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THE ECONOMICS OF LAND CONSERVATION: A CASE STUDY OF BLOCK ISLAND, RHODE ISLAND

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THE ECONOMICS OF LAND CONSERVATION:
A CASE STUDY
OF
BLOCK ISLAND, RHODE ISLAND

BY
AMY H. BELL

A RESEARCH PROJECT SUBMITTED IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF
COMMUNITY PLANNING

UNIVERSITY OF RHODE ISLAND

1991

MASTER OF COMMUNITY PLANNING
RESEARCH PROJECT

OF

AMY H. BELL

Approved by:
Major Professor



Farhad Atash

Acknowledged by:
Director



Howard H. Foster, Jr.

A C K N O W L E D G E M E N T S

I would like to extend my sincerest appreciation and gratitude to the many people who have contributed to the conduct of this research.

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CHAPTER ONE Introduction

Research Issue

In the 1980's, coastal communities in the northeast were subject to heightened demand for residential and commercial land uses. This increased demand combined with the reality of a fixed resource has resulted in growing conflict between the preservation of open space and development. As municipal leaders attempt to balance expenditures with revenues, they often question if it is fiscally and economically prudent to invest in the protection of open space. Yet, environmental quality, attained in part by the conservation of open space, is often the basis for sustaining the quality of life and the economic vitality of coastal communities.

The values associated with open space include scenic vistas as well as other aesthetic, social, recreational, tourist, and environmental qualities which increase adjacent property values while protecting essential natural resources. This increase in property values benefits a community's fiscal and economic stability.

A quantitative measurement of the impacts of land conservation strategies on a rural community's economy and tax base is needed to justify municipal expenditures and management strategies for preserving open space. Under the constraints of dwindling budgets and increasing local opposition a fiscal impact analysis methodology applicable

to rural communities is needed to weigh the costs of development versus the benefits gained by preservation.

Research Objective

The primary objective of this research is to estimate the economic and fiscal impacts of open space conservation on a coastal community in New England. This will be accomplished through the application of quantitative methods which assess the importance of open space conservation to the study area of the Town of New Shoreham (Block Island), Rhode Island.

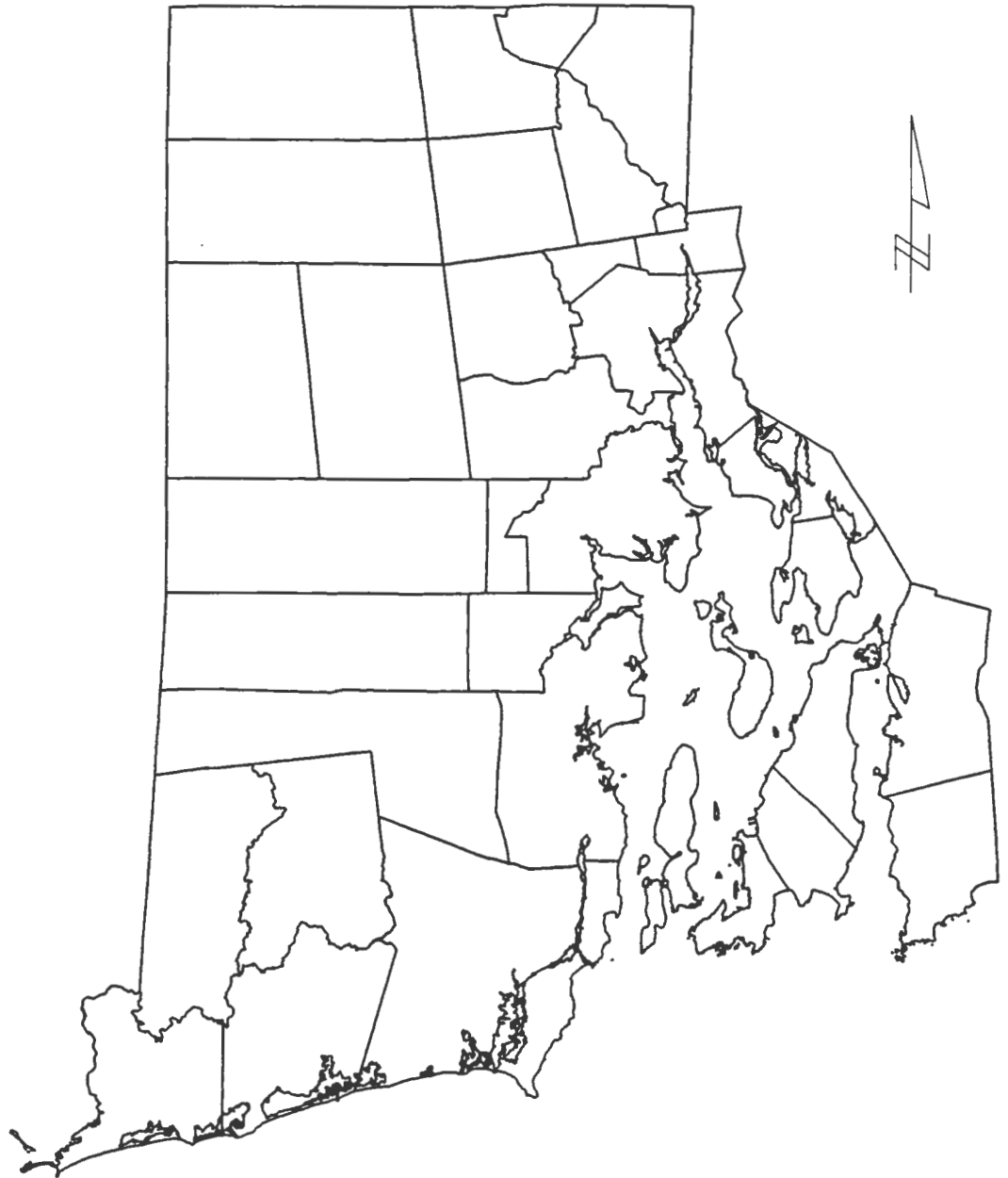
This project will address two fundamental issues. First, the study examines the fiscal impact of land conservation on a community's tax base. A fiscal impact analysis methodology, adapted from past research on the economic impacts of land conservation, will be utilized to estimate tax revenues generated by residential development; the costs associated with providing essential services to residential development; and a comparison of the cost of residential development with the expenses incurred for acquisition and maintenance of open space (if any). Second, the study examines whether the conservation of open space enhances adjacent property values and therefore offsets the monetary cost of preservation. As previously stated, the research design is a case study analysis using the community of New Shoreham (Block Island), Rhode Island.

As more land has been developed, people have begun to realize that the open space that was once so plentiful is now becoming a scarce and increasingly expensive commodity. Currently, only limited fiscal and economic analysis relating to land conservation has been undertaken in New England. Local leaders have expressed a need for new methods which evaluate the fiscal impacts of policy decisions. A method for justification of open space conservation is also needed to provide insight into land use and planning policy issues and to assure continued protection of important environmental resources. Therefore, this study will provide decision-makers and planners with the knowledge necessary to address policy questions regarding the protection of open space and the justification of public expenditures.

Background of Study Area

Block Island often referred to as the "Bermuda of the North", lies twelve miles off the southern coast of Rhode Island (refer to Figure 1). Much smaller than its well known island neighbors, Martha's Vineyard, Nantucket, and Long Island, Block Island is roughly 11 square miles in size with a year round population of 832 in 1990. During the peak summer months of July and August an estimated 12,000 to 15,000 people visit the Island per day (Everett, 1986:5).

RHODE ISLAND



Block Island



Figure 1 LOCUS MAP

Tourist expenditures on Block Island in 1990 generated 31.5 million dollars in revenue (Tyrrell, 1991:2).

Those who visit the Island are attracted by its beautiful scenery, spectacular high coastal bluffs, miles of pristine sandy beaches, its comfortable landscape of fields, stone walls and cottages, and its abundant opportunities for swimming, bicycling, hiking, bird-watching, fishing and boating. As is true for many other coastal communities in New England, the success of Block Island as a seasonal tourist destination have brought about great changes. These changes threaten the very amenities that attract visitors and support the Island's economy.

