

## **Economic Benefits of the Great Marsh**

A Report of the Great Marsh Coalition\*  
September 2003



\* The Great Marsh Coalition is a group of organizations and agencies seeking to build a regional identity and awareness for the Great Marsh. The Coalition supports a coordinated approach to education and stewardship of the Great Marsh. Coalition members include: Eight Towns and the Bay Committee, Essex County Greenbelt Association, Essex National Heritage Area, Massachusetts Audubon Society, Massachusetts Office of Coastal Zone Management, Parker River Clean Water Association, and The Trustees of Reservations.

## **Executive Summary**

The Great Marsh is the largest salt marsh in New England and includes over 20,000 acres of marsh, barrier beach, tide flats, estuary, rivers, and upland islands extending across the Massachusetts North Shore from Gloucester to Salisbury. As part of an ongoing program to increase the awareness of this resource area, the Great Marsh Coalition sought to estimate the economic benefits of the area's natural resources to improve future management decisions and ultimately prevent further anthropogenic development that could degrade the quality of the Great Marsh. This project tested the hypotheses that there are substantial economic and fiscal benefits that accrue from natural resources and that these benefits produce positive economic development in the seven communities surrounding the Great Marsh.

Environmental policies and management decisions that incorporate economic information will be more favorably received by the general public, particularly in conflict areas of preservation versus development. In addition, the numerous ecological services and resources the Great Marsh provides contribute economic benefits to surrounding communities.

In estimating the economic value of the Great Marsh, three separate valuation measures were employed:

- 1) Revenue generating activities or direct use value of the Great Marsh, estimated at approximately \$5.3 million in 2000, and representing commercial clamming, haying, and recreational boating, fishing, and beach industries. The market analysis of the Great Marsh was conducted through the collection of 2000 revenue data from various sources.
- 2) Indirect use value, defined as the increased land value and additional taxes levied as a result of a property's proximity to the Great Marsh. Land with a marsh view had a mean value of 54% greater than land without any apparent view. Additional taxes of the same magnitude may also incur.

3) The willingness to pay for the preservation of the Great Marsh. The average willingness to pay per person was \$79, leading to a Great Marsh population aggregate willingness to pay of \$6.6 million.

The sum of these measures provides a compelling, yet still partial, estimate of the economic value of the Great Marsh.

## **I. Introduction**

The Great Marsh is the largest salt marsh in New England and includes over 20,000 acres of marsh, barrier beach, tidal river, estuary, mudflat, and upland islands extending across the Massachusetts North Shore from Gloucester to Salisbury. Wetlands are known to provide ecological services, such as the prevention of storm damage, flood and water flow control, support of fisheries, nutrient and waste absorption, together with the sustainability of recreation activities, and resources used for fishing, agriculture, wildlife, and water supply (Barbier et al., 1995). These benefits could be translated into economic values, using different measurement techniques.

The Great Marsh Coalition is a group of organizations and agencies working on the North Shore of Massachusetts to build a regional awareness and identity for the Great Marsh. This group aims to estimate the existing economic benefits of the Great Marsh and to test the hypotheses of whether it will create substantial economic benefits and if these benefits produce positive economic development in the surrounding communities. According to Barbier et al. (1995), “the total economic benefits to human welfare of a wetland’s ecological services and resources may exceed the economic gains of transforming the area to an alternative use”. The goal of this project is to evaluate the economic values associated with the Great Marsh and to support future resource management decisions, particularly in upland areas surrounding the marsh.

Although the economics approach considers the environment as an asset that provides various services to humankind, it encourages economic efficient decisions to be made (Tietenberg, 2000). Information about the economic values of the Great Marsh can provide incentives for protecting and restoring the Great Marsh through environmental policies that consider the economic values of natural resources. Understanding the economic benefits of the Great Marsh through market demand helps to identify the optimal outcome of any potential actions. This study is the first to assess the economic benefits of the North Shore’s Great Marsh and can lead to more thorough future studies.

It also provides a basic framework for other similar coastal communities to follow.

The total environmental value consists of three major components, use, option and non-use values (Tietenberg, 2000).

- Use value suggests the direct use of the environmental resource, which in this study refers to the harvested clams, salt marsh hay, fishing and boating activities.
- Indirect use values include increased property and land values due to the existence of scenic views.
- Option value reflects the value people are willing to place on resources that they might use in the future, whereas non-use value refers to how much people are willing to pay for the preservation of a resource that they might never use (Tietenberg, 2000).

This study tries to interpret these values by using three different techniques; market analysis, land value comparison, and contingent valuation.

The market analysis method assesses economic benefits generated by major industries within the Great Marsh area. The comparison of land values represents a snapshot of the increased land values due to scenic views of the Great Marsh. The contingent valuation method employs a survey that estimates the willingness to pay for the preservation of the Great Marsh, and captures option and non-use values.

