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PUBLIC ATTITUDES TOWARD WATER QUALITY AND MANAGEMENT ALTERNATIVES IN THE ALBEMARLE-PAMLICO ESTUARINE SYSTEM

(PHASE I REPORT)

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EXECUTIVE SUMMARY

Most problems facing the Albemarle-Pamlico (A/P) Estuarine system arise directly or indirectly from human activity. Pressures on the system from these activities will continue to increase as a result of future population growth and economic development. Technical solutions to many land use and water quality problems affecting the Albemarle-Pamlico Estuarine system are available; but institutional or human-related obstacles exist to their implementation. Successful resource management will require strong support from different segments of the public. Such support will best be achieved by understanding public attitudes and knowledge.

The specific purpose of this study, then, was to evaluate peoples' knowledge and attitudes about natural resources in the A/P Estuarine system and management alternatives designed to protect these resources. A combination of social science research methods was used to analyze a wide range of public attitudes. The information was collected in a scientific telephone survey of 831 people selected at random from across the A/P Study area. We also conducted 30 in-depth personal interviews with some of the most knowledgeable scientists and leaders in North Carolina.

The results show that most respondents had received quite a lot of information about water pollution. The mass media clearly play the major role in providing citizens with water quality information. Almost everyone received information from television and newspapers. On the other hand, relatively few people had gotten information from the government or environmental groups. People do receive information from such groups or agencies indirectly through the mass media. The types of information provided through mass media channels may be somewhat superficial and could tend to focus on dramatic problems and controversial issues.

We found considerable variation among different information sources in terms of perceived credibility. University scientists were seen as most credible. This is likely due to their perceived expertise, as well as their unbiased perspective. Environmental groups were also seen as credible, probably because they are seen as representing the public interest, rather than private interest. Quite a few groups, including government agencies, are also given a relatively high level of credibility. On the other hand, statements from those groups that are seen as having a private, vested interest (i.e., industry and developers) tend to be viewed with considerable suspicion.

Although the public has received a good deal of information about water pollution issues, this does not necessarily mean everyone will have a lot of knowledge about resource management issues and activities. Most respondents, however, appear fairly knowledgeable about certain major issues. For example, respondents have a basic understanding of the notion of a watershed. Many do recognize that land use can have a major effect on water quality. One area where respondents were

not very knowledgeable involves issues associated with freshwater drainage and the associated impacts on estuarine water quality.

Most respondents expressed strong concerns over water pollution problems in North Carolina and in the Albemarle-Pamlico study area. They were less concerned over pollution as it got closer to home (i.e., in their own county or for their own drinking water). This may indicate a tendency to feel that water pollution is "somebody else's problem". Several findings clearly indicate that most people mainly associate water quality problems with point source pollution, especially industrial waste discharge. This type of pollution is more visible and tends to capture media attention when a spill or other discharge adversely affects a water body. Nonpoint sources of pollution, associated with land use, tend to be less readily understood as causes of pollution.

Conflicts over the use and management of natural resources will likely become increasingly evident as resource use intensifies. When asked to choose between management of such resources for the common benefit and management of these resources for private benefit, most respondents believed that public benefits need to be protected. This is true even when asked to balance private land owners' rights with the public interests. When these results are coupled with the strong environmental values and beliefs respondents expressed, we conclude that respondents will support environmental protection even at the expense of economic growth and private land owners rights.

Respondents clearly feel that far too little is being done to control pollution problems. In particular, they feel that the government is doing too little to control pollution from all sources. Furthermore, most agreed that there is far too little enforcement of existing water pollution regulations. Many respondents feel that the state government should spend more money on controlling pollution. There are also indications that a majority of people would, themselves, be willing to pay higher taxes to support such programs. However, most respondents clearly feel that polluters should mainly be responsible for paying any increased costs of pollution control. People need to learn that we all pay for pollution control even if the payments are indirect (i.e., through higher priced products and services).

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INTRODUCTION

Most problems facing the Albemarle-Pamlico Estuarine system arise directly or indirectly from human activity. Many different human activities interact directly with the Albemarle-Pamlico Estuarine system. Six of these activities (agriculture, commercial forestry, waste disposal, residential and commercial development, mining and industrial development, and national defense) **affect** water quality or the fishery. Four other activities (commercial fishing, sports fishing, recreation and tourism, and wildlife habitat) are adversely **affected by** degraded water quality. Pressures on the system from these activities will continue to increase as a result of future population growth and economic development.

Technical solutions to many land use and water quality problems affecting the Albemarle-Pamlico Estuarine system are available, but obstacles exist to their implementation. Many obstacles tend to be institutional or human-related (i.e., socio-economic). For example, the public may have little understanding of or appreciation for the complexity of most water quality problems and land use issues. This is particularly true for nonpoint source water pollution, where numerous, unrelated management decisions have significant adverse impacts on the Albemarle-Pamlico Estuarine system.