The increase in seasonal use of the Island has grown tremendously in the past thirty year. The number of year-round residents grew from 485 in 1960 to 832 in 1990; an increase of 71%. Over the same period however, the number of homes increased 176% from 438 to 1,210 (Thompson, 1989:3; URI, 1991:16) This rapid rate of growth has brought about concern over issues such as protection of rare and endangered animal species, maintaining public access to the coastline, surface and ground water quality, affordable housing for year round residents, provision of adequate municipal services, economic stability and preservation of the Island's rural character. Community leaders, concerned visitors and preservation groups have collectively set out to preserve the resources of the Island.

The land conservation movement on Block Island had its beginnings in the early 1940's. However, the late 1970's marked the beginning of cooperative efforts to preserve open space through the actions of both public and private organizations. Groups such as the State of Rhode Island's, Department of Environmental Management, the Nature Conservancy, the Block Island Conservancy established in 1972, the Block Island Land Trust established in 1986 and the Conservation Foundation have pooled their financial resources and to date have set aside 18% of the Island as open space (refer to Figure 2).

The Island has gained further distinction and technical planning assistance by being selected by the Conservation Foundation as one of only six communities nationwide to participate in the Successful Communities Program. In recognition of Block Island's unique natural qualities and ecological importance, and the strong track record of partnerships established on the Island to achieve conservation goals, The Nature Conservancy has chosen Block Island as one of its national bio-reserves. This designation acknowledges the importance of preservation and management of the Island's unique natural diversity through acquisition, land management and educational programs.

BLOCK ISLAND PROTECTED OPEN SPACE

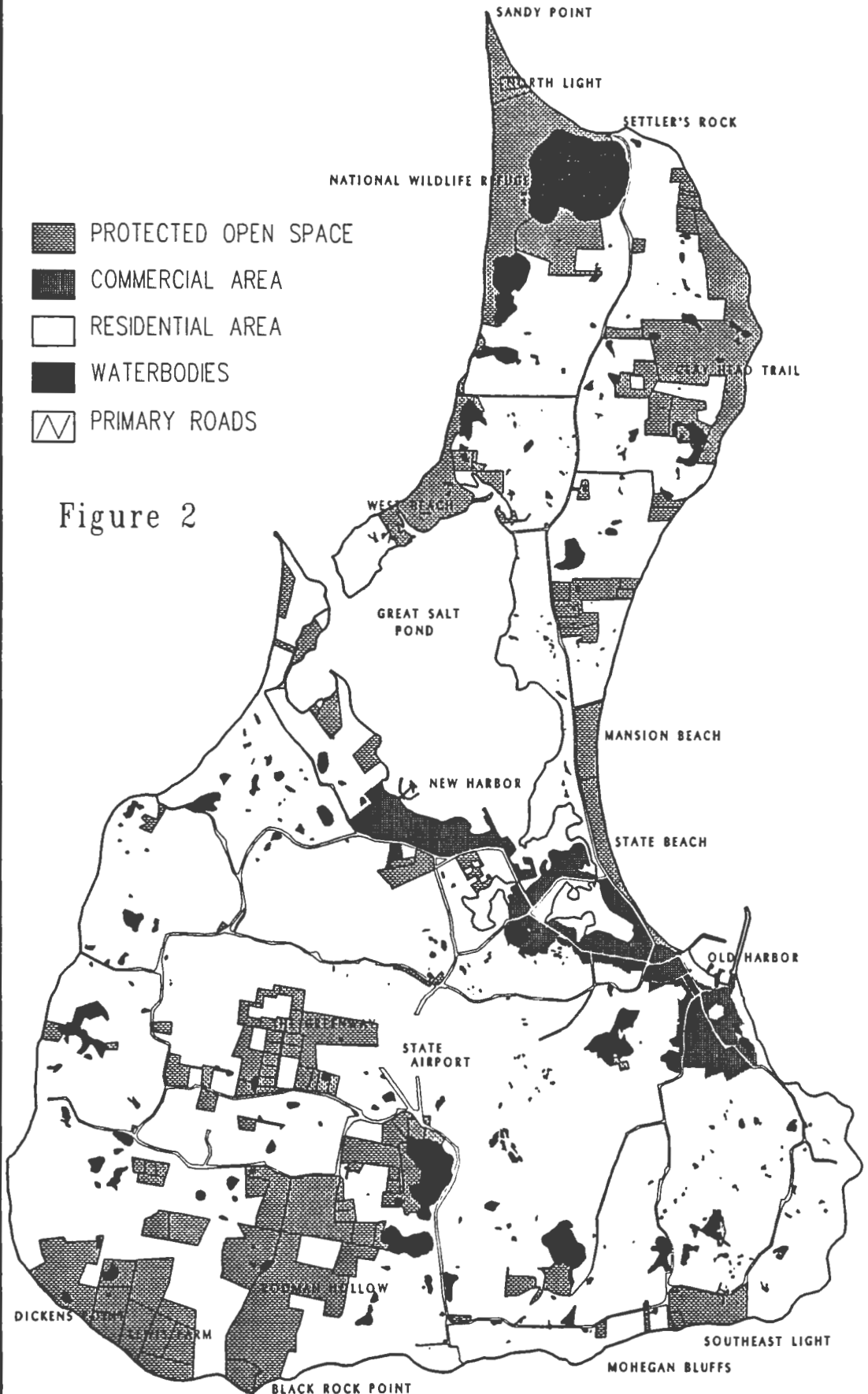


Figure 2

Significance of Research

Currently, Block Island faces issues of growth management and the desire to preserve its rural character, quality of life, and its most important resource, the natural environment, without jeopardizing the fiscal and economic well being of the community. The results of this study will provide data to decision-makers for use in evaluating land conservation strategies on Block Island.

Ideally, the findings of this study will reveal that open space conservation may be a fiscally less expensive alternative to development; that open space conservation enhances the tax base by increasing the market value of adjacent properties; and that the preservation of open space plays an integral role in Block Island's economy. In addition, it will justify the need for conservation of open space and support land conservation as a viable use of public funds and land use controls.

For this research, protected open space will be defined as either vacant land, or property which is restricted from further development due to restrictive covenants, ownership by the Town, State, Federal Government, the Block Island Land Trust, the Nature Conservancy, the Block Island Conservancy, the Audubon Society of Rhode Island, or other preservation organizations.

For the purposes of this research the terms preservation and conservation will be used interchangeably.

The author acknowledges that the definition of these two terms implies significantly different objectives when discussing the protection of land and natural resources. Notably, efforts for both species and habitat preservation and conservation of open space have occurred on Block Island.

Organization of the Study

This study is organized into five chapters. Following the introduction is chapter two which contains a review of selected relevant literature. Chapter three commences the analysis portion of the study through the application of a fiscal impact analysis technique. Chapter four utilizes econometric modeling methodology to investigate the net increase in property values that can be attributed to proximity to open space. The last chapter summarizes the findings of the research and offers policy recommendations which are drawn from the analyses in the previous chapters.

C H A P T E R T W O

Literature Review

The purpose of this chapter is to review past literature on the economics of land conservation. Previous literature can be categorized into three groups. The first of which concerns urban parks and the relationship between open space, property values and proximity to neighborhood parks. The second group examines the fiscal impacts of land conservation versus the costs associated with developing alternative land uses. And the third group concerns the financial yields associated with open space and its relationship to tourism. Each group of literature covers several areas of research, and offers major theoretical and empirical findings which provide the basis for this study.

Open Space and Property Values

In a 1967 study, Kitchen and Hendon examined the "secondary benefits" associated with owning property adjacent to urban neighborhood parks in Lubbock, Texas. They found that a market relationship existed between property values and proximity to the park, the further the distance from the park, the lower the land values. Hammer, Coughlin, and Horn (1974) built upon Kitchens research by statistically examining the potential relationship between land value and proximity to open space for Pennypack Park in Philadelphia. They also found that property values

decreased with distance from the park. They further outlined methods for comparing and controlling for variables which could affect the value of real estate, to provide conclusive evidence that the park land was the stimulus for increased property values.

The Pennypack Park study showed, however, that owners whose property abutted the park had somewhat depressed property values, because of the loss of privacy and possible nuisance associated with park activities. This suggests that the relationship between park land and property values is more complicated than a simple decline in value. But may result from the amenities provided at the park. This finding was confirmed by Weicker and Zerbst (1973) in their study of five parks in Columbus, Ohio. They found that, compared to identical properties one block away, properties facing passive recreation parks sold for \$1,130 more while those abutting active recreation facilities sold for about \$1,150 less (Weicker and Zerbst, 1973:101).

