

*An Analysis of Survey Design & Economic Embedding*  
*for Key Biscayne Beach Valuation Studies:*

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## I. Introduction

This paper reports on the first attempt in a potential series of annual surveys of beaches on Key Biscayne, Florida. It is hoped that these surveys will provide a snap-shot in time of the beach going publics' attitudes about their environment. Using the information obtained from these questionnaires, one can attempt to elicit information regarding such things as public stance on issues concerning the beach, willingness to pay for hypothetical scenarios, and the estimated value placed on the beaches themselves.

## II. Purpose

The purpose of this year's survey was dual in nature. In one respect, it represented a test run to examine the overall format and wording of the survey itself. A copy is included in Appendix A. Additionally, there was the option of modifying the construction to examine a particular economic aspect concerning beach use. To that end, this paper will also serve to explore the concept of embedding.

When a good being valued is viewed as a symbol for a larger issue, respondents often tend to give their opinions on that issue, not the importance to them of the state of the *specific good* being offered.<sup>1</sup> This concept is referred to as embedding. To look at an embedding scenario with this survey, one question was slightly modified, and an extra question was developed. Question 11 in the original format reads: "How much more would you be willing to spend as an entrance fee per trip if the beach contained an endangered turtle nesting site?" Response options ranged as follows: less than \$1; \$1-\$2; \$2-\$3; \$3-\$5; \$5-\$10; over \$10; or some other amount. This was altered to read: "How much more would you be willing to spend as an entrance fee

per trip if the beach contained a *loggerhead turtle* nesting site?” Here only one particular species of turtle is being considered. An extra question, numbered 14, was then added to the end of the survey. It read: “How much more would you be willing to spend as an entrance fee per trip if the beach contained a *loggerhead turtle* nesting site and a *green sea turtle* nesting site?” Now there are two different species referenced. In each of these questions, the response options offered were identical to those in Question 11 in the original format.

The addition of another species serves to distinguish whether people truly value the specific turtle nesting site. For those who do, it is reasonable to assume that they would be willing to pay more for a site that protects more species of turtles. Using the given definition, embedding would occur if respondents were willing to pay the same amount for both Questions 11 and 14. Thus, they value the concept of turtle protection, but are not willing to pay more for a site that protects more than one species. Prior to conducting the actual survey, it was hypothesized that embedding would be present in responses.

### **III. Procedure**

#### **A. Design**

The survey itself was designed by Dr. David Letson and Manoj Shivlani of the Division of Marine Affairs of the University of Miami’s Rosenstiel School of Marine and Atmospheric Science. It represents a hybridization of Contingent Valuation (CV) and Travel Cost (TC) methodologies. It includes thirteen questions concerning respondent age and demographics, activity options, visitation, an estimation of trip expense (TC),

reason for visitation, and willingness to pay (CV), as well as several questions on preferences. In the design, there was little in the way of information to present during the description of the hypothetical scenario. This point will be addressed further in later sections. The payment vehicle consisted of the seven option ranges discussed previously and were based on additions to entrance fees, and the preference questions are in a referendum format of yes or no, as per the recommendations of the NOAA panel regarding contingent valuation studies.<sup>2</sup> No option was given for “I don’t know” responses. The fourteenth question, described previously, was designed by Dr. Letson and myself. A duplicate survey, transcribed into Spanish by Eileen Alicia, was provided for those respondents who did not speak English.

## **B. Implementation**

Again following the recommendations of the NOAA panel, the administration of this survey took the form of in-person interviews on the beach site.<sup>3</sup> The beach surveyed in this report was Crandon Beach, a public beach of Dade County, Florida. Other beaches involved in the project were Bill Baggs State Park and Hobie Beach.

Prior to site visitation, there were several procedural issues agreed upon. It was decided that the interviews would be pro-actively acquired, that is interviewers would move from person to person along the beach. In an attempt to make it as random as possible, every third person or group would be interviewed. Proceeding in this way, it was hoped that approximately ten surveys could be conducted per hour. By spending a total of eight hours during weekdays and eight hours during weekends, it was anticipated that a total of 160 surveys could be collected. This would attempt to give a representational sample of the Key Biscayne beach going public. The approximate time of

the actual surveying ranged from noon to dusk, as it was believed that this would provide for the maximum number of people attending the beach.