The next section will describe the methodology behind the market analysis and illustrates the results of the direct economic benefits for the year 2000. Section III explains the indirect economic benefits of the Great Marsh in the form of increased land values. Section IV describes how a survey was conducted to estimate the value of the Great Marsh and interpret the responses from the survey. The discussion of the results and conclusion of this study are presented in Section V.

## II. Direct Economic Benefits: Market Analysis of Great Marsh

### (A) Introduction

Major commercial activities sustained by the Great Marsh within its surrounding seven communities have been included in the market analysis and the results are shown as follows. A total of at least 14 different organizations, businesses, and agencies (Table 2) were contacted and the revenues for their respective businesses in 2000 were reported. This list is by no means complete, as some organizations were unwilling to reveal their financial status and records.

### (B) Results

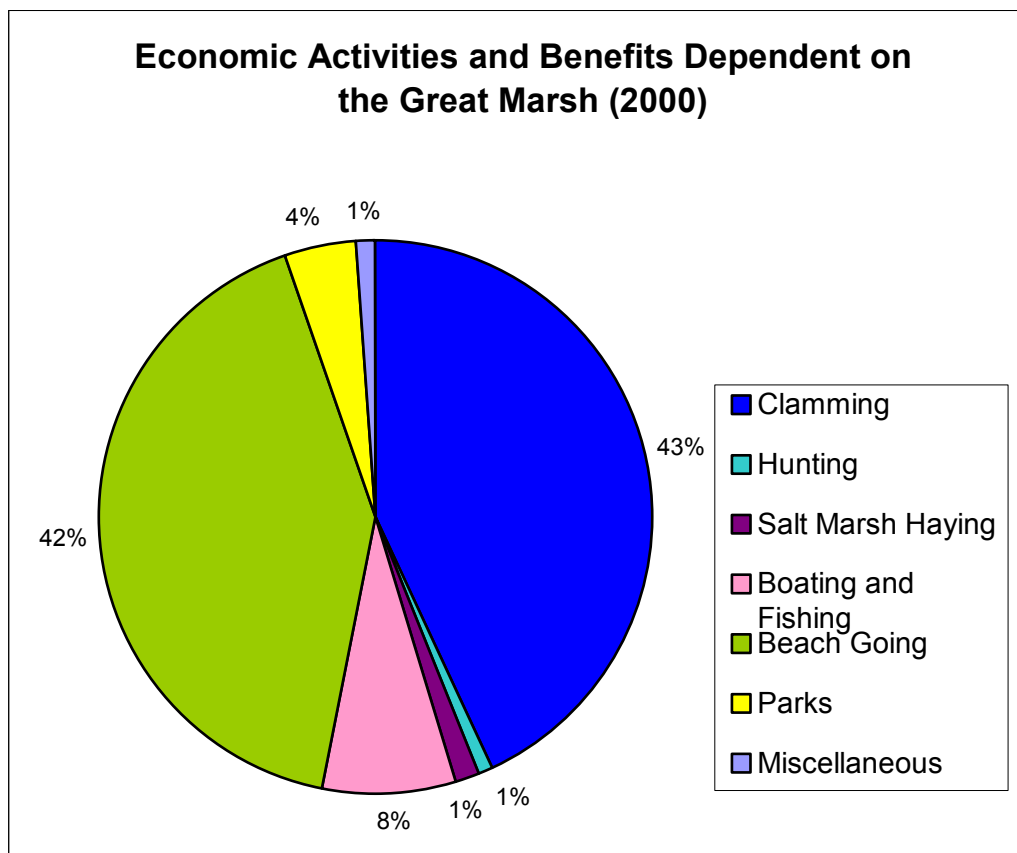
**Table 1.** Direct Economic Activities and Benefits

| YEAR 2000                  |             |
|----------------------------|-------------|
| Economic Activities        | Values (\$) |
| Clamming                   | 2, 301, 927 |
| Hunting                    | 44, 725     |
| Salt Marsh Haying          | 72, 000     |
| Boating and Fishing        | 411, 820    |
| Beach Going                | 2, 224, 000 |
| Parks                      | 232, 490    |
| Miscellaneous <sup>1</sup> | 53, 000     |
| Total                      | 5, 339, 962 |

Table 1 shows the direct economic benefits generated by the major activities dependent on the Great Marsh in 2000. Commercial clamming, which refers to the catch of soft shell clams only, had the highest economic value. Economic benefits from salt marsh haying were obtained from the three main hayers in Rowley and Plum Island. Boating and fishing are recreational activities that are seasonal and their benefits could vary according to the time of the year. Fishing guides and harbor tours were also included within this

<sup>1</sup> Miscellaneous activities include scenic flights and the operation of Essex shipbuilding museum.

category. The value of beach going activities included the economic values derived from two major beaches in the Great Marsh region, Salisbury Beach Reservation, and Crane Beach. The economic benefits resulting from the operation of State and Federal Parks comprise of the Parker River National Wildlife Refuge, Sandy Point State Reservation and various educational programs provided by the Massachusetts Audubon Society. Birdwatching has also been incorporated into this category. The economic benefits of these listed activities added up to at least \$5.3 million in the year 2000. Figure 1 shows the percentage of how much each activity contributed to the total economic benefit.