More, Stevens and Allen (1982) further investigated the degree to which park amenities differentially affect the value of surrounding properties. They utilized a benefit-cost analysis for properties surrounding four parks in Worcester, Massachusetts. Their study indicated that parks affected the value of surrounding property; on average a house located 20 feet from a park sold for \$2,675 more than a similar house located 2,000 feet away (More, Stevens and

Allen, 1982:32). In a similar study by Peter Adelson (1979), values attributed to environmental amenities and physical features of a home and lot were analyzed for two suburban communities of Sydney, Australia. The study revealed that the major determinants of house price were house quality and size, land size and inflation. Environmental and neighborhood factors explained a smaller but yet important proportion of housing price differences (Adelson, 1979:183).

In a case study of Du Page County, Illinois, a suburb of Chicago, Schroeder (1982), examined the relationship between the level of local public parks and recreation services to residential property values in a random sample of the county. The results of this study provided no support for the theory that good public parks and recreational amenities improve property values. Schroeder attributes these results to two factors: the higher proportion of privately owned open space in comparison to public parks; and the availability of substitute facilities in jurisdictions surrounding Du Page County (Schroeder, 1982:233).

In a case study of Boulder, Colorado, Correll, Lillydahl and Singell (1978) utilized multiple regression analysis to study property values in the vicinity of greenbelts. They noted that housing prices declined an average of \$4.20 for each foot from the greenbelt up to

3,200 feet. The same study determined that, other variables being constant, the average value of property adjacent to the greenbelt could be 32% higher than those 3,200 feet away (Correll, Lillydahl and Singell, 1978:211).

Land owner perceptions of the values associated with proximity to open space were examined by Mazour (1988) in suburban Rochester, Minnesota. His results indicated that 87% of owners believed the dedication of trails contributed to increased property values while only 11% felt the trails decreased their property values (Mazour, 1988:90). In a similar study, of the Burke-Gilman Trail in Seattle, Washington, two-thirds of the residents surveyed felt the existence of the trail increased their quality of life. In the same study, according to real estate agents property adjacent to the trail sold an average of 6% higher, as a result of proximity to the trail (Fox, 1990:22).

Fiscal Impacts of Alternative Land Uses

The American Farmland Trust and the Nature Conservancy have spear headed fiscal impact studies which have proven that residential development uses more dollars in services than it generates in tax revenues. For example in Northeast, New York, for every residential tax dollar received, \$1.36 was required in services. In contrast, for every agricultural tax dollar collected the town spent only \$.21, and \$.29 went to the commercial/industrial sector. In

a similar study, in Hebron, Connecticut the residential sector required \$1.06 in services for every dollar of revenue generated and \$.42 and \$.36 in services respectively for commercial/industrial and agricultural/forest land uses.

The Nature Conservancy's report entitled "The Hidden Costs of Development" identified the following as public costs associated with development: educating children; constructing and maintaining public facilities (ie. sewer, water, roads and solid waste facilities); providing public services, police, fire and rescue services; and administering local government. The Nature Conservancy argues that residential development does not pay its own way, and that property revenues do not cover the cost of providing essential services.

The New Jersey Conservation Foundation, the Association for the Preservation of Cape Cod and the University of Southern Maine's Allagash Environmental Institute have expanded the use of fiscal impact analysis techniques in open space conservation by establishing methodologies for comparing the fiscal consequences of land acquisition with the costs of residential development. All three organizations have developed manuals which provide detailed methodologies for assessing the impacts of certain land use decisions. The manuals are designed to provide simple methods and work-sheets which inform local government decision-makers of the tax implication of housing and open

space alternatives. One of these methods will be adapted for use in this study.

Tourism and Open Space

The third group of literature deals with the "secondary" economic benefits associated with open space. Outdoor recreation, natural, historical and cultural resources are becoming increasingly important attractions for travellers. A poll conducted in 1987 by the President's Commission on Americans Outdoors found that natural beauty was the single most important criterion for tourist in selecting a site for outdoor recreation (National Park Service, 1987).

For example in 1988, users of the Elroy-Aparta Trail in Wisconsin averaged expenditures of \$25.14 per day for trip related expenses. And at Lowell, Massachusetts National Historic Site for every \$1 of public investment in 1989, there has been a total private investment/return of \$7 (National Park Service, 1990:5-5). These examples clearly demonstrate that parks and trails are viable travel destinations in themselves, which when combined with other amenities can provide a complete vacation destination and provide an essential source of revenues, jobs and wages for businesses and the community.

In a 1978 study, Steven Spickard examined the economic benefits generated by the East Bay Regional Park System in

San Francisco. The most significant conclusion reached in this study is a conservative estimate of \$38.6 million in secondary benefits generated from an initial public investment of \$16.3 million. Every dollar spent on salaries, services and supplies induces \$2 of economic growth.

Spickard concluded that while research is needed "attesting to the economic benefits of parks and recreational facilities, it must not be forgotten that the benefits of parks are not only economic but the less tangible benefits such as increased quality of life, the spiritual value of easy access to natural environments, and open uncrowded spaces", which cannot be assimilated into an economic framework (Trudeau, 1978:55).

The major conclusion that can be drawn for the previous literature is that open space is an important element in community development for a number of reasons. First, it provides significant fiscal benefits. Second, it provides recreational amenities, improves community image and promotes public health. And lastly, it permits density control and shapes the development of the built environment.

Future Research

A selected review of past literature demonstrates that research on the economics of land conservation has been limited primarily to applications in urban and suburban

settings. Thus, as rural communities in New England attempt to assess the economics of land conservation additional research is necessary to establish a model that is sensitive to the unique needs of rural communities.

Past research has concentrated primarily on the relationship between park amenities and property values. The limited focus of these studies suggests the need to expand the sphere of research to include open space with few if any recreational amenities such as woodland, greenways, pasture, wetlands and scenic vistas. This study attempts to accomplish this task by adapting applicable methods from past research and applying them in a rural island community.

In addition, a selected review of literature reveals that past empirical studies examine the issue narrowly. Few, if any, take a comprehensive approach by bringing together several methodologies in a single study to assess both the primary and secondary economic impacts of land conservation. From the economists' perspective, this weaknesses can be attributed to the difficulty in applying an economic framework to a heterogenous product, environmental amenities. In such a framework consumers make decisions based on the entire package rather than on each individual element that comprises the package.

This study attempts to expand upon past research by extending the application of several empirical methodologies to the unique situation of the island community of Block

Island. The self-contained nature of this community and strong concern for preserving the Island's most essential resource, the natural environment, provides a rare opportunity to augment the findings of past research.

C H A P T E R T H R E E
Fiscal Impacts of Residential Development
vs. Open Space Conservation

The primary objective of this chapter is to acquaint the reader with a basic understanding of fiscal impact analysis. Specifically, the chapter demonstrates its applicability for estimating and comparing the fiscal impacts associated with residential development and open space conservation. The chapter will also discuss the methodology used in the study, the data requirements and the assumptions associated with the data and conclude with a discussion of the findings.

Methodology

Fiscal impact analysis (FIA) is a technique used to determine the impact of a proposed development on a local government's financial position: revenues and expenditures. The impact on revenues is determined by measuring the change in assessed land values and then the change in property tax revenue which results from a proposed development. The results indicate potential changes in land value that may alter property tax revenue receipts and therefore the fiscal flow. With property tax being the largest own-source revenue for most municipalities, fluctuations in the receipt of revenues can be crucial to the provision of municipal services.

In an era, when community members are pleading for greater fiscal accountability in their public officials, public administrators are faced with the problem of limiting property tax rate increases and maintaining tight budgets under the close scrutiny of taxpayers. As a result, local governments are being forced to establish objective criteria for evaluating policy decisions. To achieve this end, public officials are utilizing fiscal impact analysis methodologies to weight the benefits of development proposals with the costs associated with providing services to the development.

However, it is important to note that fiscal impact analysis will not provide local decision makers all the information they may need when making land use decisions. Fiscal impact focuses on the primary financial consequences of changes; it does not measure the secondary impacts, such as the environmental, economic and social effects. In many cases the secondary effects of change can have even greater fiscal implications than the cost-revenue taxation analyses.