Increased public awareness and positive public attitudes will be necessary to improve water quality. Resource managers and political leaders need to understand the attitudes of a broad, representative sample of the public, including those citizens who have not been involved in the Albemarle-Pamlico Estuarine (A/P) Study's public meetings or citizen's advisory committees. Successful resource management will require strong support from different segments of the public. Such support will best be achieved by understanding public attitudes and knowledge.

This study uses a combination of social science research methods to analyze a wide range of public attitudes regarding the natural resources of the Albemarle-Pamlico Estuarine system. The information in this report was collected in a scientific telephone survey of 831 people selected at random from across the North Carolina portion of the A/P Study area. We also present selected results from 30 in-depth personal interviews conducted with some of the most knowledgeable scientists and leaders in North Carolina. This work should enhance the understanding and appreciation of resource managers, political leaders, and concerned citizens for the complex nature of public attitudes. In addition, this work should help build support for the goals of the A/P Study by identifying educational needs and providing a credible, scientific mechanism for greater public involvement in natural resource decision making.

Theoretical Framework

Ultimately, we will develop and assess a theoretical model relating public attitudes regarding the importance of the Albemarle-Pamlico resources, the appropriateness of particular management alternatives, and individual background characteristics that influence these attitudes. This will be accomplished in two phases. Phase I examines basic attitudes and opinions. Phase II assesses reaction to different management alternatives.

This work analyzes attitudes, a subject of much previous study. Attitudes are not just facts, but include an evaluation (i.e., emotional or judgmental) component. Oskamp (1977:19) defines an attitude as "a readiness to respond in a favorable or unfavorable manner to a particular class of objects." Research and theory have shown that attitudes can be multifaceted and complex. They are also related to a particular object (e.g., management alternatives for the Albemarle-Pamlico Estuarine system). An individual's attitudes may be affected by a number of factors. Oskamp (1977) explains that attitudes are learned, but many different factors can play important roles. Direct personal experience is the most fundamental factor in attitude formation. Formal institutions (e.g., schools, the mass media, and government) and informal relationships (e.g., family, peer groups) also influence attitude formation and change.

Heberlein (1989) explains the importance of attitudes in developing effective management strategies. "Attitudinal data serve environmental management in three ways: they provide information about the level of public support and the dimensions of public knowledge relevant to a project, they help managers establish goals or objectives for a particular program, and they give an idea what people might do as part of a program." Attitude surveys can describe what the public believes about problems and possible solutions.

Sociologists have studied environmental attitudes for almost twenty years, since the beginning of the environmental movement (Buttel 1987). Environmental attitudes are composed of beliefs and feelings about specific features of the natural world. People experience the environment to varying degrees and hold interrelated beliefs and values about specific aspects of the environment (Heberlein 1981). Environmental attitudes are complex in that they are based on a system of beliefs or cognitive understanding about the world. Beliefs vary in terms of their accuracy and importance. Environmental attitudes are also based on deeply rooted values. Values tend to be stable beliefs about what is personally or socially preferable. Values are used as standards to evaluate action and attitudes (Rokeach 1973).

Social scientists have noted some basic shifts in public attitudes toward the environment in recent years (Dunlap and Van Liere 1979, Cotgrove 1984, Milbrath 1984). They describe the transition from a dominant social paradigm (DSP) to a new environmental paradigm (NEP). According to Milbrath (1984) the DSP was characterized by the following: lower evaluation of nature; compassion only for those near and dear; acceptance of risk to maximize wealth; no recognition of limits to growth; belief that the present society was preferable (e.g., based on materialism and competition); and a system of politics that relied on experts and market control. This DSP formed the basis for much of the industrial and economic growth that is now seen as a cause of environmental problems.

The DSP began to give way to the NEP in recent years, especially with the rise of the environmental movement. Milbrath (1984) characterizes this NEP, as follows: high valuation of nature for its own sake (environmental protection over economic growth); generalized compassion toward other species, other cultures, and future generations; more careful planning and action to control risk; recognition of limits to growth; belief in the need for a new society (e.g., based on simpler lifestyles and cooperation); and new politics that are more consultative and participatory. The transition to this NEP is, by no means, complete. Many people still cling to the DSP. People who are most likely to support the NEP tend to be younger, more liberal, and more highly educated. They hold different values, attitudes, and beliefs.

With these points in mind we now present an overview of the theoretical concepts that form the basis for our research. Figure 1 presents the major independent and dependent variables we measure in both Phases of this project. Figure 2 shows an illustrative theoretical model which represents the general types of relationships we hypothesize. For this discussion we first describe the nature of attitudes about the Albemarle-Pamlico Estuarine system. We then outline the major background characteristics we expect to be related to these attitudes. Public attitudes toward alternative management scenarios will be determined during the second year of this research.