**Figure 1.** Percentage of economic benefits generated by each economic activity that is dependent on the Great Marsh.

**Table 2.** Description of Economic Activities

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| Activity            | Description  | Source   |
|---------------------|--|--|
| Clamming            | Commercial soft-shell clamming and permit revenues (Essex, Gloucester, and Ipswich)          | Massachusetts Division of Marine Fisheries   |
| Hunting             | Waterfowl Stamps   | MassWildlife (Westborough)   |
| Salt Marsh Haying   | Rowley and Plum Island   | Massachusetts Audubon Society  |
| Boating and Fishing | Boating and fishing companies, including fishing guides, and harbor tours                    | Ipswich Bay Fly Fishing Derby, Essex River Cruises, Individual Fishing Guides, Private Boating Companies                   |
| Beach Going         | Salisbury Beach Reservation, Crane Beach   | Salisbury Beach Reservation, The Trustees of Reservations  |
| Parks               | State Parks (Parker River Wildlife Refuge, Sandy Point), Bird-watching, Educational Programs | Parker River National Wildlife Refuge, Massachusetts Audubon Society, Massachusetts Department of Environmental Management |
| Miscellaneous       | Scenic Flights, Museum   | Plum Island Community Airport, Essex Shipbuilding Museum   |

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### **(C) Discussion**

These direct economic benefits were obtained from various sources as shown in Table 2, and each value has been confirmed by its respective source to be relatively consistent for the past few years. The direct economic benefit of the Great Marsh in 2000 is at least approximately \$5.3 million. This could be an underestimated value, as it only included major industries and does not represent a complete list of the entire business community within the Great Marsh area. In addition, the number of jobs created by these businesses could also lead to significant economic benefits. Inflation rates and economic growth could increase the estimated current direct economic values. Hence, appropriate discounting, which could be explained by the existence of interest rates (Pearce and Turner, 1990) should be applied when undertaking future cost-benefit analysis studies.

### **III. Indirect Economic Benefits: A Comparison Between Interior Land and Land With Marsh View**

#### **(A) Introduction**

The total economic value of the Great Marsh consists of indirect and direct use values, including goods and services of direct benefit to humans, such as commercial fishing, recreational activities, and other revenue generating activities described in Section II.

The provision of scenic Great Marsh views, an indirect service, can be quantified using land values that are determined by consumer demand and willingness to pay, which are indicated by land sales and hence, the assessed land values. This study focuses on land values in towns that border the Great Marsh, and analyzes the differences between land parcels with and without a view.

Most towns and cities will receive additional taxes when land parcels with marsh views are assessed. The magnitude of the benefits will differ according to each town or city's proximity to the Great Marsh.

#### **(B) Method**

Three towns that border the Great Marsh have been chosen to represent the entire area, due to their ideal geographical characteristics and available data. All three towns, Salisbury, Newbury, and Ipswich have adequate land parcels with views of the Great Marsh and also enough interior parcels to make comparisons between the two types of land values within the same neighborhood in each town. Each neighborhood was carefully selected by the availability of different land types within the same area. Hence, an ideal neighborhood to be included in this study consists of interior land and land with marsh views with close proximity to each other. The property listings of these three towns were obtained from their respective assessors' offices. A total number of 566 parcels were analyzed for this study.

In order to provide maximum accuracy, only land parcels within the same neighborhoods were selected for this study. Different streets that reflect different views were picked from the same neighborhood, as shown by the land parcel maps available from the assessors’ offices. Values of parcels in the same neighborhood without any apparent view, i.e. interior lands, were evaluated for their land value together with parcels having a marsh view or those having views of open water. For purposes of this study, parcels adjacent to beaches and other land types with extremely high values have been excluded to minimize biased results. The building value on each land parcel was also excluded.

**(C) Results and Discussion**

Land parcels with a Great Marsh view can be assessed with values as much as 81% higher than interior lands. Table 3 shows the percentage increases in land values, for Salisbury, Newbury, and Ipswich, ranging from 26% to 81%, with a mean of 54%. These differences in land values, due to the presence of the Great Marsh view, lead to more revenue for each town paid by landowners in the form of increased property taxes.