There is a common misconception, perpetuated by developers contention that proposed development will reduce local property taxes by adding "rateables" to the tax base, when in fact the cost of providing services to new development may exceed the tax revenues generated. Empirical research indicates that certain types of residential development place more demand on services than

they generate in revenue. For example, a FIA study in Coventry, Rhode Island, found that residential development increased the tax rate by \$.42 (per \$1,000 assessed value), while open space preservation resulted in an increase of \$.33 per \$1,000 assessed value (Williamson, 1990:35).

The role of fiscal impact analysis in substantiating the case for open space conservation, based on the costs versus revenue concept dates back to the 1940's. The following quote by Lyle Fitch, former chief administrator of the City of New York summarizes the argument:

"the township stands to gain by acquiring vacant lots and development rights thereto, rather than allowing them to be developed for residences whenever (1) the costs of supplying public services to the prospective new households exceeds (2) the amount of real estate tax sacrificed by forgoing private development on the lots, plus (3) interest on the cost to the township of acquiring the lots or development rights." (Caputo, 1979:27)

Based on this premise, the Allagash Environmental Institute at the University of Southern Maine pioneered a methodology, which has been subsequently revised by the New Jersey Conservation Foundation; examines the fiscal impacts of residential development and open space acquisition. This methodology as contained in Appendix A, has been adapted for application in this case study.

Data Sources and Description

Four sources of data were utilized to fulfill the data requirements of Caputo's methodology. They include, the

1990 Annual Report on Local Government Finances and Tax Equalization, from the Rhode Island Department of Administration: Office of Municipal Affairs, report for the Town of New Shoreham; interviews with the tax assessor and a local real estate appraiser were conducted, and acquisition records for a selected parcel of property purchased by the Land Trust were obtained. Appendix B contains an itemized listing of the data compiled from the tax equalization report and Tables 3.1 and 3.2 include the data obtained from the tax assessor, real estate appraiser and the Land Trust.

The property, commonly referred to on Block Island as Turnip Farm was selected as the study area for the fiscal impact analysis. As can be seen in Figure 3, Turnip Farm is an inland site located on the southern portion of the Island. This property was selected based on its recent acquisition in 1987, by the Block Island Land Trust (Land Trust) with publically allocated funds. The site consists of 37.79 acres, 19.47 acres of which were purchased fee simple and 18.32 acres of conservation easements, for a total purchase price of \$1,810,010.68.

The Land Trust is a local government body established in 1986, that is empowered to collect a transfer fee of up to 5% on the conveyance of real property on Block Island. Currently, the land transfer fee is 3%. The Land Trust also has the authority to secure bonds on behalf of the Town. The revenue generated from the transfer fee and bonds is

Table 3.1 - The Tax Impact of Residential Development

Assumptions Regarding Proposed Development

Turnip Farm: 37.79 Acres

RA: 3 Acre Zoning

School age multiplier: .255 (1980 #households/#pupils)

Number of dwelling units: 12

Number of bedrooms per dwelling unit: 3

Market Value of bedroom unit: \$370,000 (asking price for standard 3 bedroom BI house-source local realtor)

Household size per bedroom unit: 2.23 (1980 #households/pop.)

Assessed valuation of development: \$1,445,664 (Assessed value of the same standard BI home, 3 bedroom, 2 bath house * 12 units)

PART 1 - Annual School Cost Per Development:

School age children: $.255 * 12 = 3.06$

Annual school cost: $3.06 * 5,145.50 = \$15,745.23$

PART 2 - Impact on School Tax Rate:

New school tax rate: .403 per \$100 assessed value

Impact on school tax rate: $.403 - .4 = .003$ per \$100 assessed value

PART 3 - Annual School Revenue Generated Per Development:

$1,445,664/100 * .403 = \$5,826.03$

PART 4 - Net Annual School Cost Per Development:

Net annual school cost:

$15,745.23 - 5,826.03 = \$9,919.20$

PART 5 - Annual Non-educational Service Cost Per Development:

Total population of development: $2.23 * 12 = 26.76$

Non-educational service cost: $26.76 * 1,797.93 = \$48,112.61$

PART 6 - Impact of Non-educational Tax Rate:

New non-educational tax rate:

$48,112.61 + 1,362,831.12/134,052,482 + 1,445,664 = 1.04$ per \$100 assessed value

Impact on non-educational tax rate: $1.04 - 1.02 = .02$

PART 7 - Annual Non-educational Revenue Per Development:

$1,445,664/100 * 1.04 = \$15,034.91$

PART 8 - Annual Non-educational Cost Per Development:

$48,112.61 - 15,034.91 = - \$33,077.70$

PART 9 - New Total Tax Rate:

$1.41 + .003 = 1.4103$ per \$100 assessed value

PART 10 - Total Tax Rate Impact:

$.003 + .02 = .023$ per \$100 assessed value

PART 11 - Increased Taxes On Individual Owner of a \$370,000 home:

$370,000 * .3256 * .00023 = \27.71

Table 3.2 - The Tax Impact of Open Space Preservation

Assumptions Regarding Turnip Farm Acquisition:

Assessed value of property: \$578,472

Amount of acquisition cost raised locally in 1st year: \$500,000

PART 1 - Impact of Lost Revenue on the Tax Rate:

New total assessed net valuation taxable:
 $134,052,482 - 578,472 = \$133,474,010$

New Property Tax Rate:
 $1,892,821/133,474,010 * 100 = 1.418$ per \$100 assessed value

Impact of lost revenue on property tax rate:
 $1.42 - 1.41 = .01$ per \$100 assessed value

PART 2 - Impact of Town Acquisition on the Tax Rate:

Total amount raised locally in 1st year:
 $550,000 + 69,989.31 = \$619,989.31$

Total budget raised locally in 1st year:
 $619,989.31 + 1,892,821 = \$2,512,810.31$

New property tax rate:
 $2,512,810.31/133,474,010 * 100 = 1.88$ per \$100 assessed value

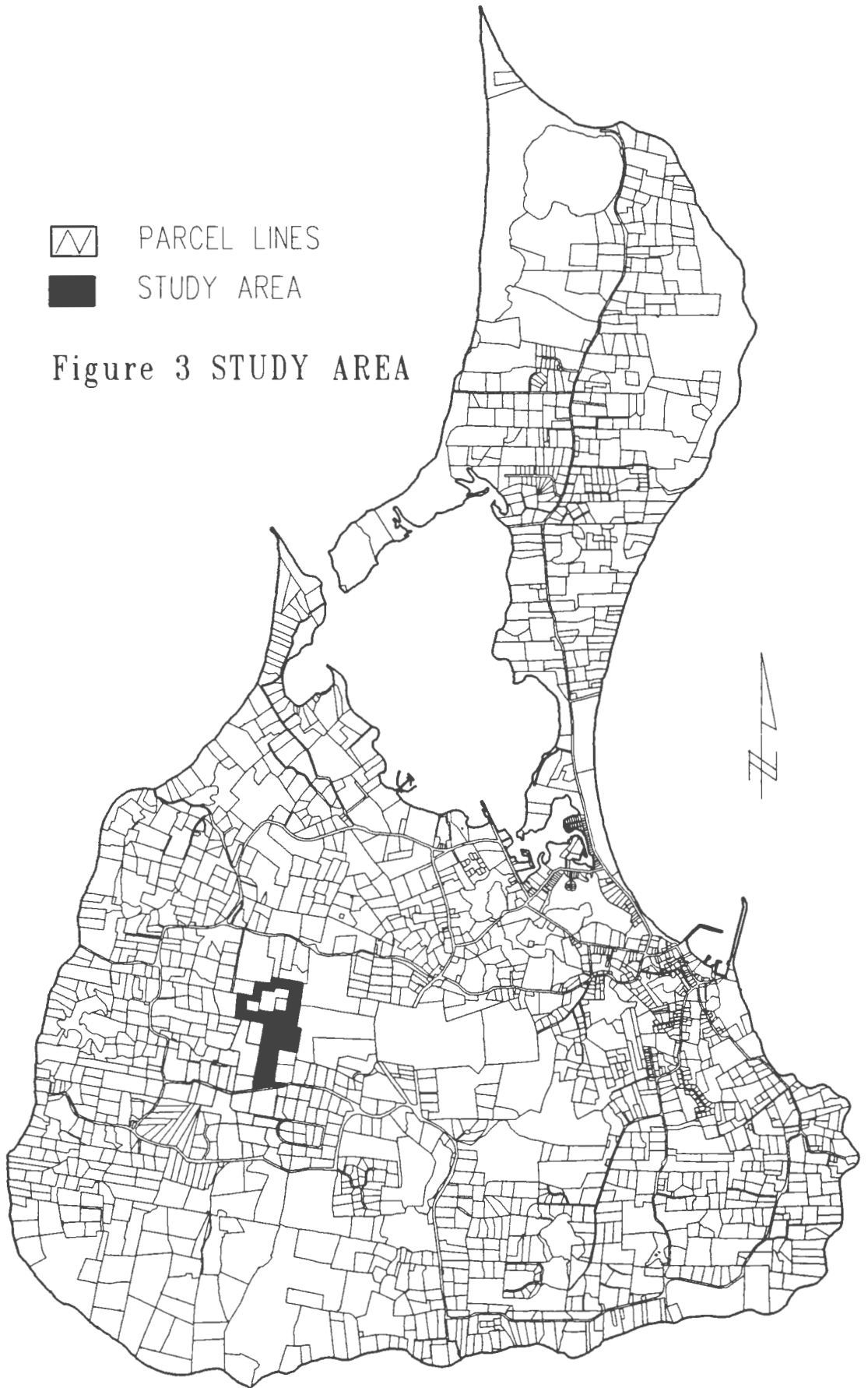
Impact of acquisition on the tax rate:
 $1.88 - 1.41 = \$.47$ \$100 assessed value

