Human Values

Research on Economic Resource Valuation Studies in Galveston Bay

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The purpose of this study is to assess the economic value of Galveston Bay. It is motivated by the recognition on the part of the Galveston Bay National Estuary Program (GBNEP) that the Comprehensive Conservation and Management Plan (CCMP) has the potential to require costly changes in the current regulatory infrastructure around the Bay, and by the desire of GBNEP to understand the potential economic benefits which may be associated with such changes. Although formal economic criteria will not be the basis for selection of alternatives in the formulation of the CCMP, GBNEP seeks insights about whether the initiatives in the plan may be worth the costs. Furthermore, GBNEP recognizes that traditional methods of economic analysis can substantially misrepresent the economic value of a natural resource. Thus, non-traditional methods are needed to support a more accurate assessment. In this study, a variety of non-traditional methods with which to estimate economic value are being employed, and the results will be compared for consistency and combined together with results from existing traditional studies to characterize the value of Galveston Bay. The selection of particular non-traditional methods has been made to address specific types of economic value that may be missing from traditional analyses, and to address issues of consistency and validity. The methods will be described below, following a brief discussion of the meaning of economic value and important concepts for the design of economic benefits assessments.

The most meaningful measure of the economic value of Galveston Bay would be a measure of the net economic benefit that results from the use and existence of the Bay's resources. The net economic benefit of any particular use or feature provided by the bay would be the economic measure of the enjoyment that individuals receive from the given activity or characteristic minus the cost of other resources that must be used to provide the use or feature that the individuals are enjoying. This concept is also referred to by economists as social surplus or social welfare. Examples of economically valuable uses include recreation (pleasure boating, swimming, bird watching, hunting and trapping, sightseeing, hiking, picnicking, and camping), sport and commercial fishing, real-estate, wastewater treatment, storm buffer capacity, and shipping. Non-use features of the Bay might include the more intangible and aesthetic characteristics such as scenic views, the very existence of the resource, and the option of using it in the future, both for the individuals alive today and for future generations. These features also have economic value and require non-traditional methods of economic analysis for their measurement.

It is important to keep in mind in the estimation of both use values and non-use

values that these values change as the water quality and access to Galveston Bay change. Thus, the value of the Bay for commercial and recreational fishing could conceivably decline to zero if pollution of the bay killed all fish. The value of the bay for shipping purposes, on the other hand, is largely insensitive to changes in water quality. Estimates of use and non-use values must, thus, be based on a particular management strategy and its associated water quality and land use patterns. It is not plausible to suppose that Galveston Bay itself would cease to exist (as would be implied by a measure of the absolute, or total, value of the Bay). The biological, hydrological, and ecological systems could, however, suffer irreversible damage, and from a policy perspective, one would like to know (among other things) how such changes affect the well-being of humans.

Existing traditional studies of use values for Galveston Bay have been reviewed and critiqued as part of this research. In many cases, especially when gross revenues are reported for an activity, the assessed values may be overestimated because benefits are included which are not specifically derived from use of the Bay. In addition, the enjoyment that people received from an activity beyond the price paid would be an economic benefit that is often not included in these studies.

The primary effort of our current work, however, is to directly assess use and non-use value through a non-traditional method called Contingent Valuation (CV), in which hypothetical markets are proposed to individuals, and they are asked for their willingness to pay (or willingness to accept payment) for specific changes in the natural resources being studied. The CV survey instrument is currently being revised on the basis of results from a pre-test, but will continue to have three basic parts. The first asks about the respondent's current uses and attitudes toward the Bay. The second describes in some detail a change in the conditions of the Bay and asks about willingness to pay a specified amount to ensure that this change would occur (or would be willing to accept as compensation for a detrimental change *not* to occur). The institutional and financial arrangements are carefully specified to make this hypothetical situation plausible to respondents. The third section collects basic demographic information. We are currently designing our instrument to address important concerns about validity and reliability of the results.

The other methodologies that we are employing include the benefit transfer method, in which existing measurements of non-market values (both use and non-use, but not traded in markets) at a different study site (not Galveston Bay) are transferred to the location of the current study site, and the embodied energy analysis approach. The latter is not, strictly speaking, an economic method, but its current popularity suggests that many environmentalists and ecologists find it quite useful in helping them think about environmental management issues.

