wildlife habitat. We have more than enough wildlife. In fact it is increasing difficult, if not impossible, to have a decent garden in Jamestown with all the deer and rabbits. Also, its dangerous driving around at night on Beavertail Road. There should be a controlled deer kill in Jamestown before we even think about additional wildlife habitat."

"Preserve the farms first, we might need them someday."

"It is important to stop the building on the island. Especially along the coast and to maintain access for residents to water- we all pay taxes."

"I'm glad someone is asking each landowner."

"The town should stay out of the real estate business! Every time another parcel of land is sold to the town, that parcel becomes tax-free forever, thereby putting the added burden on every other Jamestown. Your children will not be able to afford to live in Jamestown."

"Yes- It was very confusing. It felt like trick questions on an SAT. I would gladly pay extra taxes to preserve the most land possible. I think it is very important for wildlife habitat as well as quality of life in Jamestown. Why don't you tell us exactly which parcels you are talking about? I would support preservation of almost any land in Jamestown"

"Land conservation is important but it is only one of many aspects of improving "island character." Here are some other aspects germane to the issue:

1. Levy a development impact fee on all new housing.

2. Improve island roads.

3. Better enforcement of zoning laws (get rid of excess unregistered vehicles, stop non-conforming property use, etc.)

4. Raise taxes to accomplish steps 2 and 3 and to provide funds for government to undertake the myriad tasks essential to the objective.

Even though it is carefully developed, it is still confusing as to choices and benefits- alternatives."

"I would like to see the purchase of small lots in the Jamestown Shores area to prevent further building and the effect this has on the environment."

"It is very important to us to preserve the "island character" of Jamestown. By opening areas to the general public we create areas of litter, congestion, and encourage undesirable elements to congregate thereby creating more stress on our emergency services."

"I am strongly in favor of 'zero' further development in Jamestown. Restoration yes- new homes 'zero.'"

"I think it is extremely important to preserve open spaces and limit development- don't feel we need more parks/ picnic areas as we have plenty or pre-existing great spots (Ft. Getty, Watermill, Beavertail, etc.) Preserved spaces for natural preservation."

"Choice B's would be acceptable in some cases to limit development. They do not always need to be accessible to the public. It would depend on the property."

"Keep the town out of the land business. The land trust should continue as they have- the old fashioned way- its working. We don't need more town employees or departments managing land!!"

"I believe that Jamestown must be preserved at any costs. Having hiking trails, picnic areas, etc. brings more people and their noise and trash. It also adds pollution to the air. Wild animals and birds are disturbed and upset. We must preserve the island in its present state before its too late."

"Undeveloped open space is one of the most important features of life in Jamestown to me. However, the addition of more recreational facilities is not that important. 2 playgrounds, several state parks, picnic areas, golf course, 2 launching ramps, etc. are enough for a town of our size."

"I cannot afford any more taxes but I definitely want to preserve every acre we, the town, can possibly do."

"Was that a typo- going from 120 to 20 acres? That was the deciding factor in my response."

"This survey was sent to our home and we- two of us completed the survey and each agree in all cases and would have liked to have the survey count towards 2 votes in all cases , not just one. We want to see less construction and growth and protection of both farm and wooded lands."

"Most of Jamestown , not too long ago, was primarily sheep pastures- the wooded areas Jamestown now owns are not maintained (i.e. around Reservoir Circle to the reservoir- the vines have taken over and are killing the trees and the land beneath is dank and dead (nothing grows)."

"The "thinking" or "models" are very confusing... uncertainty about A vs. B sizes? I support both types of ownership but am concerned that "scenic" receive some priority."

Appendix N

Additional Respondent Information

The table below shows the characteristics of the individuals who answered yes
and no at each bid level for either Parcel A or Parcel B.