Unfortunately, the 160 response goal was not able to be achieved. There were two major factors which prevented this: time and weather. The survey itself was not ready until mid-October, and it was not possible to meet as a group to discuss sampling techniques until the third week in October. Given the project due date of November 13th, 1997, this did not allow a very large window of opportunity to survey when taking into consideration personal work and class schedules as well as the advent of daylight savings time, which brought darkness at around 5:30 to 6:00 PM.

A second, more limiting factor, was weather. Only one day was what could be considered “prime” beach going weather: sunny, clear, and in the 80’s. An extended period of cloudy and rainy days during the first week, coupled with several days of cooler temperatures either prevented surveying altogether, or served to limit the number of beachgoers on Crandon Beach. Particularly on weekdays, there were so few people on the beach that even reducing the sampling rate from every third individual or group to every other still produced roughly ten surveys before the entire beach was exhausted. Additionally, there were not enough people entering the beach to warrant continuing after a full run of the beach was conducted. Of the two weekends, one day was lost to rain, another day was cut short due to rain, and cool temperatures reduced the last weekend to numbers similar to that of a weekday.

During the data collection itself, a “run” began at one end of the beach and continued to the other. Since most people were within twenty feet of the water, it was possible to make just one run to interview the appropriate number of respondents. These

people were spread out along the length of the beach and didn't appear to be clustered in any specific locations. Only primarily sedentary people were approached: those swimming, running, and walking along were omitted due to an uncertainty of how to include them in the sampling procedure. Also left out were people who appeared to be sleeping (i.e. with faces covered) so as not to startle and potentially anger them. If there were small clusters of people along the sand closest to the boardwalk, these were interviewed as well, although this was the case only twice. For English speaking respondents, the questions were asked by the interviewer who then recorded the answers. For Spanish speaking respondents, the Spanish survey was handed to them, and they filled it out themselves. A summary of results that were collected is as follows.

**Table 1:**

<b>Date</b>	<b># of Interviews</b>	<b># of Responses</b>	<b># of Refusals</b>	<b>Time Spent</b>
Wednesday October 29, 1997	10	8	1	1 hr 5 min
Friday October 31, 1997	9	8	1	1hr 10 mins
Sunday November 2, 1997	22	20	2	1hr 45 mins
Saturday November 8, 1997	10	9	1	1 hr 0 mins
<b>Totals:</b>	<b>51</b>	<b>45</b>	<b>5</b>	<b>5hrs 0 mins</b>

In addition, two other weekdays were attempted, but upon entering the parking lot, the lack of cars indicated there were probably not too many people. Upon confirmation from the attendant, it was judged such a day would not be worth the effort and expense. However, from the numbers in Table 1 the response rate was 88.2%, the refusal rate was 11.8%, and roughly 9 surveys were collected per hour. While these

figures were very encouraging, it is unfortunate that the aforementioned factors limited the amount of time spent on the beach.

#### **IV. Analysis of Data**

##### **A. Typical Crandon Beach Goer**

A total of 45 surveys (64.4% weekends and 35.6% weekday) were collected from individuals or groups totaling 140 people. The total beach population for the purposes of this survey was estimated at about 479 people. (An explanation of the estimation of total population is found in Appendix B.) Thus, the sample reflects roughly 30% of the Crandon Beach population on days surveyed. It is not known whether the sample is truly representative of Dade County, as census information was only used for income data. It would be beneficial, however, to get an idea of what characterized the typical respondent. Here, 'typical' refers to the choice with greatest frequency for each question. Where possible, quantitative means were calculated. In such cases, 'no responses' were omitted. In calculating the average income (using average household income data from the 1990 census), foreign tourists were excluded, and those living outside of Florida were assigned incomes equal to the average US household income for 1990. In two questions, multiple responses were allowed, and in one of these cases three choices had percentages of greater than 60%, so all three were considered. The results are shown in Table 2.