Socioeconomic Characterization of Galveston Bay

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In this paper, the results of a study which investigated socioeconomic characteristics and trends of the Galveston Bay system are presented. The objectives of the study were as follows: to conduct a demographic analysis of the Galveston Bay system; to characterize socioeconomic dependence on the Bay system; to identify social trends which affect Bay resources; to characterize the economic value of Bay activities; to predict future trends in Bay use; to predict the potential impact of a Comprehensive Conservation and Management Plan on Bay communities and groups; to identify gaps in existing socioeconomic information on the Bay; and to develop recommendations for additional research on the socioeconomic character of the Bay system.

Among the trends studied were changes in the demography of counties in the Galveston Bay region, of selected municipalities, and of those census tracts immediately bordering the Galveston Bay. Trends in population size, ethnic composition, median income, age, and employment were investigated by means of time-series techniques. The most obvious, yet noteworthy, trend observed has been the continued growth in population throughout the area. With the single exception of the city of Galveston, all counties, municipalities, and census tracts considered in this study have experienced such growth over the period from 1950 to 1990.

In addition to demographic trends, the study characterized Bay system dependence among user groups, including the nature of group dependence on the Bay system and inter-relationships (inter-dependence and competition) between the different user groups.

It did so by analyzing survey data gathered under a previous contract with the Galveston Bay National Estuary Program, specifically contract number 14-09036, "Public Perceptions of Galveston Bay." Additionally, the study also characterized dependence by analyzing additional data collected utilizing a technique known as "snowball survey sampling."

Among the principal findings with respect to user group dependence were the following:

- about 9% of Brazoria, Chambers, Galveston, and Harris County households reported income derived from activities directly associated with the Bay;

- oil production, transportation, and construction were the economic activities most frequently mentioned as sources of Bay-related income;

- the most frequently mentioned recreational uses of the Bay were walking along the shore, observing birds or wildlife, and swimming;

- the most frequent user of the Bay is a long-time resident of the area, older in age, relatively high in income and education, and currently a resident of Chambers or Galveston counties;

- an extensive network of cooperative group relationships was found including environmental groups cooperating with recreation groups and government; petrochemical organizations cooperating with government agencies, with construction organizations, and with oil exploration groups;

- frequent forms of inter-group cooperation reportedly included meetings, regulatory permit reviews, and activities jointly conducted;

- a variety of intergroup conflicts were identified including ones between environmental groups, on the one hand, and government agencies, the petrochemical industry, commercial fishing groups, and the oil exploration industry, on the other hand. Similarly, representatives of government agencies reported conflicts with environmental groups, with recreation agencies, with commercial fishing groups, with homeowners, and with other government agencies; and

- intergroup conflicts ranged from disagreements over legislative or regulatory implementation, to blocking activities using environmental impact statements, to conflicts over the use of territory.

Another objective of the study was to identify social trends which affect Bay resources. This objective was accomplished in part by means of a Delphi process. Experts on the Bay system who were impaneled for the Delphi pointed first to "public concern for the environment" and to "increasing population density along the Bay" as important social trends. Other trends pointed to by the Delphi experts included industrial expansion, the limiting of fresh water inflow, increasing recreational uses, increased pollution discharges, further demands for residential units, increased shipping and foreign trade, and the continued shipping of oil and hazardous materials.

Still another objective of the study was to characterize the economic value of Bay activities. This objective was accomplished by collecting and synthesizing existing data on a number of Bay system activities: shipping, oil and gas leasing, wastewater treatment, commercial and recreational fishing, agriculture, realty (land use values), navigation, manufacturing, recreational boating, tourism, and others. In general, but with some notable exceptions, the data show that economic activity has been increasing in the recent past. In particular, there has been a substantial increase in the labor force since 1950 in each of the counties in the Bay region. On the other hand, recent shifts in the production of oil and gas and reductions in manufacturing employment were identified as having serious implications for the Galveston Bay system.

Finally, forecasts of trends in Bay use were also developed as part of the study. Such forecasts were developed generally either by means of regression-curve fitting techniques or by "ARIMA" model building procedures. Among the future trends in Bay use identified by means of these techniques and procedures were the following:

- tourism-related employment can be expected to grow, but only to about the 1983 level, which was the peak level for such employment;

- total boat registrations will likely continue to increase;

- slight decreases can be expected both in the commercial finfish and shellfish yields with slightly greater decreases in the latter than in the former;

- the declining trend in crude oil and natural gas can be expected to continue while condensate production from the Bay can be expected to increase; and

- more land designated as "open space" is predicted for the combined counties of Brazoria, Chambers, and Galveston.

Ecotourism in Galveston Bay — An Economic Opportunity

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Ecotourism is tourism that is based upon the natural rather than the synthetic attractions of a locality. Ecotourism is the tourist industry's most rapidly expanding sector (Alpine, 1986; Groom et al., 1991). A number of states and local communities in the United States have come to recognize ecotourism as a significant facet of their economic strategy. For example, in several western states it has become the largest private employer (Vickerman 1988).