Increased Taxes On Individual Owner of \$370,000 home:
 $370,000 * .3256 * .0048 = \578.26

BLOCK ISLAND

- ▧ PARCEL LINES
- STUDY AREA

Figure 3 STUDY AREA



used to acquire and manage public recreation lands, open space, farm land and wildlife habitat on Block Island.

For the purpose of determining the hypothetical tax impact of residential development on the Turnip Farm site, the entire 37.79 acres, zoned RA or residential three acre was proposed for subdivision. Therefore, the hypothetical development would have a maximum of twelve building lots. The basic assumptions relating to the proposed development are listed in Table 3.1.

The FIA calculations breakdown the analysis into the impact on the school and the non-educational tax rates. The 1990 tax rate was \$18.88. This is divided into \$5.29 for school expenditures and \$13.59 for the non-educational or municipal budget. Historically, expenditures on education receive the largest percentage of tax revenues. But, due to the size of Block Island's population, geographic isolation and seasonal fluctuations in service demand all essential service must have the capacity to meet the peak demand and be provided by the Town. Therefore, only 28% of the current tax rate is dedicated to education costs and 72% for municipal expenditures.

However, Block Island had the highest per pupil cost in the state \$7,882, in 1989. This is indicative of the comparatively low school enrollment figures, and the economy of scale which dictates the disproportionate expense for educating so few students.

The most vital and sensitive link in this method of predicting future education spending involves the estimate of the number of school-age children expected to live in the new development. To insure that the school age multiplier accurately reflects the peculiarity of Block Island school enrollment figures, the multiplier was calculated based on the 1980 census of housing and the 1980 school enrollment figures. Traditionally, the school age multiplier ranges from 4.0 to 1.0, but in the case of Block Island the multiplier is only .255. Therefore, future educational spending properly attributable to new housing construction is intended to provide a perspective on increased education costs.

The tax impact of open space acquisition was based upon the assumption that the assessed value of the entire Turnip Farm property would be removed from the tax roll. As previously mentioned, in reality only 17.47 acres were purchased fee simple, thus only a portion of the taxable value was removed. It was further, assumed that town funds were used for the acquisition of the property. Therefore, the total tax burden of the acquisition would accrue to municipal expenditures.

Application of the Method

To assess the tax impact of open space preservation, the FIA methodology established by Darryl Caputo and the New

Jersey Conservation Foundation was utilized. This procedure establishes a framework for calculating and comparing the tax impact of acquisition and removal of property from the tax rolls, as open space; to the tax impact of permitting the same piece of property to be developed for residential use. For the purpose of discussing Caputo's methodology, the discussion of the analysis and findings are divided into two segments: the tax impact of residential development (Table 3.1), and the tax impact of open space acquisition (Table 3.2).

Findings

The numerical result of Caputo's FIA are listed in Tables 3.1 and 3.2. The results reveal that the development of Turnip Farm for residential use would result in an increase of \$.023 (per \$100 assessed value) in the tax rate, \$.003/\$100 and \$.02/\$100, respectively, for school and municipal expenditures. This negligible increase would affect the yearly tax bill of a home owner, assessed at \$370,000 by only \$27.71.

From the results in Table 3.2, it is determined that the removal of the Turnip Farm property from the tax rolls would increase the property tax rate by \$.01 per \$100 assessed value. Likewise, acquisition of the property would increase the tax rate by \$.47/\$100, from 1.41 to 1.88. The total tax impact, therefore, would be \$.48 per \$100 assessed

valuation. Whereas, the owner of a \$370,000 home had to pay \$27.71 annually in additional taxes when the property was developed, he/she would pay \$578.26 if it were acquired as open space.

It is important to note that the tax rate increase resulting from open space acquisition declines each year as the outstanding loan is reduced. In the actual acquisition of Turnip Farm by the Land Trust, the principal and interest were paid in 1990. Thus, over a three year period the debt was discharged, and the current tax impact is zero, but the \$27.71 per year brought about by the development continues indefinitely. At some point in the near future, the increased taxes brought about by the development would exceed the amortized cost of acquiring the Turnip Farm property. Furthermore, if the property were assessed as Farm, Forest and Open Space, and a portion of the acquisition were obtained from a private organization ie. Block Island Conservancy of The Nature Conservancy the total tax impact of the acquisition would be significantly reduced (Caputo, 1979:45).

Discussion of Findings

It is apparent after examining the results of the FIA that based on the stated assumptions, the cost to preserve Turnip Farm exceeds the costs associated with providing services if it were converted to residential development.

These results are contrary to empirical findings in previous studies which utilized the same methodology, namely Williamson (1990), and Caputo (1979).

As suggested by Muller (1975), the contradictory findings may result from three factors. First, the set of initial assumptions. Second, the choice of allocation approaches. Third, the spatial scope of the analysis.

The initial set of assumptions applied in this analysis are influenced by the analysts' familiarity with the community and literature on the subject. The analysis assumes that the official assessed to market value ratio will be maintained for an extended period of time once the development is completed. In fact, due to inflationary pressures, infrequent reassessments, and other factors there tends to be a gap between official and actual assessed value (Muller, 1975:16).

The choice of allocation approaches refers to the costs attributable to a single development. Using Caputo's methodology, the assumption is made that past expenditure trends will increase proportionally to new development. This reasoning, however, is only valid if the project represents the final development to take place on Block Island. In reality the incremental increase of development may require the construction of additional public facilities. Therefore, a share of the projected cost of public improvements should be allocated to new projects

based on the anticipated level of facility usage by new residents.

In addition, there is no commonly accepted methodology for allocation of costs for services jointly used by residential, commercial and retail development such as transportation, public safety, sanitary sewers, solid waste and electricity. Despite these and other limitations, the literature recommends that in the absence of more intensive analysis, that service consumption be used to allocate the cost of public services (Muller, 1975:22).

Caputo's fiscal impact analysis methodology limits the scope of analysis to direct cost-revenue effects of new development. A limited scope neglects consideration of the effects of cumulative development on the cost of providing additional services and on the level of anticipated revenue from households. Similarly, additional development can affect the unit cost of constructing public facilities by increasing the ability to take advantage of scale economies.

For example, Block Islands comparatively high per pupil cost of \$7,882 in 1989, brought about primarily by high operating and maintenance costs, for a limited number of students would suggest that the school system could absorb additional students without extra cost. In this scenario, per pupil cost would likely decrease until additional capital improvements or outlays for staffing were necessary. The existence of scale effects, such as this, may not

accurately represent the impact of a proposed development on the total community, because as population increases the original residents benefit by lower tax rates since the increased numbers of pupils reduces the average cost of educating each student.