**Table 2:**

<b>QUESTION</b>	<b>TYPICAL BEACH GOER</b>	<b>NUMBER</b>	<b>PERCENT</b>
RESIDENCY	Dade County	31	86.1%
AVERAGE INCOME	\$40,124.81	36	-
AGE	16-25	16	35.6%
RENT OR OWN	Rent	27	60.0%

AVERAGE NUMBER / TRIP	3.1	45	-
ACTIVITIES (TOP 3)	Sunbathing	33	73.3%
(Mult. responses allowed)	Swimming	30	66.7%
	Beach Walking	28	62.2%
AVERAGE EXPENDITURE	Less than \$10	19	42.2%
FREQUENCY OF VISITS	2-5 per month	19	42.2%
MAIN REASON FOR VISIT	Availability of space	14	31.1%
OTHER BEACH ?	Some other site	27	60.0%
FAVOR TURTLE SITE?	Yes	36	80.0%
WTP FOR ONE TURTLE	\$2.45	37	-
FAVOR BAN ON JET-SKIS?	Yes	31	68.9%
FAVOR RV PARK?	No	24	53.3%
WTP FOR TWO TURTLES	\$2.73	37	-

## B. Embedding Issue

Recalling the definition of embedding, it would appear from the results in Table 2 that people did in fact place more value on a nesting site that contained two species rather than one: \$2.45 for one species versus \$2.73 for two. Note further that in Table 3a, 35.1% of those surveyed indicated that their willingness to pay (WTP) fell between \$1 - \$2, but in Table 3b, the highest percentage (27%) is associated with a response between \$3 and \$5. This too seemed to indicate an increase in WTP for a site with more than one turtle species, and thusly that there is no embedding occurring. However, the actual response options in the survey for these two questions gave only ranges of values to select. In order to get a numeric figure, a simplifying assumption was made to use the mean of the value range coupled with the frequency of the response to estimate the average willingness to pay. Those who indicated they would pay nothing were placed in the “other” category. Question responses and calculations of average WTP are summarized in Tables 3a-b.

### Table 3a:

QUESTION 11	MEAN VALUE	FREQUENCY	PERCENT	(MEAN VAL) x (FREQ)
less than \$1	\$0.50	5	13.5%	\$2.50
\$1 - \$2	\$1.50	13	35.1%	\$19.50
\$2 - \$3	\$2.50	4	10.8%	\$10.00
\$3 - \$5	\$4.00	9	24.3%	\$36.00
\$5 - \$10	\$7.50	3	8.1%	\$22.50
over \$10	\$10.00	0	0.0%	\$0.00
other	\$0.00	3	8.1%	\$0.00
		37	100.0%	
			<b>TOTAL</b>	<b>\$90.50</b>
			<b>AVE WTP</b>	<b>\$2.45</b>

**Table 3b:**

QUESTION 14	MEAN VALUE	FREQUENCY	PERCENT	(MEAN VAL) x (FREQ)
less than \$1	\$0.50	5	13.5%	\$2.50
\$1 - \$2	\$1.50	9	24.3%	\$13.50
\$2 - \$3	\$2.50	6	16.2%	\$15.00
\$3 - \$5	\$4.00	10	27.0%	\$40.00
\$5 - \$10	\$7.50	4	10.8%	\$30.00
over \$10	\$10.00	0	0.0%	\$0.00
other	\$0.00	3	8.1%	\$0.00
		37	100.0%	
			<b>TOTAL</b>	<b>\$101.00</b>
			<b>AVE WTP</b>	<b>\$2.73</b>

Because these figures are based on estimates from interval choices, the calculated WTP may not truly reflect the attitudes of the sample as a whole. In fact, 81% of those interviewed indicated that they would pay the same amount for Question 14 as they did in Question 11. Therefore, we need to look more carefully at the conclusion that no embedding occurred. (As an aside, it is also interesting to note that for each average WTP, neither fell into the range of highest frequency.)

To rectify this dilemma, we can use the statistical method known as the t-Test to analyze the hypothesis that the difference in overall means of the beach samples equals zero, which is to say they are actually the same.<sup>4</sup> Such an occurrence would then imply that there was in fact an embedding scenario. Use of the t-Test requires a near normal

sampling distribution. For the scope of this paper, it is assumed that the samples are indeed normal. Statistical analysis using QuattroPro provided the following results:

QUESTION 11		QUESTION 14	
Mean	3.1081081081	Mean	3.2972972973
Standard Error	0.2761375157	Standard Error	0.27362779367
Median	3	Median	3
Mode	2	Mode	4
Standard Deviation	1.679678934	Standard Deviation	1.66441289056
Variance	2.8213213213	Variance	2.77027027027
Count	37	Count	37
Confidence Level (0.950)	0.5412195879	Confidence Level (0.950)	0.53630062295