Characteristics of those responding "yes" and "no" at each bid level

Parcel A: $5

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	0	0	5	5.0
40-49	14	6.2	14	14.1
50-59	50	22.2	40	40.4
60-69	77	34.2	23	23.2
70+	42	18.6	17	17.1
Gender				
Male	111	49.3	56	56.5
Female	114	50.6	43	43.4
Educational Attainment				
Grade school or some high school	1	0.4	4	4.0
High school or GED	10	4.4	4	4.0
Some college/Vocational school	28	12.4	13	13.1
College grad or Graduate School	184	81.7	77	77.7
Income				
0-$19,999	3	1.3	4	4.0
$20,000-$39,999	16	7.1	4	4.0
$40,000-$59,999	31	13.7	6	6.0
$60,000-$79,999	35	15.5	12	12.1
$80,000-$99,999	25	11.1	15	15.1
$100,000+	94	41.7	45	45.4

Parcel B: $5

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	5	4.7	12	6.0
40-49	14	13.3	51	25.6
50-59	41	39.0	67	33.6
60-69	30	28.5	36	18.0
70+	17	16.1	33	16.5
Gender				
Male	59	56.1	96	48.2
Female	46	43.8	103	51.7
Educational Attainment				
Grade school or some high school	3	2.8	6	3.0
High school or GED	2	1.9	11	5.5
Some college/Vocational school	9	8.5	24	12.0
College grad or Graduate School	91	86.6	157	78.8
Income				
0-$19,999	3	2.8	4	2.0
$20,000-$39,999	8	7.6	15	7.5
$40,000-$59,999	9	8.5	29	14.5
$60,000-$79,999	15	14.2	16	8.0
$80,000-$99,999	17	16.1	28	14.0
$100,000+	54	51.4	89	44.7

Parcel A: $10

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	14	7.5	7	6.5
40-49	56	30.1	19	17.7
50-59	59	31.7	38	35.5
60-69	35	18.8	29	27.1
70+	25	13.4	13	12.5
Gender				
Male	87	46.7	52	48.5
Female	99	53.2	55	51.4
Educational Attainment				
Grade school or some high school	1	0.5	4	3.7
High school or GED	4	2.1	6	5.6
Some college/Vocational school	30	16.1	13	12.1
College grad or Graduate School	151	81.1	83	77.5
Income				
0-$19,999	3	1.6	3	2.8
$20,000-$39,999	15	8.0	4	3.7
$40,000-$59,999	20	10.7	13	12.1
$60,000-$79,999	28	15.0	16	14.9
$80,000-$99,999	24	12.9	14	13.0
$100,000+	86	46.2	43	40.1

Parcel B: $10

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	9	7.9	9	4.5
40-49	25	22.1	35	17.6
50-59	41	36.2	76	38.3
60-69	23	20.3	41	20.7
70+	16	14.1	38	19.1
Gender				
Male	68	60.1	99	50.0
Female	45	39.8	99	50.0
Educational Attainment				
Grade school or some high school	1	0.8	2	1.0
High school or GED	3	2.6	13	6.5
Some college/Vocational school	14	12.3	33	16.6
College grad or Graduate School	95	84.0	152	76.7
Income				
0-$19,999	2	1.7	4	2.0
$20,000-$39,999	6	5.3	19	9.5
$40,000-$59,999	15	13.2	24	12.1
$60,000-$79,999	15	13.2	36	18.1
$80,000-$99,999	19	16.8	13	6.5
$100,000+	45	39.8	88	44.4

Parcel A: $35

| | "Yes" Respondents | | "No" Respondents | |
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	11	4.9	6	5.7
40-49	50	22.6	15	14.4
50-59	81	36.6	38	36.5
60-69	46	20.8	25	24.0
70+	34	15.3	21	20.1
Gender				
Male	101	45.7	54	51.9
Female	120	54.2	50	48.0
Educational Attainment				
Grade school or some high school	1	0.4	3	2.8
High school or GED	5.4	7	6.7	
Some college/Vocational school	27	12.2	8	7.6
College grad or Graduate School	181	81.9	87	83.6
Income				
0-$19,999	2	0.9	2	1.9
$20,000-$39,999	18	8.1	8	7.6
$40,000-$59,999	30	13.5	12	11.5
$60,000-$79,999	26	11.7	15	14.4
$80,000-$99,999	45	20.3	11	10.5
$100,000+	84	38.0	46	44.2