**Table 3.** Total Percentage Increase in Land Values

| Town/City | Marsh View (%) |
|-----------|----------------|
| Salisbury | 56             |
| Newbury   | 26             |
| Ipswich   | 81             |
| Mean      | 54             |

Since there are many variables that determine land values (e.g. proximity to schools and public transportation), this study tries to focus on the view factor by taking the “neighborhood” approach. It is important to understand that land values were not compared for all parcels within each town. Rather, the scale and scope of this study’s results are from limited neighborhood snapshots in close proximity to the marsh that

provide a representative picture of the enhanced value of Great Marsh. More thorough research should be carried out in the future by increasing the sample size to include inland areas in each town for comparison with marsh view parcels.

Additional land values associated with the close proximity to the Great Marsh lead to significant indirect economic benefits. However, having higher land values is just one example of the various indirect wetland benefits to the surrounding communities. Indirect functional benefits of the Great Marsh for future studies could include flood control, groundwater recharge, wastewater treatment, and ecosystem support functions. Future indirect benefit studies should try to include these other functions of the Great Marsh, so as to provide a more complete estimation of indirect wetland values.

## **IV. Contingent Valuation: Willingness to Pay**

### **(A) Introduction**

Contingent valuation is a method of environmental valuation that involves asking a sample population willingness to pay (WTP) questions. It is known as “contingent valuation” because the valuation is dependent on a hypothetical scenario given to the respondents (Perman et al., 1999). Since contingent valuation can estimate non-use value (Perman et al., 1999), including option value, and is effective in acquiring non-market value (Udziela and Bennett, 1996), it is used in this study to measure price estimates for the non-market services provided by the Great Marsh. Non-market services refer to Great Marsh qualities that are not reflected in both the market analysis and land value comparison studies explained in sections II and III. Residents’ attitudes to the general values of the Great Marsh, its development and eventually WTP for its preservation were derived through a survey. The sample WTP data were used to calculate the average WTP for the entire population in the seven Great Marsh communities.

### **(B) Method**

This study employs a quantitative and qualitative research design. A survey of sample size 100 was conducted in August 2003, at various locations on the North Shore of Massachusetts. Questionnaires were used to survey residents from the Great Marsh region, including Essex, Gloucester, Ipswich, Newbury, Newburyport, Rowley, and Salisbury. The survey was conducted personally to achieve maximum response rate and to ensure the reliability of the results (Perman et al., 1999).

The questionnaire (Appendix I) designed for this study consisted of eleven questions, and took approximately five minutes to complete. Question 1 was asked to confirm that all respondents were indeed residents from the Great Marsh region. Questions 2 to 5 asked for respondent knowledge, opinions about the Great Marsh, and respondent behavior. Question 2 allowed respondents to reveal their frequency of visits to the Great Marsh, while Question 3 provided the reasons for their visits. Eleven perceived values of the Great Marsh, based on the understanding of the common values of the Great Marsh and

modified from previous similar studies (Borrie et al., 2002; Henneberger, 1996), were listed in Question 4. Respondents were asked to rank each individual value according to its importance. Questions 6 and 7 were valuation questions that indicate the willingness to pay for the preservation of the Great Marsh. The last four questions collected demographic information including age, education, number of family members, and income. A map was provided to the respondents throughout the survey process. This was to ensure that every respondent knew exactly where is the Great Marsh, and what type of land uses it covers.

Two sets of surveys with different questions about willingness to pay (question numbers 6 and 7) were used to prevent any bias in payment type. Therefore, half of the questionnaires had increased annual taxation as the payment mechanism, while the other half included private donation. A short description of how a respondent's payment would be helpful in preserving the Great Marsh was also explained. Current preservation and conservation projects were described to each respondent to help them understand how payments could be used, including salt marsh restoration, land acquisition, and water quality monitoring projects. The survey responses collected were analyzed and described in the following section.