From this we have the necessary information to perform the t-Test. Setting  $\alpha = 0.05$  to achieve a confidence interval of 95% we get the following:

t-Test Two Sample Assuming Equal Variance	QUESTION 11	QUESTION 14
Mean	3.1081081081	3.2972972972973
Variance	2.8213213213	2.7702702702703
Observations	37	37
Hypothesized Mean Difference	0	
df	72	
t	<b>-0.486664263</b>	
P(T<=t) two-tail	0.6279744569	
t Critical two-tail	1.9934635639	

Since the value generated for t ( -0.4867) lies within the range:

$$t_{1/2\alpha} (N_{11} + N_{14} - 2) < t < t_{1-1/2\alpha} (N_{11} + N_{14} - 2)$$

$$t_{0.025} (72) < t < t_{0.975} (72)$$

$$-1.9934 < t < 1.9934$$

we can conclude with 95% confidence that the hypothesis stating that the difference between the two mean WTP amounts is zero cannot be rejected. This would then imply that embedding is present.

That we know embedding has occurred is one thing; the ramifications of this are another. Socially speaking, 80% of those surveyed were willing to support a turtle nesting site on Crandon Beach. Economically speaking, they are also willing to pay between \$2 and \$3 as an added entrance fee to Crandon Beach if it contains such a site. However, they are indifferent to the number of turtle species such a site contains. As there has been no policy developed for such a site yet, careful consideration should be given as to how this extra fee might be used. If potential policy makers had envisioned this added money to help defray part of the cost of establishing and/or maintaining such a site, one which could support multiple species (and therefore be presumably more expensive) may not be feasible. The data gathered indicates it would not be the case that the public would want to pay any more for an increase in species. If a multiple species site was either imperative or desirable, then policy makers would have to explore other avenues to procure means of financial support. A possibility might be an attempt to educate the public to sway them to pay above the current amount. It should be noted that because there was no supporting information provided for the respondents to consider, it is unclear if the willingness to pay estimates are wholly accurate. It is possible that more information could have altered respondents attitudes sufficiently to cause a change in WTP.

### **C. Survey Evaluation**

Outside of a disappointing number of surveys collected, the overall survey process went well. Nine out of ten people were willing to be surveyed, and it was favorably

received. Few people showed signs of agitation or impatience with the length, which took approximately five minutes, including answering questions. Many respondents also took time to reflect on the options before giving a response, most notably when selecting a choice of travel cost or willingness to pay. There were not sufficiently many questions asked to infer that respondents did not understand a given question, but the majority were asked in reference to the turtle nesting sites. While there were no glaring problems, several suggestions for further surveys do come to mind.

1) *Start Earlier*- Allow plenty of time to survey, taking into account the variability of South Florida weather. Beginning earlier, when the temperatures are warmer, should also increase the number of people at the beach. Keep in mind daylight savings time brings darkness earlier.

2) *Language* - While many foreign tourists are able to speak English, many did not know what a turtle or RV was. Having a French, Spanish, or German translation or a picture would be very beneficial.

3) *Activities* - Very few respondents selected fishing or kayaking. On Hobie Beach in particular, wind surfing is quite popular. It may be interesting to add that option and an “other” category in place of fishing and kayaking.

4) *Hypothetical Scenario* - In a situation similar to the Wittington et al. survey of Galveston Bay, there was no real policy scenario being described in this survey.<sup>5</sup> Further there was little information on the specifics of turtle nesting on South Florida beaches. Questions respondents tended to ask concerned what nesting sites were, how they would be partitioned, who would be in charge, and so on. It would be helpful to the respondent to have more information on some of these issues in order to make the most informed

choice. With respect to the payment vehicle options, there were few people who fell in the category of \$5 - \$10, and none in the over \$10 range. In order to get clearer picture of a quantitative mean for WTP, following surveys should cover a range of under \$1 to \$5 in \$1 dollar increments, with added choices of greater than \$5, and an “other” category. This breaks the estimated mean value for a given range to within \$0.50 of either end, giving a potentially better estimation.

5) *Future Research* - There are a myriad of other issues to address in a survey such as this. A particular one along the same lines as this survey could be explored. In administering this survey, if a respondent replied that he was unwilling to see part of the beach closed as an endangered sea turtle nesting site, the questions regarding willingness to pay were omitted. It was assumed that one who was not in favor of a turtle nesting site would not want to pay extra to use a beach that did. It would be interesting to see if this assumption is valid. There may be people who value a particular beach so much that they may be willing to pay extra for something they would not necessarily be in favor of.