The potential pool of ecotourists in the United States is impressive. The U.S. Fish and Wildlife Service (USFWS) estimated in 1980 that 93 million Americans participated in some form of nonconsumptive use of wildlife, and 79 million enjoyed wildlife while on a trip away from home. Most importantly, the USFWS found that 28.6 million people engaged in travel *primarily* for the nonconsumptive enjoyment of wildlife and spent $4.0 billion in the process (Shaw and Mangun, 1984). The exponential growth in environmental awareness among the American public suggests that the number of potential ecotourists will proportionately multiply as well.

Communities wishing to develop an ecotourist base are confronted with a number of challenges. First, the locality must possess substantial and/or unique natural or environmental attractions. For example, the community of Rockport has a unique ecotourist asset in the whooping cranes which winter at the nearby Aransas National Wildlife Refuge. The Texas Parks and Wildlife Department estimates that crane watching generates $4.5 million annually in the local community. Second, a tourist support infrastructure (hotels, restaurants) must exist or be developed. Third, information concerning the environmental attributes of the area must be developed for both advertisement and guidance. Information concerning the ecological assets of the area should be directed at increasing environmental awareness among local residents, attracting ecotourists from outside of the community and aiding tourists in locating and enjoying particular sites. Last, materials and personnel offering assistance in interpreting the ecological value of the respective sites should be available. Most of the pool of potential ecotourists are *not* seasoned naturalists or ecologists, and aid in comprehending the area's natural history will significantly enhance their experience.

Galveston Bay is blessed with an abundance of ecologically valuable sites (Figure 1) and a substantial tourist support infrastructure. Galveston Bay communities, however, lack a cohesive, comprehensive strategy to develop ecotourism beyond its present latent level. The following are examples of initial steps that might be taken towards the development of a sustainable, long-term ecotourist industry for