It is important to make several points at the beginning. We do anticipate and will propose interrelationships among the different attitudes shown in Figure 1. For example, certain attitudes (e.g., about severity of problems) will influence other attitudes (e.g., about the alternative management scenarios). Knowledge about resource management and associated issues will influence individual's attitudes toward management alternatives. Because of constraints on length we do not describe all the hypothesized interrelationships among different background characteristics and attitudes. Representative examples of various models are presented.

BACKGROUND CHARACTERISTICS

Demographic
- Education
- Age
- Sex
- Income
- Race

Residence
- Coastal/Inland
- Land Ownership
- Rural/Urban
- Length of Time

Political Orientation
- Party Membership
- Philosophy

Information Use
- Mass Media
- Interpersonal
- Organizations
- Evaluation

Support for/Affiliation With
- Environmental Groups
- Agriculture
- Fishing
- Recreation

ATTITUDES FOR PHASE I

Knowledge and Awareness
- Natural Systems
- Policies and Issues
- Agencies and Program

Severity of Problems
- Nature of Concerns
- Causes of Problems
- Consequences/Effects
- Conflicts Between Groups
- Responsibility for Problems

Management and Policies
- Resource Conflicts
- Pollution Control
- Level of Effort Effectiveness

ATTITUDES FOR PHASE II

Alternative Management Scenarios
- Fairness
- Effectiveness
- Impacts
- Acceptability

Necessary Actions
- Willingness to Pay
- Behavioral Changes
- Information Needed
- Public Policy Changes

Figure 1. Major Independent Variables (Individual Background Variables) and Dependent Variables (Attitudes)