Parcel B: $35

| | "Yes" Respondents | | "No" Respondents | |
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	7	6.5	12	5.6
40-49	23	21.4	43	20.3
50-59	42	39.2	72	34.1
60-69	14	13.0	47	22.2
70+	21	19.6	39	18.4
Gender				
Male	49	45.7	110	52.1
Female	58	54.2	101	47.8
Educational Attainment				
Grade school or some high school	1	0.9	1	0.4
High school or GED	5	4.6	12	5.6
Some college/Vocational school	13	12.1	29	13.7
College grad or Graduate School	88	82.2	171	81.0
Income				
0-$19,999	2	1.8	3	1.4
$20,000-$39,999	5	4.6	11	5.2
$40,000-$59,999	13	12.1	38	18.0
$60,000-$79,999	13	12.1	20	9.4
$80,000-$99,999	18	16.8	38	18.0
$100,000+	44	41.1	86	40.7

Parcel A: $50

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	10	5.4	13	10.5
40-49	47	25.8	21	17.0
50-59	63	34.6	41	33.3
60-69	39	21.4	25	20.3
70+	23	12.6	23	18.6
Gender				
Male	80	43.9	69	56.0
Female	102	56.0	54	43.9
Educational Attainment				
Grade school or some high school	0	0	0	0
High school or GED	12	6.5	7	5.6
Some college/Vocational school	20	10.9	21	17.0
College grad or Graduate School	151	82.9	95	77.2
Income				
0-$19,999	1	0.5	2	1.6
$20,000-$39,999	13	7.1	10	8.1
$40,000-$59,999	32	17.5	20	16.2
$60,000-$79,999	24	13.1	14	11.3
$80,000-$99,999	17	9.3	20	16.2
$100,000+	79	43.4	45	36.5

Parcel B: $50

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	6	6.0	14	7.0
40-49	27	27.0	47	23.7
50-59	36	36.0	63	31.8
60-69	20	20.0	40	20.2
70+	11	11.0	35	17.6
Gender				
Male	55	55.0	96	48.4
Female	45	45.0	102	51.5
Educational Attainment				
Grade school or some high school	0	0	1	0.5
High school or GED	3	3.0	8	4.0
Some college/Vocational school	13	13.0	24	12.1
College grad or Graduate School	83	83.0	166	83.8
Income				
0-$19,999	1	1.0	3	1.5
$20,000-$39,999	5	5.0	19	9.5
$40,000-$59,999	11	11.0	26	13.1
$60,000-$79,999	19	19.0	29	14.6
$80,000-$99,999	17	17.0	21	10.6
$100,000+	39	39.0	87	43.9

Parcel A: $75

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	11	6.3	7	5.3
40-49	40	23.2	27	20.6
50-59	53	30.8	47	35.8
60-69	38	22.0	21	16.0
70+	32	18.6	28	21.3
Gender				
Male	81	47.0	69	52.6
Female	1	52.9	62	47.3
Educational Attainment				
Grade school or some high school	0	0	3	2.2
High school or GED	13	7.5	3	2.2
Some college/Vocational school	19	11.0	20	15.2
College grad or Graduate School	41	81.9	105	80.1
Income				
0-$19,999	2	1.1	2	1.5
$20,000-$39,999	21	12.2	13	9.9
$40,000-$59,999	21	12.2	17	12.9
$60,000-$79,999	22	12.7	16	12.2
$80,000-$99,999	18	10.4	23	17.5
$100,000+	78	45.3	49	37.4