As a result of complexities in projecting costs and revenues in the public sector further efforts are required to develop a comprehensive methodology which addresses both the primary (fiscal) and secondary (environmental, economic and social) impacts of land use decisions. It is recommended that a FIA methodology that is more sensitive at measuring the service demands of additional development, particularly sanitary sewers, solid waste, water and electricity, such as the Service Standard or Case Study Methods, be utilized for future analysis. This is particularly important, because municipal outlays comprise 78% of Block Islands total tax rate.

C H A P T E R F O U R
**Open Space Conservation and Adjacent
Property Values**

This chapter establishes the framework for using multi-variate regression analysis procedure for examining the relationship between property values and proximity to open space. The chapter includes a discussion of the methodology, the sources of data, the application of the method and concludes with a discussion of findings.

Methodology

Multiple Regression analysis is a statistical procedure used to determine the combined and individual relationship between more than two independent variables and a dependent variable. It utilizes a mathematical formulation of economic theory and statistical procedures to measure theoretical relationships between variables, also commonly referred to as econometric modeling (Muller, 1975:10). This methodology allows the researcher to statistically control for any number of variables and determine the significance of each independent variable (cause) and its relationship or influence on the dependent variable (effect). The simplest straight line relationship can be expressed in the following equation:

$$Y = a + bx,$$

where Y is the "predicted" value of the two coefficients a and b.

The multi-variate regression formula differs because it permits the researcher to incorporate more than one independent variable into the equation. This is useful for several reasons. First, it offers a more expansive explanation of the dependent variable since few effects are products of a single cause. Second, the effect of one independent is clarified because the possibility of distorting influences from other independent variables is eliminated (Lewis-Beck, 1982:47).

For the general multi-variate regression equation the dependent variable is seen as a linear function of more than one independent variable as expressed below:

$$Y = a + B_1 X_1 + B_2 X_2 + \dots + B_m X_m$$

where the subscript identifies the number of independent variables.

Data Sources and Description

The selection of variables was based upon the availability of data and a review of previous literature. In the selections of variables, the researcher's primary objective was to develop a model which would account for large variation in property values (dependent variable).

The literature indicated that several types of independent variables could achieve this objective.

The literature suggested using assessed value as the dependent variable (Williamson, 1990). The author's past experience with Block Island's tax assessment records indicated that an alternate variable should be utilized. Several factors influenced this decision. First, nine years had passed since the last town-wide reassessment, thus the assessed values no longer accurately reflects current market value. Second, a considerable amount of open space was dedicated subsequent to the last reassessment. Consequently, changes in market value brought about by proximity to open space would not be represented in the assessed value data. Therefore, as suggested by Correll et al. (1978); Hammer et al. (1974); Weicker and Zerbst (1973), market sales price was selected as the dependent variable.

Four sources of primary and secondary data were utilized to formulate the regression model. The exact specification of variables was in many cases governed by the availability of data. The sources of data for this analysis were limited to: interviews with local realtors and residents of the community; a listing of all property transfers since June 1st of 1986, obtained from the Block Island Land Trust; tax assessor field cards and Block Island's Geographic Information System parcel database.

First, interviews with local realtors, appraisers and residents were conducted to indicate which variables, unique to Block Island, influence the marketability and sale price of property. Understandably, views and frontage on water were considered the most "saleable" features. According to one realtor property on Block Island can be classified into one of three categories; water view, interior country, or big water view with the quality of the view being the criteria for delineation.

Several other features were credited with positively impacting the market value of property including the amenities and conveniences provided by improvements to the lot; lot size, but only if the lot were large enough for subdivision; and the number of bedrooms and sleeping capacity of a home, particularly as it relates to rental income and entertaining guests. Surprisingly, distance to the central business district was not considered a locational advantage unless the intended use of the property were commercial or retail.

Proximity to open space was acknowledged by both realtors and residents to enhance the marketability of property. In particular, the realtors suggested open space provided perspective owners the assurance that views would not be obstructed by future development, thus increasing the perspective buyers "willingness to pay".

Residents expressed skepticism that the researcher would be able to isolate the value attributable to proximity to open space, from the all variables that affect market value. Several, felt the volatile nature of the real estate market on Block Island would prevent segmenting market value among many variables. They also suggested that factors attributable to market value could not be consistently applied across the Island. Notably, this observation may correspond to the realtors property classification scheme.

Second, the land transfer history for all property transfers over the past six years on Block Island was obtained from the Land Trust to ascertain the geographic location based on plat/lot/sublot numbers of each market transaction. Contrary to the methodologies of previous literature, both improved and vacant lots were included in the sample, this was necessary to insure adequate sample size. From the listing of land transfers, parcels adjacent to protected open space were highlighted for inclusion in the sample. From the remaining transactions, an equal number of lots were selected, regardless of proximity to open space and geographic location on the Island. Each transaction was then scrutinized to eliminate bargain sales or those that occurred between family members. Initially, the sample size was 50, but two observation were removed due to apparent bargain sales.

Third, the tax assessor field cards were reviewed to ascertain the availability of data regarding the structural characteristics of each lot. The following four variables were selected from the assessor cards for inclusion in the model based on discussion with the realtors and previous literature: lot size, the existence of a structure, age of the structure, and the number of bedrooms. An additional three observations were removed from the sample because the lots had been subdivided subsequent to their sale, therefore the tax assessor cards were no longer available. Improvements had also been added to several previously vacant lots, thus the market value did not reflect the existence of a structure. Consequently, these lots were treated as if they remained vacant.

And lastly, the distance between each parcel and the nearest protected open space were measured using the straight line distance with Block Island's Geographic Information System parcel database. All non-existent or missing variables were coded zero, to prevent observation with missing variables from being overlooked during statistical analysis. The database used for the multiple regression analysis is included in Appendix C.

Application of the Method

The initial stage of the analysis was the development of a model that would test the relationship between market

values and selected locational and structural characteristics of properties sold within the past six years on Block Island.

As previously mentioned improved and vacant lots were included in the sample, therefore the existence of a structure was controlled for by including a "dummy variable" entitled *structure*. A dummy variable is a variable that has a value of unity for observations which fall into the same group. For example, a zero indicates the lot is vacant, and a one indicates that a structure occupies the lot.

Since the properties sampled were sold in different years, the sale price of each lot had to be adjusted for inflation. This was accomplished using the Consumer Price Index multiplier which established 1983 as the base year. Consequently, the *adjusted sale price* variable is equivalent to 1983 dollars. The data was then analyzed using multiple regression statistical technique and Number Cruncher Statistical Software.

The dependent variable is *adjusted sale price*. The independent variables are *lot size*; *age*; *# bedrooms*; *distance to open space*; and the dummy variable, *structure*.

Therefore, the linear regression equation would be represented as:

$$\begin{array}{l} \text{Adjusted} \\ \text{Sale} \\ \text{Price} \end{array} = a + b_1 (\text{lot size}) + b_2 (\text{age}) + b_3 (\# \text{ bedrooms}) \\ + b_4 (\text{structure}) + b_5 (\text{distance to open space})$$

A cursory examination of the data, by plotting each independent variable against the dependent variable *adjusted sale price* revealed that two outlying observations did not fit the model. These observations skewed the regression line based on large lot size and high sale prices, thus they were removed from the sample. The exclusion of these observations resulted in a significant increases in the R-squared score, creating a better fit with the linear model. The improved fit with the model insures that the results of the analysis will provide an enhanced estimate of changes attributable to the independent variables. The final database consisting of 41 observations is shown in Appendix C.

Findings

The result of the linear regression analysis are shown in Table 4.1, and are outlined below. From this analysis the distance to open space and lot size emerged as the most significant factors in explaining sales price; as indicated by low probability scores of .000 and .106.

Table 4.1 - Regression Results

Variable Name	Parameter Estimate	Standard Error	T-Value (b=0)	Prob. b=0	Sequential R-Squared	Simple R-Squared
Constant	115223.4					
Lot Size	.4699	6.164 x E-2	7.62	.000	.5635	.5635
Structure	31995.24	49435.06	.65	.522	.5988	.0032
Age	-61.3768	620.695	-.10	.922	.5989	.0016
# Bedrooms	10327.37	14436.02	.72	.479	.6115	.0003
Distance to Open Space	-25.37423	15.31205	-1.66	.106	.6398	.0313

Hedonic amenity pricing, demonstrated by the parameter estimate (coefficient) for each of the variables, determines the average household "willingness to pay" for amenity values assuming the market is perfect and household preferences are similar.