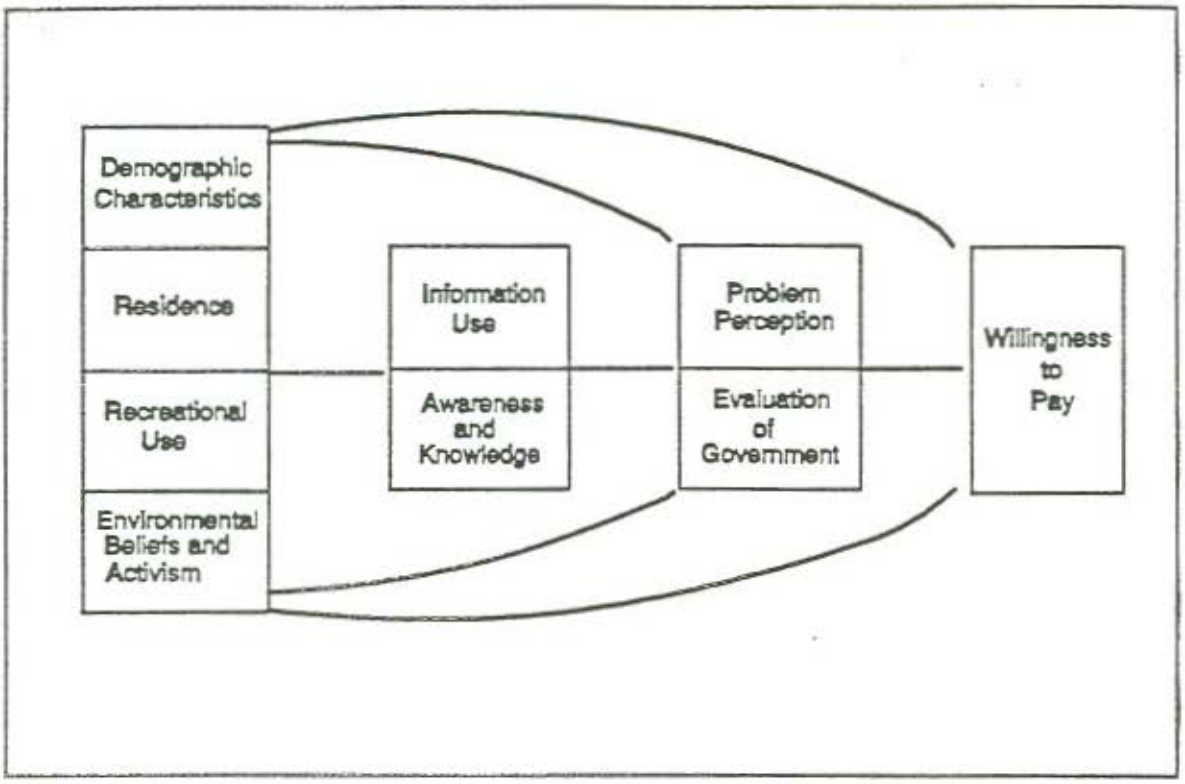

Figure 2. Illustrative Theoretical Model

Phase I examines basic attitudes and knowledge about the Albemarle-Pamlico Estuarine system. Public attitudes about the importance of the Albemarle-Pamlico Estuarine system resources are evaluated. We determine respondents' use of the water resources and fisheries of the Albemarle-Pamlico Estuarine system for recreation. Questions also examine how the public feels about conflicting uses of the Albemarle-Pamlico Estuarine system for specific purposes (e.g., recreation vs. development). Awareness and recognition of water quality problems are assessed. We determine the extent of concerns related to different water resource locations. We assess respondents' attitudes regarding the causes of water quality problems. They are asked to rate the relative severity of different pollution sources (e.g., agriculture, industry, municipal waste treatment, and septic systems). We also determine how well the public understands and appreciates the consequences of water quality problems. The survey includes an assessment of respondents' awareness and knowledge, including public awareness of the Albemarle-Pamlico Estuarine Study and other government programs. Finally, we analyze respondents' use and evaluation of different information sources.

An important focus in Phase II of this research is to determine public attitudes toward alternative strategies for managing the natural and human resources in the Albemarle-Pamlico Estuarine system. During the second phase of this project, we will develop three to five realistic and specific scenarios that cover the range of management actions that could be taken. We will ask respondents to evaluate each scenario (i.e., management strategy) in terms of its acceptability, equity, and effectiveness. We also will determine attitudes about possible impacts of each scenario on various interest groups. Along with evaluation of these specific management alternatives, we also will determine individual's own willingness to pay for increased water quality, either directly through taxes or indirectly through higher cost products. We will analyze what types of behavioral changes individuals would be willing to make. We will also determine what other types of information people need and want, along with the best way to provide them with such information. Finally, we will determine attitudes about what public policy changes should be made to manage the Albemarle-Pamlico Estuarine system.

A basic premise of our theoretical model is that people's attitudes about the Albemarle-Pamlico Estuarine system will differ, based on a set of individual background characteristics. In this section we briefly describe the main background characteristics that we hypothesize influence attitudes about the Albemarle-Pamlico Estuarine system. As was mentioned above, we will not, at this point, fully specify all the hypothesized relationships between these background characteristics and the various attitudes just described. Selected background characteristics will, themselves, be inter-related. In fact, some may be intervening between other background characteristics and attitudes. This discussion and Figure 2 indicate some of the general relationships we predict.

Certain demographic variables have been shown to have an important influence on environmental attitudes (Van Liere and Dunlap 1980; Buttel 1987). Level of formal education is directly related to positive environmental attitudes and concern over pollution. Age is also related, with younger people tending to be more concerned about environmental issues. Sex differences in environmental attitudes have also been found, but the results are not conclusive. Likewise income has been found to have an important, but inconsistent, relationship to environmental concern. Race may also be a factor, but this has not been adequately investigated.

Where an individual lives can also have an important influence on environmental attitudes. The most important residence factor for this study may be proximity to the coastal area. Coastal residents will likely have different attitudes than those who live inland. One particular mediating factor, however, will be whether inland residents use the coastal region for recreation or own property on the coast. Past research has not examined the issue of proximity to the environment of interest. Residence related research has mainly focused on rural and urban differences in environmental attitudes (Buttel 1987; Murch 1974). Although debate remains, most

research indicates that urban residents hold stronger environmental attitudes. A final residence-related characteristic may involve the length of time a person has lived in the area. For example, long time coastal residents could hold different attitudes than those who have recently moved to the coast.

Political party affiliation and orientation also likely influence environmental attitudes. Past research has shown that liberal political philosophy was positively related to environmental concern (Van Liere and Dunlap 1980). Environmental activism is also an important factor. This is usually assessed by determining organizational membership. In particular, active members of environmental groups likely hold stronger environmental attitudes than nonmembers. A similar pattern of relationship is anticipated with regard to contributions of money to environmental causes and attendance at public meetings.

To understand and influence attitudes and behavior, it is important to identify and analyze how people develop their beliefs and attitudes about the environment (Heberlein 1981). People obtain information from a number of sources, including the mass media, interpersonal relationships (i.e, friends and family), and their own experience. Interpersonal influence plays an important role in shaping attitudes and behavior (Rogers 1983). The mass media may not directly change attitudes, but rather will identify problems and help determine what topics are considered important or part of the public agenda. We analyze the frequency of use and importance of different sources of information the public has used relative to environmental issues in general and the Albemarle-Pamlico Estuarine system in particular. Sources include mass media, interpersonal sources, and formal organizations. Respondents also rate the usefulness and credibility of the various sources.