## **V. Conclusions**

From the data collected, several important elements should be highlighted. First, a profile of a typical beach goer from Crandon beach was identified in Table 2. Second, with regards to the issue of embedding, statistical analysis (subject to simplifying assumptions) indicated that embedding was a factor in respondent’s answers. There was no statistical increase in willingness to pay to correspond to an increase in turtle species. Third, a meaningful test run of the survey was performed. Overall, there were no major sources of problems in the survey design. Some questions might need altering, but nothing of great significance. The most important design element that needs to be

addressed in future surveys is the ability to convey certain terms in other languages, as well as providing more background information on turtle nesting sites and issues pertaining to them. Finally, in terms of overall surveying, the sooner this can begin, the easier it will be to collect and analyze the data.

**APPENDIX A:**BEACH PREFERENCE SURVEY

Conducted by the MAF/RSMAS/University of Miami, Fall 1997

1. What is your zip code? \_\_\_\_\_
2. Which of the following includes your age?
  - a. 16 - 25 years
  - b. 26 - 35 years
  - c. 36 - 45 years
  - d. 46 - 55 years
  - e. over 55 years
3. Do you rent or own your residence?
  - a. rent
  - b. own
4. How many passengers on this trip (including yourself) ?
 

1    2    3    4    5    6    7    more than 8
5. Do you participate in any of the following activities while at this beach?
 

a. swimming / snorkeling	yes	no
b. sunbathing	yes	no
c. jet-skiing/water-biking	yes	no
d. fishing	yes	no
e. kayaking	yes	no
f. nature walk/birdwatching	yes	no
6. What is your average expenditure during this type of trip, including park entrance, parking, food, and fuel?
  - a. less than \$10
  - b. \$10 - \$30
  - c. \$30 - \$50
  - d. \$50 - \$100
  - e. over \$100
7. How often do you visit this beach site?
  - a. one visit per month
  - b. 2-5 visits per month
  - c. 5-10 visits per month
  - d. over 10 visits per month
  - e. other
8. Which is the MOST important reason you chose this beach?
  - a. availability of space/less crowded conditions
  - b. cleanliness and general park conditions
  - c. amenities (concession, parking, etc.)
  - d. distance from home
  - e. wildlife/ vegetative growth
  - f. others \_\_\_\_\_
9. Which of these other nearby sites do you visit as often?
  - a. Crandon Park
  - b. Hobie Beach
  - c. Bill Baggs
  - d. other \_\_\_\_\_
10. Would you be in favor of seeing part of the beach closed as an endangered sea turtle nesting site (such as loggerhead or Kemp Ridley's sea turtles) nesting site?
  - a. yes
  - b. no

11. How much more would you be willing to spend as beach entrance fee per trip if the beach contains a loggerhead turtle nesting site?
- a. less than \$1
  - b. \$1 - \$2
  - c. \$2 - \$3
  - d. \$3 - \$5
  - e. \$5 - \$10
  - f. over \$10
  - g. other \_\_\_\_\_
12. Should jet-skiing and powerboat use be banned from general-use beach areas?
- a. yes
  - b. no
13. If Dade county officials decided to set a recreational vehicle (RV) park in an undeveloped portion of Virginia Key, would you be in favor of it?
- a. yes
  - b. no
14. How much more would you be willing to spend as beach entrance fee per trip if the beach contains a loggerhead and green sea turtle nesting site?
- a. less than \$1
  - b. \$1 - \$2
  - c. \$2 - \$3
  - d. \$3 - \$5
  - e. \$5 - \$10
  - f. over \$10
  - g. other \_\_\_\_\_