Parcel B: $75

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	7	6.9	11	4.7
40-49	22	21.7	47	20.3
50-59	36	35.6	84	36.3
60-69	18	17.8	50	21.6
70+	16	15.8	37	16.0
Gender				
Male	54	53.4	106	45.8
Female	47	46.5	125	54.1
Educational Attainment				
Grade school or some high school	0	0	2	0.8
High school or GED	4	3.9	9	3.8
Some college/Vocational school	10	9.9	24	10.3
College grad or Graduate School	86	85.1	194	83.9
Income				
0-$19,999	1	0.9	5	2.1
$20,000-$39,999	5	4.9	13	5.6
$40,000-$59,999	9	8.9	28	12.1
$60,000-$79,999	9	8.9	28	12.1
$80,000-$99,999	16	15.8	38	16.4
$100,000+	49	48.5	97	41.9

Parcel A: $100

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	12	6.7	9	6.0
40-49	42	23.5	38	25.5
50-59	50	28.0	48	32.2
60-69	39	21.9	28	18.7
70+	35	19.6	23	15.4
Gender				
Male	76	42.6	85	57.7
Female	102	57.3	64	42.9
Educational Attainment				
Grade school or some high school	0	0	1	0.6
High school or GED	10	5.6	8	5.3
Some college/Vocational school	12	6.7	17	11.4
College grad or Graduate School	155	87.0	123	82.5
Income				
0-$19,999	3	1.6	4	2.6
$20,000-$39,999	18	10.1	6	4.0
$40,000-$59,999	26	14.6	14	9.3
$60,000-$79,999	29	16.2	13	8.7
$80,000-$99,999	18	10.1	28	18.7
$100,000+	71	39.8	66	44.2

Parcel B: $100

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	7	11.4	15	6.2
40-49	17	27.8	51	21.1
50-59	19	31.1	78	32.3
60-69	10	16.3	50	20.7
70+	7	11.4	48	19.9
Gender				
Male	34	55.7	109	45.2
Female	27	44.2	132	54.7
Educational Attainment				
Grade school or some high school	0	0	1	0.4
High school or GED	0	0	16	6.6
Some college/Vocational school	7	11.4	30	12.4
College grad or Graduate School	54	88.5	192	79.6
Income				
0-$19,999	0	0	3	1.2
$20,000-$39,999	6	9.8	28	11.6
$40,000-$59,999	4	6.5	28	11.6
$60,000-$79,999	8	13.1	33	13.6
$80,000-$99,999	11	18.0	33	13.6
$100,000+	27	44.2	96	39.8

Parcel A: $200

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	7	4.6	11	6.2
40-49	29	19.4	34	19.3
50-59	54	36.2	71	40.3
60-69	28	18.7	31	17.6
70+	31	20.8	30	17.0
Gender				
Male	73	48.9	98	55.6
Female	76	51.0	78	44.3
Educational Attainment				
Grade school or some high school	0	0	3	1.7
High school or GED	3	2.0	12	6.8
Some college/Vocational school	20	13.4	17	9.6
College grad or Graduate School	127	85.2	142	80.6
Income				
0-$19,999	1	0.6	4	2.2
$20,000-$39,999	9	6.0	15	8.5
$40,000-$59,999	12	8.0	22	12.5
$60,000-$79,999	21	14.0	22	12.5
$80,000-$99,999	23	15.4	26	14.7
$100,000+	74	49.6	69	39.2

Parcel B: $200

	"Yes" Respondents		"No" Respondents	
	Number of Respondents	%	Number of Respondents	%
Age				
30-39	4	6.5	19	6.8
40-49	14	22.9	63	22.6
50-59	21	34.4	86	30.9
60-69	12	19.6	60	21.5
70+	10	16.3	50	17.9
Gender				
Male	33	54.0	128	46.0
Female	28	45.9	150	53.9
Educational Attainment				
Grade school or some high school	1	1.6	2	0.7
High school or GED	2	3.2	23	8.2
Some college/Vocational school	0	0	34	12.2
College grad or Graduate School	58	95.0	218	78.4
Income				
0-$19,999	0	0	5	1.7
$20,000-$39,999	4	6.5	27	9.7
$40,000-$59,999	7	11.4	35	12.5
$60,000-$79,999	7	11.4	45	16.1
$80,000-$99,999	6	9.8	32	11.5
$100,000+	27	44.2	109	39.2

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