Review of Related Research in Other Estuary Projects

The preceding section contained a review of the general nature of public attitudes and influences on public attitudes toward the environment. We now summarize selected results of surveys conducted by other estuarine programs. To better understand public perceptions of issues related to the Albemarle-Pamlico Estuarine System, we reviewed four studies of other estuarine systems. This review included analysis of surveys done for the Inland Bays Area of Delaware (Munda and Hastings 1987), the San Francisco Bay area (Battelle Ocean Sciences and Technology Division 1987), the Narragansett Bay Area of Rhode Island (Center for Environmental Studies 1987), and the Puget Sound of Washington State (Gilmore Research Group 1988). These estuary systems have large fishing and recreational industries. Each has recently confronted increased development due to its appeal for seasonal and full-time residence, commercial, and industrial needs. Because of the similar demands on these areas public perceptions in these systems should prove relevant to our current and proposed work.

The surveys evaluated current policies and regulations. Among Delaware Bay property owners 42 percent believed stronger enforcement of present laws and regulations was needed. About one quarter thought more public education and involvement were needed and another quarter indicated more stringent environmental laws or regulations were required. Less than three percent felt nothing should be done. Washingtonians want to see stricter enforcement of current pollution laws, rather than new laws. Most believed laws and enforcement should be applied to both industry and individuals. In the San Francisco Bay Area, respondents were evenly divided as to whether current regulations were sufficient or not to prevent adverse environmental impacts. Many individuals felt current regulations should be updated to eliminate loopholes and ambiguities, recognize priorities such as agriculture, and create positive economic incentives for pollution control. Twenty percent felt current enforcement measures were adequate while almost two-thirds believed they were insufficient. Most Rhode Islanders felt current state policies were inadequate to resolve conflict over Bay use. Further, most deemed enforcement of regulations as inadequate. Many blamed decreases in federal and state funding for regulatory agencies for causing or aggravating this problem.

These studies assessed public perception of which level of government should be responsible for environmental policy. Over half of Delaware Bay property owners thought state agencies should be responsible, while fewer believed federal and local agencies should be responsible. Half of Washington respondents believed state government should be responsible for water-pollution control and cleanup, while smaller proportions believed it is the responsibility of federal and local governments. Most Rhode Island respondents thought the state should establish a comprehensive policy governing the use of the bay to protect public resources from infringement by private interest.

Public preferences toward policy orientations were also analyzed. A majority of Delaware Bay property owners believed water, recreational, and living quality had declined during the past five years. Almost three quarters favored increased growth management by state, county, and local governments. In Washington, support for pollution education had increased above its previously strong levels. Almost all state residents wanted to see more education. Most residents also believed increased funding for water pollution control and clean-up should come from heavier fines on all polluters, including individuals.

San Francisco Bay respondents identified the two major problem areas hindering management efforts as the influence of politics on management decisions, and the lack of consensus on problems. Most thought more emphasis should be placed on research to provide current data for sound resource management decisions. In Rhode Island there was a clear expression of need for a process through which both organized and unorganized users could have a greater voice in policy formation. Many perceived the Coastal Resource Management Council as too political and as

favoring development interests over others. When the public was asked what should happen when residential development conflicts with recreational access, almost all respondents thought development should be stopped. Most believed there was a need for greater control of development. In addition, the public overwhelmingly believed industry should pay to clean up its wastewater. Rhode Islanders placed a higher priority on shellfishing than on recreational use of the Bay. Over three quarters believed shellfishing should be given preference over boating and marinas when the uses conflict. Respondents saw three research topics as needing highest priority: the effects on water quality of raw sewage, industrial waste, and shoreline development.

Rhode Islanders were very opposed to uncontrolled development and pollution. They were also quite willing to personally incur the expense of increased management. Respondents stated their willingness to sacrifice jobs and tolerate increased housing and service costs if necessary to prevent pollution caused by increased development. In addition, most respondents would be willing to pay twice as much to ensure that shellfish would be safer to eat. Two-thirds of Washington residents would be willing to spend one dollar per month per household to clean up Puget Sound. While the Delaware and San Francisco studies did not specifically ask about willingness to pay, public support for tougher regulations, stronger enforcement, and increased research indicates a desire for more expenditures on environmental quality.

PROJECT PROCEDURES

Purpose and Objectives

This research operationalizes and analyzes a theoretical model of relationships between background characteristics and public attitudes about the Albemarle-Pamlico Estuarine system (Figure 1). The specific purpose is to evaluate peoples' knowledge and attitudes about natural resources in the Albemarle-Pamlico Estuarine system and management alternatives designed to protect these resources. This work accomplishes the following specific objectives in two Phases.

Objectives for Phase I

1. Evaluate public understanding of the causes, severity, and consequences of water quality problems in the Albemarle-Pamlico Estuarine system.