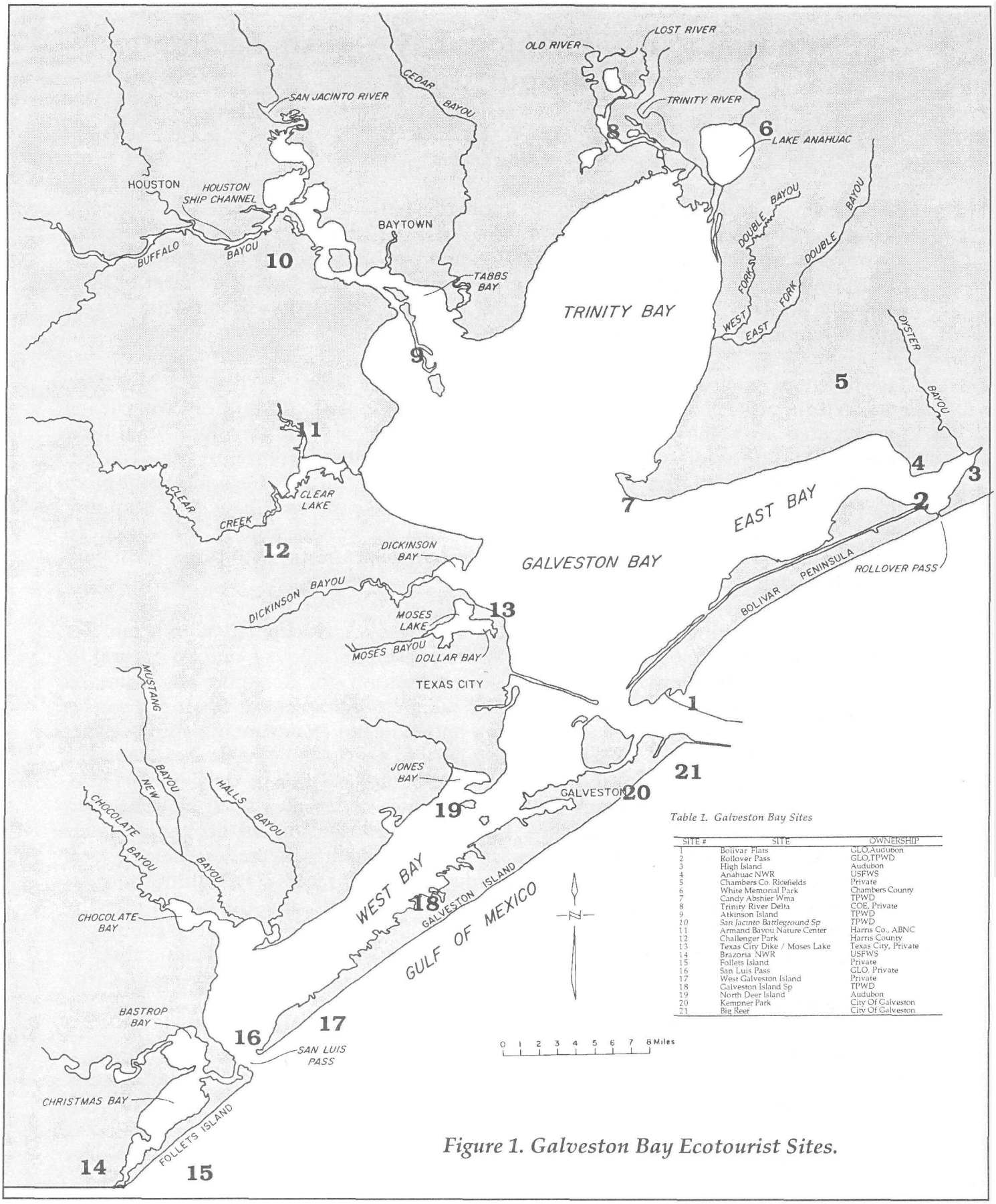

Table 1. Galveston Bay Sites

SITE #	SITE	OWNERSHIP
1	Bolivar Flats	GLO,Audubon
2	Rollover Pass	GLO,TPWD
3	High Island	Audubon
4	Anahuac NWR	USFWS
5	Chambers Co. Ricefields	Private
6	White Memorial Park	Chambers County
7	Candy Abshier Wma	TPWD
8	Trinity River Delta	COE, Private
9	Atkinson Island	TPWD
10	*San Jacinto Battleground Sp*	TPWD
11	Armand Bayou Nature Center	Harris Co., ABNC
12	Challenger Park	Harris County
13	Texas City Dike / Moses Lake	Texas City, Private
14	Brazoria NWR	USFWS
15	Follets Island	Private
16	San Luis Pass	GLO, Private
17	West Galveston Island	Private
18	Galveston Island Sp	TPWD
19	North Deer Island	Audubon
20	Kempner Park	City Of Galveston
21	Big Reef	City Of Galveston

Figure 1. Galveston Bay Ecotourist Sites.

Galveston Bay:

- Establish a Galveston Bay ecotourist council.
- Create and distribute a brochure which details the ecological assets and features of Galveston Bay.
- Advertise Galveston Bay ecotourism in both regional and national press.
- Publish a wildlife watching guide for Galveston Bay.
- Plan special environmentally oriented events, such as the hummingbird festival which is held annually in Rockport. For example, sponsor a spring migrant bird festival corresponding with the peak of spring migration (the last weekend of April or the first two weekends in May).
- Establish a shuttle service to transport tourists between area hotels and the various sites. The drivers of these shuttles should also be able to act as interpreters and guides.

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Public Attitudes in a Time of Economic Recession: The Texas Environmental Survey, 1990-1992

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Funded by grants from the Margaret Cullinan Wray Lead Annuity Trust and the Texas Environmental Center, the Department of Sociology at Rice University, working with Telesurveys of Texas, recently conducted the second biennial Texas-wide survey of environmental attitudes. During the last two weeks of September, 1992, a representative sample of 1004 Texans from across the state participated in intensive 20-minute interviews, expressing their views on a wide variety of questions pertaining to environmental and political concerns.

By replicating many questions from a similar survey conducted two years earlier (in August, 1990), the data provide a uniquely revealing analysis of the way the environmental concerns of Texans have been changing during a period of prolonged and deepening economic recession. Findings from the survey point to three compelling conclusions.

Expressions of economic concern grew significantly between 1990 and 1992.

When asked to name the most serious problems in their communities, 40% of Texans in 1990 mentioned unemployment, poverty, or other economic concerns. That figure had increased to 51% by September, 1992. Only 28% in 1990 said that unemployment was a serious problem, but 43% believed that in 1992.

When asked to judge which of four global problems represented the biggest long-term threat to the American people, decisive majorities in both years put international drug trafficking in first or second place. But the two samples differed significantly in their assessment of the second biggest threat: In 1990, 61% cited "the deterioration of the earth's environment," and only 37% chose "the economic threat from Japan and Europe". By 1992, concern about the global environment was down to 47%, and 53% of the respondents now cited the threat of economic competition.

Despite economic recession, environmental concerns remained surprisingly strong among Texas residents. The only signs of the effects of increased economic anxiety appeared on questions involving direct tradeoffs between environmental protection and economic interests.