## **(C) Results**

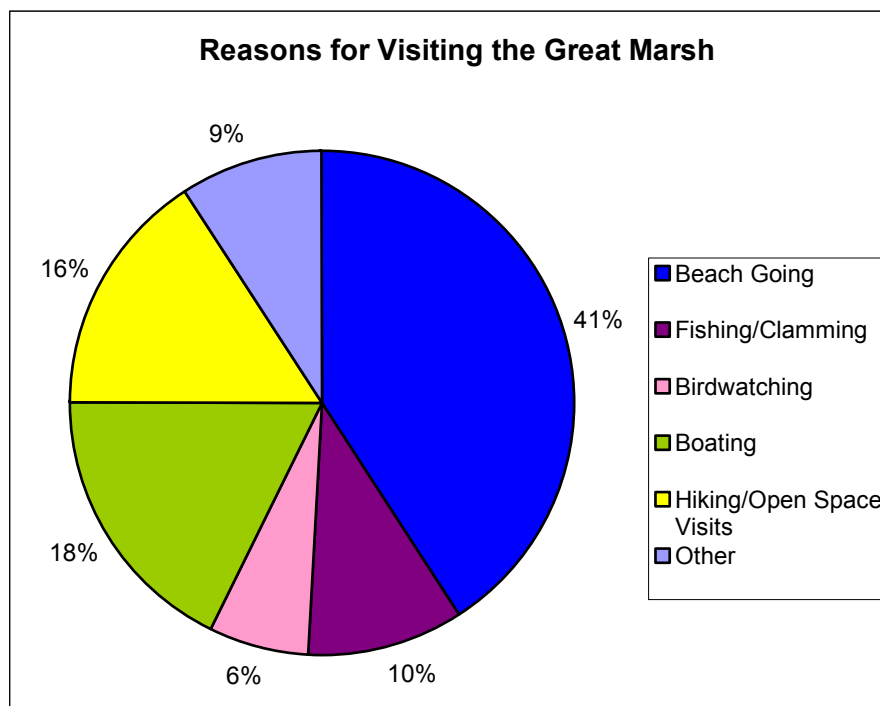
### **1. Public's Behavior and Opinions**

The following diagrams illustrate public's behavior and opinions regarding the Great Marsh. The most popular reason respondents visit the Great Marsh is for beach going, while the least popular reason is birdwatching (Figure 2). Other activities not listed on the questionnaire, but provided by the respondents themselves include jogging, photography, and painting. Driving past the Great Marsh is not classified as an activity, nor counted as a visit.

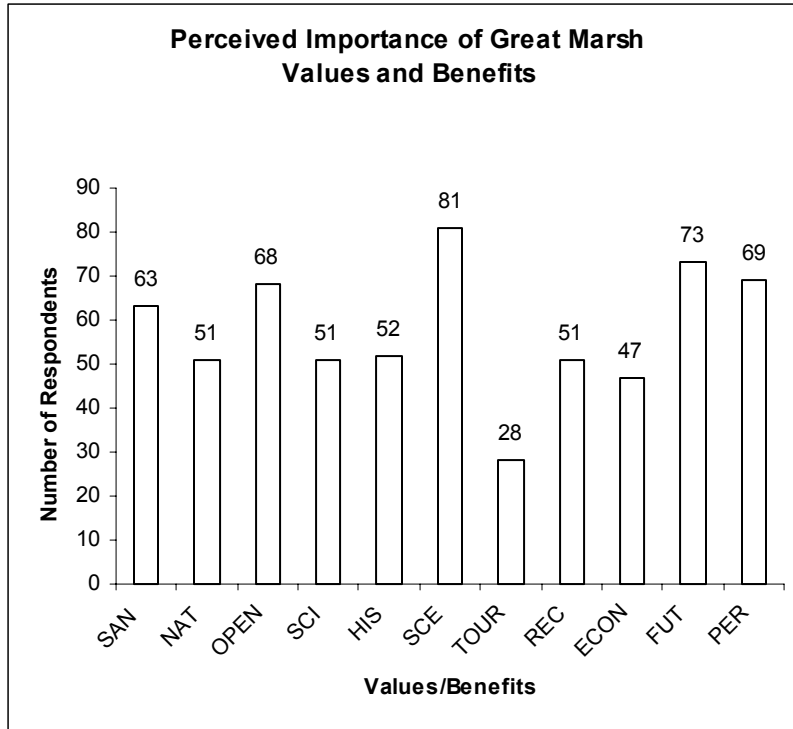
Of all the eleven different Great Marsh values and benefits listed in the questionnaire, the respondents indicated "a place of scenic beauty" as the most important value of the Great Marsh to them personally. 81 respondents out of 100 perceived it as most important

(Figure 3). The coding of each value shown in Figure 3 is explained in Table 4. The Great Marsh as “a tourist destination” was indicated to have the least important value and benefit, since only 28 respondents thought it was most important.

Over 90% of the respondents agreed that development could adversely affect the Great Marsh (Figure 4). However, this does not imply that all the respondents who agreed would be willing to pay for the preservation of the Great Marsh. Only 77% of the respondents (Figure 5) would be willing to pay either in the form of increased taxes or donations. There were people who agreed that development could adversely affect the Great Marsh, yet were not willing to pay to preserve the Great Marsh.