2. Provide scientifically valid description and comparison of the attitudes of different segments of the public and opinion leaders about the importance of the Albemarle-Pamlico resources.

3. Analyze the nature and extent of consensus and differences among groups of affecting and affected users of the Albemarle-Pamlico Estuarine system.

Objectives for Phase II

4. Provide scientifically valid description and comparison of the attitudes of different segments of the public and opinion leaders about the appropriateness of particular management alternatives.

5. Determine attitudes about the effectiveness and equity of alternative programs and policies aimed at improving water quality in the Albemarle-Pamlico Estuarine system.

6. Analyze attitudes, knowledge, and interest regarding the Albemarle-Pamlico Estuarine Study to determine mechanisms to build public awareness of and support for the Study.

Questionnaire Development

We established a 25 member advisory committee to help us plan and conduct our project. This committee includes university scientists, agency personnel, and citizen representatives. Initially, our committee provided valuable advice on the selection of respondents and design of the questionnaire for our in-person interviews. The committee nominated individuals for our in-person interviews from several different groups: agriculture, forestry, commercial fishing, recreational interests, industry, development, environmental groups, and local government. We also asked for nominations of resource managers and scientists.

With help from our advisory committee we developed an in-person interview survey instrument that provides considerable background information useful in designing the telephone surveys for both Phase I and Phase II. We asked questions on a number of different topics, including: nature and causes of problems and issues; evaluation of current and future management strategies; barriers to water quality improvement; influence of different groups, levels of government, and the public; nature of public attitudes; educational strategies and approaches; and evaluation of the A/P study.

We pretested and finalized the questionnaire for the in-person interviews. All in-person interview respondents were contacted by letter. The interviews were completed by March of 1990. Tapes from completed interviews were transcribed and the responses were analyzed. Results of these in-person interviews are summarized in the following section. For this report we briefly highlight some of the key findings in two areas: public attitudes and alternative management strategies.

We conducted an extensive literature review of other surveys related to environmental attitudes. This effort included written contact with over 150 social scientists from around the country. We also wrote the coordinators of all the other estuary programs. We compiled and organized all survey questions that could possibly be used in our telephone interviews. Based on these reviews and information from the in-person interviews, we drafted a version of the telephone survey instrument. We sent our advisory committee several drafts for review. A meeting was held to review and finalize the survey instrument. The committee also made recommendations regarding the sample design.

Sample Design for Telephone Survey

Given the study's objectives, the research design employed was cross-sectional utilizing a random sample of households with telephones. The universe was defined as the 33 counties in North Carolina making up the watershed of the Albemarle-Pamlico Estuarine system. Because we were interested in subarea variations and the region as whole, it was necessary to design a sampling strategy that would permit us

to examine both. This required a compromise. On the one hand, drawing a random sample from the entire region would result in only a small number of interviews being conducted with respondents from coastal counties; while the majority of interviews would be conducted with people from the more populous western part of the region (e.g., Wake County). In this case, the lowest standard errors of estimation would be achieved for the entire watershed when the sample is distributed in proportion to the distribution in the population. On the other hand, we could have selected cases from each subarea equally. That would produce the lowest standard error of estimation for subarea differences. Therefore, we selected an option that allows us to generalize to the region as a whole, minimizes obtainable standard errors, and assures enough cases in each subarea to make meaningful comparisons.

The sampling design was based on advice from a statistical consultant and our advisory committee. We chose to use a disproportionate stratified random sample. The counties making up the entire watershed were stratified into three subareas: coast, sound and drainage basin (See Figure 3). These regions were identified in an earlier research effort funded by the Albemarle-Pamlico Estuarine Study by Tschetter (1989). The number of cases for each subarea was generated using the formula: $N_h^{.2}$, which is the proportionality factor applied to the number of residents in each subarea. The 1987 population and proportionality factors for the three regions were:

	Population	Proportionality Factor
Coast	90,000	2.46
Sound	235,000	2.98
Drainage Basin	1,203,000	4.03

A total sample size of 800 was determined to be sufficient to represent this universe, based on the availability of funds. Multiplying the sample size (800) by the proportionality factor of each subarea results in the anticipated number of cases: 206 for the coast, 249 for the sound, and 345 for the drainage basin. Since a disproportionate stratified random sampling technique was employed to generate the sample, it is necessary to adjust the results for the region as a whole. By applying weights to the data, we are able to generalize to the entire watershed.