On every question involving environment/economy tradeoffs, Texans continued in 1992 to come down decisively on the side of the environment, but they did so to a lesser extent than two years earlier. By 68% in 1992 (it was 77% in 1990), they were

opposed to "locating a new plant in this area that would employ a thousand people but would also cause a substantial increase in pollution." By 52% (vs. 68% two years earlier), they disagreed with the suggestion that "we should think of jobs first, and pollution second."

By 51 to 40 % (vs. 63 to 33% in 1990), they said they would be willing to pay $200 more each year for the things they buy if that would be the result of new pollution controls. When asked about their self-perceptions, 61% of the respondents in 1992 said they considered themselves to be sympathetic or active supporters of environmental causes; but this was true of 76% in 1990.

On the other hand, despite increasing economic preoccupation, there were no consistent changes in respondents' positions on *any* of the other distinct dimensions of environmental concern that were measured in the surveys. With regard to their assessments of specific environmental problems, for example, Texans in 1992 evidenced the same high levels of concern that they expressed in 1990; there were modest increases in their evaluations of the seriousness of environmental problems in their own communities, and slight decreases in their concern about the state of the environment in Texas as a whole.

On questions about pro-ecological behaviors, the same proportions in both surveys indicated that they specifically avoided buying or using environmentally damaging products. But a higher proportion in 1992 than in 1990 reported participating in recycling efforts, while fewer claimed to have contributed time and money to environmental groups.

In their support for stronger environmental initiatives, respondents in both years were decisively in favor of new laws that would require a deposit on glass bottles and that would force people to recycle their trash. Clear majorities in both surveys were also in favor of new taxes on coal and oil consumption to reduce the emissions that cause global warming. But by 61 to 34%, respondents were just as opposed in 1992 as they had been two years earlier to raising gasoline taxes in order to encourage greater energy efficiency.

In their perceptions of global ecological constraints, the Texas respondents continued (by 60 to 31%) to believe as they did in 1990 that "when humans change the natural environment, by building dams or clearing forests, it often produces disastrous results." By majorities of 58 and 61%, they rejected the suggestions that "plants and animals exist primarily to be used by humans," or that "we will be able to solve our environmental problems by better technologies alone, without having to change our lifestyles." By 73%, they regarded the threat of global warming to be at least "somewhat serious," and 81% said the same was true of world population growth. Not surprisingly, therefore, 60% of the respondents also agreed with the assertion that "we humans are approaching the limits of the earth's room and resources."

An analysis of individual differences among the respondents points to the importance of media exposure and of progressive political views in accounting for the continuing concerns that Texans express with regard to environmental issues.

Environmental problems are long-term, slowly-developing, and often remote. Rarely do they directly impact individuals in their immediate surroundings. Thus, when asked if they or anyone in their family had ever personally suffered any significant negative effects from an environmental problem, only 14% of the Texas respondents answered in the affirmative.

What, then, accounts for the pervasive awareness of environmental problems and the continuing environmental concern among Texas residents? It must have something to do with exposure to the mass media, to newspaper and television accounts of scientists' growing concerns about ozone depletion and global warming, to depictions of spectacular events such as the slashing and burning of tropical forests, or the sudden depletion of the oyster catch in Galveston Bay.

Significantly, one of the strongest predictors of environmental concern in the Texas surveys was the extent to which respondents paid attention to current events in general, even when these were unrelated to environmental issues. Texans who could identify Kuwait as the country liberated by the Gulf War and could name Canada and Mexico as the two nations that were planning to join with the U.S. in a free trade agreement, evidenced significantly more concern about environmental issues than did those who were less informed, even at similar levels of education.

Knowledge of current events — and levels of educational attainment in general — is only part of the story. People also differ in their willingness to accept the environmental messages the media are conveying, messages that challenge traditional assumptions by suggesting that industrial patterns of economic growth are ultimately incompatible with environmental protection and sustainable development.

Two additional factors were found to be important in accounting for differences among Texans in their environmental concern — age and political ideology. Survey respondents who were over 60, or who expressed politically conservative views with regard either to alleviating poverty or to traditional values, were significantly less likely to agree with the new environmental consensus.

Despite their preoccupation with the economy, the surveys make it clear that Texans generally have remained as concerned about environmental protection as they were during the period of economic recovery in 1990. The data further suggest that enduring environmental concerns are largely a consequence of continuing media attention to environmental issues. What is not yet clear is the extent to which Texas voters are also prepared, during a time of persistent economic recession, to translate their continuing concerns into significantly stronger measures to protect the environment.