According to this model, the coefficient of the variable lot size, evaluated at the mean reveals that the sale price for a three acre lot is \$186,798.46. Therefore, the sale price of a three acre lot on Block Island, given the following assumptions: a structure occupies the lot, has three bedrooms, is ten years of age, and the distance to open space is 200 feet; can be estimated as follows:

\$186,798.46	3 Acres of Land
31,995.24	Structure
30,982.11	3 Bedrooms (\$10,327.37 * 3)
- 613.80	10 Years of Age (-61.38 * 10)
<u>- 5,074.00</u>	200 ft. from Open Space (-25.37 * 200)
\$244,088.01	Total in 1983 Dollars
\$327,244.25	TOTAL in 1991 Dollars

The ability to apply the statistical results of the regression analysis to actual cost estimation, and receive realistic results suggests that the model provides an accurate representation of the relationship between sale price, and the five independent variables.

Age and distance to open space are observed to have a negative impact on the price of property. In particular, the price of a parcel decreases \$25.37 for a distance of one foot from open space. In comparison, Correll, Lillydahl and Singell (1978) and Williamson (1990), found that sale price

decreased by only \$10.20 and \$11 respectively, over the same distance. Age had a similar effect, for each additional year of age the sale price decreases by \$61.37 which supports the conclusion of Weicker and Zerbst (1973), market values tend to decline with the age of the house.

The coefficient of lot size in the equation is .4677, which means that each additional square foot of land adds \$.4677 to the value of the property. Comparatively, this value estimate is almost half that of Weicker and Zerbst study of urban park land, in which each additional square foot of land was worth \$.8687 (Weicker and Zerbst, 1973:103).

Statistically, the fit of the regression equation as measured by the R-squared values, also referred to as the regression coefficient, indicates the proportion of variation in sale price which can be attributed to the five variables selected in this model. This analysis indicates that 63% of the variance in sale price is contributed by the five independent variables.

As expected, lot size and sales price are related positively with lot size contributing 56% of the value to sale price. This finding would appear to contradict the realtors assumption that lot size affects sale price only if the lot is large enough for subdivision.

Based on the results of this study, it can be concluded that the relationship between open space and sale price is

indicative of a demonstrable market relationship. Relative to other variables influencing land values, this relationship may appear less important. But, in determination of the economic costs and benefits of open space preservation, differentials in land values of this type might be considered as a significant secondary economic benefit.

Knowledge of the significant relationship between distance to open space and market value could assist the town in recovering increased tax revenue from properties which benefit from the protection of open space. This could be accomplished by including proximity to open space in the Town's assessment formula during the upcoming reappraisal in 1992.

There are several other variables which may individually or in combination result in a greater than 63% explanation of the dependent variable (*adjusted sale price*). In particular, as suggested by local realtors physical and visual access to the ocean may contribute the remaining 37% of value to sale price. Due to time constraints and the subjective nature of qualifying views, as well as speculating on potential views which might occur if currently vacant lots were build upon, the direct influence of views was not considered in this analysis. In an attempt to compensate for this apparent weakness with the model, the researcher's familiarity with the topography and view sheds

of the Island assisted in selecting a cross section of observations, including inland, upland and lowland properties.

Another factor which may have influenced the results of the study is the limited number of observation used in the analysis. As previously stated, every attempt was made to maximize the sample size by including vacant and developed parcels. It is recommended that future research include land transfer data for a period of at least ten years or more.

Further limitation on the data may result from the changeable nature of the real estate market on Block Island during the late 1980's. Over the time frame that the land transfer data was collected the real estate market experienced rapid fluctuations. Therefore, some sale prices may be artificially inflated, while others may be more representative of market value. Despite these fluctuations the analysis demonstrates the relationship between open space and property values.

CHAPTER FIVE Conclusions and Policy Implications

As communities in Rhode Island and throughout the United States deal with issues of growth management, and attempt to establish a balance between economic growth and environmental protection, quantitative measures, such as those utilized in this analysis will become quintessential to local government decision-making. Providing, not only objective criteria for estimating the economics of land conservation but setting the ground work for expanding the focus of future analysis to include both the primary and secondary impacts of land use decisions.

Conclusions

The preceding analysis of the economics of land conservation suggest that the existence of open space on Block Island may have a significant impact on the sale price of adjacent properties. The sale price of a given piece of property decreases by \$25.37 for each foot the parcel is located from open space. Furthermore, it indicates that the fiscal impact of a hypothetical new development would increase the tax rate by \$.023 per \$100 assessed value; while the cost of preserving the same parcel of land would increase the tax rate by \$.48 per \$100 assessed value. Thus, taking into consideration the assumptions of the FIA model and the unique characteristics of the case study,

residential development would be a less expensive alternative to preservation.

As previously stated, empirical research supports the conclusion that preserved open space and parkland increases the value of adjacent land. Although, past research on the fiscal impacts of land conservation have obtained differing outcomes, the results of this study substantiate the need for developing a comprehensive methodology that addresses the unique service demands in rural coastal communities.

Policy Implications

Several policy implications arise from the conclusions reached in this study. In particular, the regression analysis suggests an alteration in the Town's tax policy would be advantageous for several reasons. First, it would recover increased tax revenue from properties which benefit from the protection of open space thus offsetting a portion of the cost of preserving open space. Second, it would provide a caveat for internalizing the cost of preserving essential natural resources, by introducing them into an economic framework. Third, the assessed valuation would more accurately represent market value and consumers "willingness to pay" for open space amenities.

The policy implications of the fiscal impact analysis suggest the importance of maintaining a mosaic of residential, commercial/retail and conservation land uses.

This, insures the economic stability, well-being and quality of life for residents of the community. Additional research is necessary to assess the fiscal impacts of service demands unique to Block Island, such as electricity, transportation, public works and solid waste management.

As has been the past practice on Block Island alternative land conservation measures, such as, the purchase of conservation easements, purchase of development rights, and restrictive covenants should be encouraged, to minimize the quantity of land removed from the tax rolls. Continued cooperation among preservation groups would further minimize the fiscal impacts of land conservation.

It is important to consider innovative approaches for economic development that are in harmony with the environment and the values of Block Island residents. Development need not destroy that which is so cherished. This can be accomplished by refocusing efforts on establishing a diverse economy that combines agriculture and aquaculture industries with tourism. A cooperative meeting of the minds when combined can generate tourist revenue in the form of jobs, wages, and tax revenue in addition to tax revenues from productive yields, yet preserves the natural and cultural resources of Block Island.

The New Jersey Conservation Foundation in its publication "Open Space Pays" suggested the term "socioenvironmics" in acknowledgement of the interdependency

of the social, environmental and economic benefits of land conservation. The social benefits were identified as providing recreational amenity, enhanced community image, density control and educational value. The environmental benefits include perpetuation of natural systems, natural diversity and prevention of development in hazardous areas. Furthermore, nature performs valuable work which can only be replicated at great expense. And lastly, the economic benefits, increased adjacent property values, promotes tourism, results in cost efficient development and prevents development in hazardous areas. Furthermore, nature performs valuable environmental work which has significant economic value such as assimilation of pollutants.

To place this research in perspective, this case study has highlighted two of the economic benefits of land conservation. The reasons for open space preservation should not be limited to strictly economic considerations. Although it is difficult to quantify social and environmental considerations, they are essential component of economic considerations particularly for tourist communities such as Block Island. The future challenge is to develop quantitative methods that provide an organized framework to assess the combined impact of open space conservation. These methods provide decision-makers with improved information on which to base their land use decisions.

In the increasingly complex world of today, the public is clamoring for greater accountability in public official. To make decisions which bear up under close scrutiny, public decision makers have been forced to use increasingly objective criteria. An unfortunate consequence of increasing objectivity in decision-making is that economic studies, with hard dollar figures, are being relied upon, at the exclusion of social considerations which do not fit the economic calculus. A study such as this one, which attempts to value economic benefits of open space can never measure all benefits. After all, the reason open spaces tend to be publically provided in the first place is because all benefits are not economic (Trudeau, 1978).

APPENDIX A

The Tax Impact of Open Space Preservation

This section presents a procedure to follow to calculate the tax impacts of removing property from the tax rolls and of acquiring the property for open space. To determine these impacts the following information is required:

1. Assessed value of property.
2. County equalization ratio.
3. Total assessed net valuation taxable.
4. Town's assessed property tax rate.
5. Amount of acquisition cost to be raised locally in first year.
6. Total property tax levied.