**APPENDIX B:****ESTIMATION OF TOTAL  
BEACH POPULATION**

<b>DATE</b>	<b># OF PASSENGERS</b>	<b>DATE</b>	<b># OF PASSENGERS</b>
	<b>Q 4</b>		<b>Q 4</b>
10/29/97	1	10/31/97	3
10/29/97	5	10/31/97	2
10/29/97	3	10/31/97	2
10/29/07	2	10/31/97	2
10/29/97	1	10/31/97	3
10/29/97	2	10/31/97	2
10/29/97	2	10/31/97	2
10/29/97	1	10/31/97	2
<b>TOTAL SURVEYED 10/29</b>	<b>17</b>	<b>TOTAL SURVEYED 10/31</b>	<b>18</b>
(EVERY OTHER GRP)		(EVERY OTHER GRP)	
<b>TOTAL GRPS SURV</b>	<b>8</b>	<b>TOTAL GRPS SURV</b>	<b>8</b>
<b>AVE # / GRP</b>	2.125	<b>AVE # / GRP</b>	2.25
<b>EST GRPS NOT SURV:</b>	<b>8</b>	<b>EST GRPS NOT SURV:</b>	<b>8</b>
x AVE # per GRP + 20	<b>37</b>	x AVE # per GRP + 20	<b>38</b>
<b>TOTAL ON BEACH 10/29</b>	<b>54</b>	<b>TOTAL ON BEACH 10/31</b>	<b>56</b>

11/2/97	6	11/8/97	3
11/2/97	6	11/8/97	4
11/2/97	2	11/8/97	4
11/2/97	5	11/8/97	1
11/2/97	2	11/8/97	6
11/2/97	3	11/8/97	1
11/2/97	1	11/8/97	3
11/2/97	3	11/8/97	3
11/2/97	8	11/8/97	1
11/2/97	2	<b>TOTAL SURVEYED 11/8</b>	<b>26</b>
11/2/97	4	(EVERY OTHER GRP)	
11/2/97	3	<b>TOTAL GRPS SURV</b>	<b>9</b>
11/2/97	8	<b>AVE # / GRP</b>	2.889
11/2/97	4	<b>EST GRPS NOT SURV:</b>	<b>9</b>
11/2/97	6	x AVE # per GRP + 20	<b>46</b>
11/2/97	4	<b>TOTAL ON BEACH 11/8</b>	<b>72</b>
11/2/97	2		
11/2/97	4		
11/2/97	2		
11/2/97	4		
11/2/97	4		
11/2/97	2		
11/2/97	4		
<b>TOTAL SURVEYED 11/2</b>	<b>79</b>		
(EVERY THIRD GRP)			
<b>TOTAL GRPS SURV</b>	<b>20</b>		
<b>AVE # / GRP</b>	3.95		
<b>EST GRPS NOT SURV:</b>	<b>40</b>		
x AVE # per GRP + 60	<b>218</b>		

  

<b>GRAND TOTAL SURVEYED</b>	<b>140</b>
<b>GRAND TOTAL ON BEACH</b>	<b>479</b>
<b>PERCENT SURVEYED</b>	<b>29.2%</b>

<b>TOTAL ON BEACH 11/2</b>	<b>297</b>
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***APPENDIX B: CONT'D***

To estimate total beach population, on any given day the total surveyed was added up, and divided by the number of groups surveyed. This gives the average number per group. Taking into account the sampling rate, the total number of groups on the beach can be found. Multiplied by the average number per group yields the total population not surveyed. To this was added a compensating factor to take into account those omitted or in motion. This was estimated at 20 people per weekday and 60 people per weekend.

**ENDNOTES**

- <sup>1</sup> Donald H. Rosenthal, and Robert H Nelson, “Why Existence Value Should Not Be Used in Cost-Benefit Analysis,” Journal of Policy Analysis and Management, Vol. 11, No. 1. John Wiley & Sons, Inc. Winter, 1995. p. 120.
- <sup>2</sup> Richard T. Carson, et al. “Was the NOAA Panel Correct about Contingent Valuation?” (From the files of Dr. David Letson, Division of Marine Affairs, University of Miami Rosenstiel School of Marine and Atmospheric Science) 1996. p. 2.
- <sup>3</sup> Paul R. Portnoy, “The Contingent Valuation Debate: Why Economists Should Care.” Journal of Economic Perspectives, Vol. 8, No. 4, Fall 1994. p. 9.
- <sup>4</sup> Wilfrid J. Dixon, and Frank J. Massey Jr., Introduction to Statistical Analysis, Fourth Edition, New York: McGraw-Hill Publishing Co., 1983. pp. 121 - 26.
- <sup>5</sup> Dale Wittington, et al. “The Economic Value of Improving the Environmental Quality of Galveston Bay,” Sustaining Coastal Resources: Economics and the Natural Sciences, Maine: Edmund S. Muskie Institute of Public Affairs, Univ. of Southern Maine, 1995. p. 26.

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