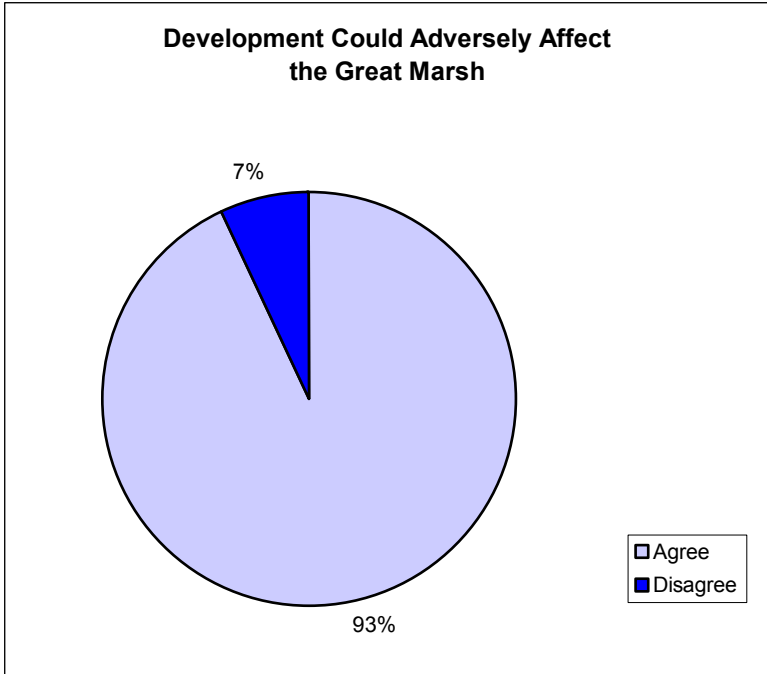
**Figure 2.** Activities that reflect the reasons for visiting the Great Marsh.



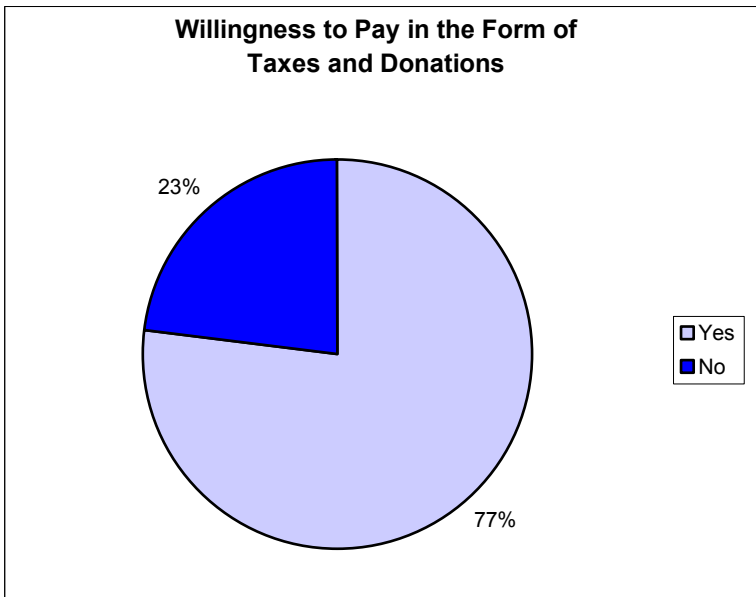
**Figure 3.** Perceived importance of Great Marsh values and benefits as implied by the number of respondents who indicated them as most important.

**Table 4.** Description of Great Marsh Values and Benefits

| Value | Description                                     |
|-------|---|
| SAN   | A sanctuary for fish and wildlife               |
| NAT   | A place for education about nature              |
| OPEN  | A place for open space                          |
| SCI   | A place for scientific research and monitoring  |
| HIS   | An historic and cultural resource               |
| SCE   | A place of scenic beauty                        |
| TOUR  | A tourist destination                           |
| REC   | A place for recreational activities             |
| ECON  | An economic resource for fishing, clamming etc. |
| FUT   | A reserve of natural resources for future use   |
| PER   | A place to create sense of personal well-being  |



**Figure 4.** Development could adversely affect the Great Marsh.



**Figure 5.** Percentage of respondents who are willing to pay to support projects that help preserve the Great Marsh, in the form of either increased taxes or donations.

**Table 5.** Results of Tax and Donation Surveys

|                              | Payment Vehicle |          |
|------------------------------|-----------------|----------|
|                              | Tax             | Donation |
| Number of Respondents (%)    | 72              | 82       |
| Mean Willingness to Pay (\$) | 83              | 74       |

People were generally more willing to pay in the form of donations (Table 5). However, they were willing to pay less when compared with people who were willing to pay in the form of increased taxes. While there was a 10% increase in the number of respondents who were willing to pay in the form of donations, respondents who were willing to pay with increased taxes gave a mean amount 11% higher than respondents who agreed to pay donations.

## 2. Willingness to Pay

The WTP for the preservation of the Great Marsh was derived from the survey (Table 6). The aggregate WTP was estimated using the total population (Year 2000) of all seven Great Marsh communities, which totaled 83,760 residents. The average WTP per person was \$79. Although the median WTP (31) was found to be significantly lower than the mean (79), the mean was still chosen to represent the aggregate WTP, as it represented respondents who were willing to pay high amount of taxes or donations for marsh preservation.