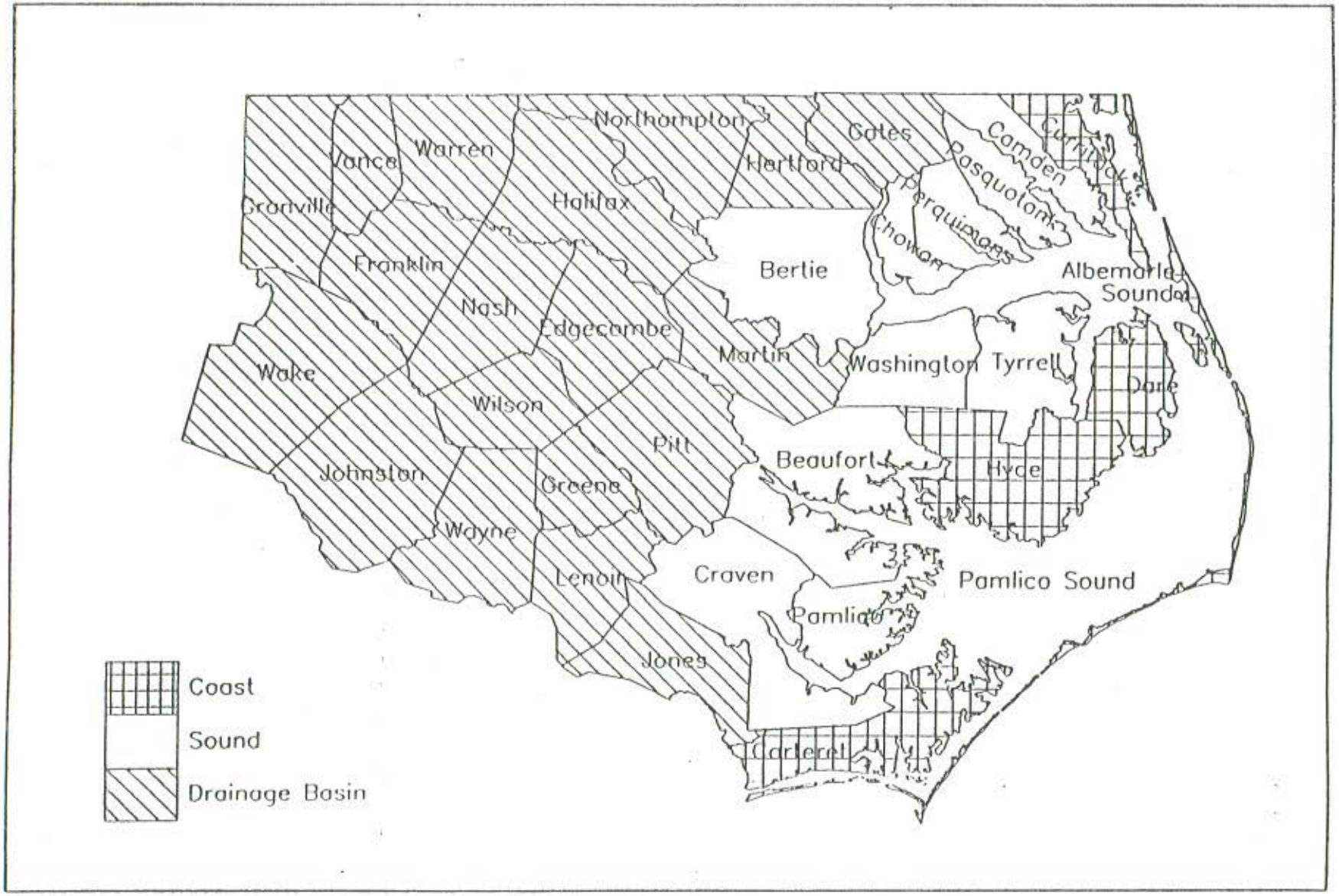

Figure 3. Albemarle-Pamlico Estuarine Study area indicating subareas used in sample design.

Sampling weights (raising factors) were generated by dividing the actual number of cases for each subarea in the sample into the total population for each subarea:

	Pop'n		Number		Weight Factor
Coast	90,000	/	218	=	413
Sound	235,000	/	269	=	874
Drainage Basin	1,203,000	/	344	=	3497

Dividing these numbers by 1,839, (the number of persons each case in the sample represents of the total population) yields the weights applied in the statistical analysis for the region as a whole. Throughout this report, the analysis for the entire study area is based on weighted data using the following weights:

	Weight Factor		Number		Weight
Coast	413	/	1839	=	.225
Sound	874	/	1839	=	.475
Drainage Basin	3497	/	1839	=	1.902

Phone numbers for the sample were selected using a random digit dialing technique. This ensures that all households with phones had an equal opportunity of being included in the sample. A professional sampling firm, (Survey Sampling, Inc.) generated the random list of telephone numbers for each of the subareas. Each county is represented in proportion to the total for the subarea in which it falls. Three digit prefix numbers were identified for each area and the remaining four numbers were produced randomly. The numbers were then screened to remove businesses and those not in service.