(40)

The procedure is as follows:

Part 1: Calculate impact of lost revenue on the tax rate:

- A. Calculate new total assessed net valuation taxable:
new valuation = total assessed net valuation taxable -
assessed value of property
- B. Calculate new tax rate:
new tax rate = $\frac{\text{total property tax levied}}{\text{new total assessed net valuation taxable}}$
- C. Calculate the impact of lost revenue on the tax rate:
impact = new tax rate - old tax rate

Part 2: Calculate impact of town acquisition on the tax rate:

- A. Calculate amount of acquisition cost to be raised locally in the first year:
cost = down payment on property + principal + interest on borrowed money.
- B. Calculate total budget to be raised locally in first year of acquisition:
total budget = amount of acquisition cost to be raised in first year + total property tax levied
- C. Calculate new tax rate:
new rate = $\frac{\text{total budget}}{\text{new total assessed net valuation taxable}}$
- D. Calculate impact of acquisition on tax rate:
impact = new tax rate - old tax rate

Procedure for Calculating Tax Impact of Development

Part 1: Calculate annual school cost per development:

A. school-age children population =

$$\frac{\text{school-age children multiplier}}{\text{bedroom unit}} \times \frac{\text{the number of bedroom units}}{\text{development}}$$

B. annual school cost =

$$\frac{\text{school-age children population}}{\text{development}} \times \frac{\text{school property tax levied}}{\text{school-age child}}$$

Part 2: Calculate impact on the school tax rate:

A. new school tax rate =

$$\frac{\text{annual school cost} + \text{the school property tax levied}}{\text{total assessed net valuation} + \text{assessed valuation of the development}}$$

B. impact on the school tax rate = new school tax rate - old school tax rate

Part 3: Calculate annual school revenue generated per development

Annual school revenue generated = assessed valuation of the development X new assessed school tax rate

Part 4: Calculate net annual school cost or benefit per development

net annual school cost or benefit =

$$\frac{\text{average annual school cost}}{\text{development}} - \frac{\text{average school revenue generated}}{\text{development}}$$

Part 5: Calculate annual non-educational service cost per development:

A. $\frac{\text{total population}}{\text{development}} = \frac{\text{total household size}}{\text{bedroom unit}} \times$

$$\frac{\text{number of bedroom units}}{\text{development}}$$

B. non-educational service cost = $\frac{\text{total population}}{\text{development}} \times$

$$\frac{\text{municipal property tax}}{\text{person}} + \frac{\text{county property tax}}{\text{person}} +$$

$$\frac{\text{deductions property tax}}{\text{number of persons}}$$

Part 6: Calculate impact on the non-educational assessed tax rate:

A. new non-educational tax rate =

$$\frac{\text{annual non-educational cost} + \text{total non-educational property tax levied}}{\text{total assessed net valuation} + \text{assessed valuation of the development}}$$

B. impact on the non-educational tax rate =

$$\text{new non-educational tax rate} - \text{old non-educational tax rate}$$

Part 7: Calculate annual non-educational revenue per development:

annual non-educational revenue generated =

$$\text{assessed valuation of the development} \times \text{new municipal assessed non-educational property tax rate}$$

Part 8: Calculate annual non-educational cost or benefit per development:

$$\frac{\text{net annual non-educational cost or benefit}}{\text{development}} =$$

$$\frac{\text{non-educational cost}}{\text{development}} - \frac{\text{non-educational revenue generated}}{\text{development}}$$

* Positive figure implies cost, negative figure implies benefit.

Part 9: Calculate new total tax rate:

$$\text{new total tax rate} = \text{old tax rate} + \text{school tax rate impact} + \text{non-educational tax rate impact}$$

Part 10: Calculate total tax rate impact:

$$\text{total tax rate impact} = \text{school tax rate impact} + \text{non-educational tax rate impact}$$

Part 11: Calculate the increase in taxes an individual owner of an average-value home would have to pay:

$$\text{increase in taxes} = \text{market value of home} \times \text{town's assessment ratio} \times \text{total tax rate impact}$$



APPENDIX B

CAPUTO'S FISCAL IMPACT ANALYSIS METHODOLOGY DATA	
1. Total Population (1980 Census)	758
2. Total Assessed Net Valuation Taxable	134052482
4. Total Equalized Net Valuation Taxable	411709097
5. Assessment Ratio	32.56
6. Total Property Tax Levied	1892821
6a. Assessed Total Tax Rate	1.41
6b. Equalized Total Tax rate	0.46
7. Municipal Property Tax Levied	1362831.12
7a. Assessed Municipal Tax Rate	1.02
7b. Equalized Municipal Tax Rate	0.39
7c. Municipal Property Tax per Person	1797.93
9. Deduction Property Tax Levied	1615408
9a. Deduction Assessed Tax Rate	1.2
9b. Deduction Equalized Tax Rate	0.39
9c. Deduction Property Tax per Person	2131.15
11. School Property Tax Levied	529989.88
11a. Assessed School Rate	0.4
11b. Equalized School Tax Rate	0.13
12. Property Tax Levy per Child	5145.5

Source: Rhode Island Department of Administration: Office of Municipal Affairs. 1990 Annual State Report on Local Government Finances and Tax Equalization.

* Note the numbers adjacent to each data source correspond to the specific steps in Caputo's Methodolgy, which are contained in Appendix A.

Multiple Regression Database

Plat & Lot	Adjusted Sale Price	Sale Price	Year Sale	Lot size	Structure	Age	Number of Bedrooms	Distance to Open Space
706300	138778.8	175000	1989	13310	1	71	2	1725
810600	157515.7	175000	1986	47916	1	15	0	3651.5
821301	115313.6	125000	1985	261360	0	0	0	2726.8
909500	175276.8	190000	1985	108900	1	31	5	2606.9
909301	155172.4	180000	1987	258746.4	0	0	0	2202.2
1900400	121512.1	135000	1986	150674	0	0	0	300
1805200	225022.5	250000	1986	37500	1	141	7	900
1601400	170664.2	185000	1985	87120	1	12	3	350
1603100	209267.6	280000	1990	43560	1	91	2	250
1602503	141215.1	172000	1988	91040	0	0	0	0
1502800	101476	110000	1985	80586	0	0	0	400
1403100	173717.4	193000	1986	135036	1	61	3	1400
1400107	41512.91	45000	1985	169012	0	0	0	0
1400106	427542.8	475000	1986	367646.4	0	0	0	0
1301000	311986.9	380000	1988	88862.4	1	10	3	700
1102000	336206.9	390000	1987	640332	0	0	0	0
1101400	214655.2	249000	1987	39000	1	21	2	0
1108000	144014	160000	1986	54635	1	6	3	150
1108700	340517.3	395000	1987	30352	1	8	3	0
1106900	144014.4	160000	1986	28623	0	0	0	0
1106700	144014.4	160000	1986	23183	0	0	0	300
1107000	144014.4	160000	1986	37949	0	0	0	0
1107800	144014.4	160000	1986	58865	0	0	0	250
1108300	144014.4	160000	1986	35406	0	0	0	0
1107600	144014.4	160000	1986	35540	0	0	0	250
1106500	144014.4	160000	1986	32894	0	0	0	0
1108700	144014.4	160000	1986	30352	0	0	0	0
1108500	144014.4	160000	1986	28417	0	0	0	0
1002900	170664.2	185000	1985	78408	1	26	4	0
908300	79741.38	92500	1987	100188	0	0	0	550
815000	133213.3	148000	1986	87120	1	21	3	1600
507406	270027	300000	1986	12842	0	0	0	0
403200	45004.5	50000	1986	84070	1	16	2	500
404500	452029.5	490000	1985	509652	0	0	0	80
311700	90909.09	101000	1986	261360	0	0	0	0
303100	157515.8	175000	1986	47916	1	31	2	450
303800	135013.5	150000	1986	34700	1	26	4	0
302000	55355.54	61500	1986	20000	1	26	2	100
302600	254515.6	310000	1988	30708	1	26	4	350
301300	258302.6	280000	1985	88426	1	6	4	0
201102	225780	275000	1988	91040	0	0	0	550
203801	720072	800000	1986	1200256	0	0	0	0

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