**Table 6.** Willingness to Pay (WTP) for the Preservation of the Great Marsh

|                             | Price Estimate (\$) |
|-----------------------------|---------------------|
| Aggregate WTP of Population | 6, 610, 339         |
| Average WTP per person      | 79                  |

A regression model was used to conclude which variables affect WTP. The WTP for Great Marsh preservation is the dependent variable, while demographic characteristics of

the respondents, gender (GEN), age (AGE), education level (EDU), family size (FAM), and income level (INC) are the independent variables, together with the frequency of visits (VIS).

$$WTP = \beta_0 + \beta_1 GEN + \beta_2 AGE + \beta_3 EDU + \beta_4 FAM + \beta_5 INC + \beta_6 VIS + \varepsilon, \quad (1)$$

where  $\beta_0$  is the constant.

The results are shown in Table 7, with Table 8 describing the variables used in the regression analysis. There is no significant relationship between WTP and demographic variables of gender, age, education, and family size. However, income level and the frequency of visits to the Great Marsh appeared to be significant ( $t > 1$ ). The higher the income level of a respondent, the more he or she will be willing to pay. Similarly, the more a respondent visits the Great Marsh, the larger the amount of payment he or she will be willing to make.

**Table 7.** Results of WTP Regression Model

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Dependent Variable: *WTP*

Observations                      100

Independent Variables

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|                            |                      |
|----------------------------|----------------------|
| <i>Constant</i>            | -3.27E+01<br>(-0.41) |
| <i>Gender</i>              | -3.68E+01<br>(-1.39) |
| <i>Age</i>                 | 5.62E-01<br>(0.60)   |
| <i>Education</i>           | 3.85<br>(0.21)       |
| <i>Family size</i>         | 4.84<br>(0.57)       |
| <i>Income</i>              | 9.76E-04<br>(1.93)   |
| <i>Frequency of Visits</i> | 3.00E-01<br>(2.35)   |
| <i>R-Squared</i>           | 0.1                  |

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Results of regression model, which estimated the correlations between the WTP for Great Marsh preservation, and five demographic variables, together with the frequency of visits. The first figure refers to the estimated coefficient, and the figure in parentheses below is the t-ratio of the coefficient.

**Table 8.** Description of Variables in the Regression Analysis

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| Name               | Mean   | Definition of variable  |
|--------------------|--------|---|
| Willingness to Pay | 78.92  | Willingness to pay for Great Marsh protection, in the form of either increased taxes or donation. |
| Gender             | 0.52   | Sex of Respondent, 0 = male, 1 = female.  |
| Age                | 45.2   | Age of respondent, years.   |
| Education level    | 2.9    | Education level, 4-point scale, 4 = Completed Graduate School.                                    |
| Family size        | 2.61   | Number of family members in a household.  |
| Income             | 67,400 | Annual household income.  |

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## **(D) Discussion**

The survey and subsequent data analysis contributed to a number of significant findings. Beach going was found to be the most popular reason to visit the Great Marsh, followed by boating and hiking. This could explain the high economic benefits incurred by the beach sites as estimated in Section II. Respondents perceived the Great Marsh as “a place of scenic beauty” as the most important, and “a tourist destinations” as the least important value. Although tourism leads to positive economic growth and development in Massachusetts (Travel Industry Association of America, 2003), the local residents within the Great Marsh region appeared to perceive tourism as a more negative than positive value. If surveyed, visitors from other areas could have a different opinion regarding the importance of Great Marsh as a tourist destination. 93% of the respondents agreed that development of the surrounding uplands could adversely affect the Great Marsh, however, this did not imply that the same number of respondents would also be willing to pay for the preservation of the Great Marsh.

The percentage of respondents who were willing to pay for the preservation of the Great Marsh through taxes (72%) was lower than respondents willing to pay with donations (82%). On the contrary, the mean WTP when tax was the payment mechanism was \$11 higher than when donation was used as the payment type. Therefore, the mean WTP value was not biased because of the type of payment mechanism. In addition, gender bias was also not an issue in this study as each gender has been well represented. Almost equal number of males (48%) and females (52%) were interviewed.

The average annual WTP for Great Marsh preservation was \$79, regardless of payment type. Income and frequency of visits were significant variables and have positive correlations associated with WTP. Hence, individuals with higher income levels, and individuals who visit the Great Marsh frequently were willing to pay more for the preservation of the Great Marsh.

## **V. Conclusion**

The positive economic values, derived from the market analysis of direct economic benefits and contingent valuation, are significant figures that should be taken into account when making resource management decisions in the Great Marsh. All three analyses provided sufficient data to test the hypotheses of the Great Marsh Coalition. There are substantial economic and fiscal benefits that accrue from natural resources and these benefits produce positive economic development in the seven communities surrounding the Great Marsh.

Since this is the first attempt of an economic study on the North Shore's Great Marsh, it could act as a foundation for future studies. Further research should focus on additional indirect economic benefits of the Great Marsh, which will enable a more thorough understanding of the cost of not preserving the Great Marsh. The scope of the land value comparison and contingent valuation should also be expanded to increase their accuracies.

## VI. References

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## Appendix I

Great Marsh Survey – Tax Payment<sup>2</sup>

### **THE GREAT MARSH COALITION Environmental Economics Project August 2003**

#### **Introduction**

#### **Willingness to Pay for the Preservation of the Great Marsh**

The purpose of this questionnaire is to gather information related to the economic values of the Great Marsh, from residents in Great Marsh communities.

The area defined as the Great Marsh is as follows (show map).

The different land and water resources, including salt marsh grasslands, tidal creeks, estuaries and beaches, have been recognized to provide ecological, economic, recreational, and cultural values. This survey aims to estimate the economic value of the Great Marsh, through your willingness to pay for its preservation.

Some popular Great Marsh beaches, parks and wildlife refuges are:

- Crane Beach (Ipswich, Essex)
- Pavilion Beach (Ipswich)
- Plum Island Beach (Newburyport, Newbury, Rowley, Ipswich)
- Salisbury Beach (Salisbury)
- Wingaersheek Beach (Gloucester)
- Joppa Flats Wildlife Sanctuary (Newburyport)
- Parker River National Wildlife Refuge (Plum Island)
- Essex County Greenbelt Headquarters (Essex)
- Old Town Hill Reservation (Newbury)

I appreciate your time and assistance.

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<sup>2</sup> The format of the tax payment survey is identical to the donation survey. The donation payment survey differed only in the wording of questions 6 and 7. Instead of annual additional taxes, the donation survey asked for annual donations.

1. Are you a resident of one of the following communities?
    - a) Essex
    - b) Gloucester
    - c) Ipswich
    - d) Newbury
    - e) Newburyport
    - f) Rowley
    - g) Salisbury
  
  2. Approximately how many times have you visited the Great Marsh within the past year?
- 

3. Which of the following activities best describe the reason for your visits? You may choose more than one answer.
  - a) Beach going
  - b) Fishing/clamming
  - c) Birdwatching
  - d) Boating
  - e) Hiking/open space visits
  - f) Other (Please Specify) \_\_\_\_\_

4. We are interested in your opinions about the values and benefits of the Great Marsh. Please indicate for each of the following, how important the Great Marsh is to you: (1=not important, and 8=very important)

|  |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|
| A sanctuary for fish and wildlife                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place for education about nature                               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place for open space   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place for scientific research and monitoring                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| An historic and cultural resource                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place of scenic beauty   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A tourist destination  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place for recreational activities                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| An economic resource for fishing, clamming, and other activities | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A reserve of natural resources for future use                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A place to create sense of personal well-being                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

5. One of the most significant current threats to the Great Marsh is development of its surrounding upland. Development of the coastline may lead to water pollution, and loss of habitat, scenery, and recreational opportunities.

Do you agree that development could adversely affect the Great Marsh?

- a) Yes
- b) No

6. I am interested in finding out how much preserving the Great Marsh in its present state is worth to you. Would you be willing to pay additional taxes to support projects that help preserve the Great Marsh in its present state? Examples of current projects include salt marsh restoration, open space acquisition, and restoration of migratory fish passage.

- a) Yes
- b) No

7. How much would you be willing to pay in additional taxes on an annual basis?

- |            |               |                |
|------------|---------------|----------------|
| a) 0       | e) \$61-80    | i) \$401-600   |
| b) \$1-20  | f) \$81-100   | j) \$601-800   |
| c) \$21-40 | g) \$101- 200 | k) \$801-1000  |
| d) \$41-60 | h) \$201-400  | l) Over \$1000 |

The last few questions are for demographic purposes, and will help us better understand the results of this survey. Your answers will be kept confidential.

8. What is your age?

- a) Under 20
- b) 20 - 29
- c) 30 - 39
- d) 40 - 49
- e) 50 - 59
- f) Over 60

9. Which of the following is your highest level of education acquired?

- a) Less than 12 years
- b) Completed High School
- c) Completed College
- d) Completed Graduate School

10. How many family members (including yourself) do you have in your household?

- a) 1 – 2
- b) 3 – 4
- c) 5 - 7
- d) 8 - 12
- e) Over 12

11. Which of the following best describes your *annual household* income last year?
- a) Under \$10, 000
  - b) \$10, 000-\$30,000
  - c) \$30, 000-\$50,000
  - d) \$50, 000-\$70,000
  - e) \$70, 000-\$90,000
  - f) Over \$90,000