A total of 831 interviews were completed: 344 in the drainage basin, 269 in the sound and 218 in the coastal counties. Interviews averaged 22 minutes in length. Repeated efforts were made to contact households to assure a representative sample. A minimum of twelve attempts were made before a number was eliminated. Attrition typically took the form of refusals or termination before interview completion. The disposition by status for the total sample was:

Status	Frequency	Percent
Refused	217	20.0
Terminated	40	4.0
Completed	831	76.0
Total	1088	100.0

The interviews were conducted by the Center for Urban Affairs and Community Service of NCSU. The Center employs a cadre of interviewers who were extensively trained prior to conducting the interviews for this study. A copy of the materials used in the training process are included in an appendix. The face sheet which was used to maintain a record of the status of each interview is also included. Ten percent of each interviewers' completed surveys were systematically selected for verification.

Measurement and Analysis of Telephone Survey Data

In an effort to limit the length of this report, a copy of the complete questionnaire is included as an appendix. This should provide interested readers with information on how each variable is measured. Once the survey was completed, it was checked for accuracy and keyed to computer disk. Each record was 100 percent verified. Many of the variables were recoded. In most cases, "don't know" responses are treated as missing. A codebook was developed and is available from the authors. Basic analysis was performed using tape and disk files on both a mainframe computer and microcomputer.

Data presented in this report are analyzed, for the most part, using descriptive statistical measures, e.g., the arithmetical mean and percentage distributions. To measure and assess the relative importance of bivariate relationships, zero-order correlation coefficients were computed. The results of multivariate analysis are not presented in this report, but will appear in later reports.

IN-PERSON INTERVIEW RESULTS

We conducted about 30 in-person interviews with a diverse group of knowledgeable opinion leaders. The group included individuals from agriculture, forestry, commercial fishing, recreation, industry, development, environmental groups, and local government. We also interviewed resource managers and scientists. The interviews lasted between 45 and 90 minutes depending on how much different respondents had to say. In this section we highlight some of the key findings in two areas: public attitudes and management alternatives. Our intent in summarizing these selected results is to provide a general understanding of what these opinion leaders consider to be the information needs and management implications of a public attitude survey. The material presented in this section represents the ideas and thoughts of these opinion leaders, rather than our interpretation. A more detailed presentation would be beyond the scope of this report, because the intent of the in-person interviews was to help us define the major issues to be addressed in the telephone interviews with the general public.

Nature and Importance of Public Attitudes

Respondents to our in-person interviews were asked to suggest the types of questions we should include on a survey of the general public. We developed questions for our telephone surveys based on many of these suggestions. These opinion leaders were also asked why they thought public attitudes are important for management of the Albemarle Pamlico Estuarine system. These leaders believe public attitudes will play a major role in determining the success of any management strategy. Effective management will not be possible without public understanding of and appreciation for the importance of natural resources and their own individual and collective responsibility for these resources. Elected officials need to understand what policies will be acceptable to their constituencies. Comprehensive management plans must reflect the interests of a broad cross-section of the public, not just the special interest groups that have tended to dominate most past decisions. Public support will be needed for increased funding of public programs, as well as enforcement of regulations.

The opinion leaders indicated the need to analyze public awareness and knowledge of a number of subjects. They stressed the need to determine whether people understand what the main pollution sources are. It is not clear whether people truly understand what happens to waste after they dispose of it. The survey should determine whether people understand how development and growth pressures contribute to problems. It will be important to determine what people understand about the effects on the estuaries of their own lifestyles and occupations. They also felt that we should learn how people rate the present quality of surface and ground water for recreation and drinking. Questions should also be asked to evaluate how well people understand some basic biological, hydrological, and ecological features related to the land and water resources of the estuarine systems.

The leaders also felt it will be important to analyze public understanding of present policies and programs. We need to determine if the public feels current government programs are capable of adequately protecting resources. We need to identify how much regulation the public feels is necessary and acceptable. The survey should determine whether people feel we now have too much, too little, or the right amount of control over a number of areas (e.g., agriculture, commercial fishing, wetland drainage, residential development). We must analyze whether people feel landowners have a right to use their land as they see fit or if stronger controls are needed. It will also be important to understand public attitudes toward growth and development, including how the public trades off long term and short term benefits and costs.

We need to analyze how respondents receive information about water quality and coastal management issues. It will also be important to determine what uses respondents make of the resources, as well as factors that limit their ability to use the resources. The public should be asked whether they understand the importance of a high quality estuary system to them individually and for society. This should include both intrinsic and economic values. People should also be asked what type of future they want for the estuarine resources. We should analyze whether they think the resources are infinite or are we likely to reach limits soon. The leaders noted that the public has already expressed concern over environmental issues. There has not yet been a related increase in responsibility for resolving problems. We need to analyze what people would be willing to do or pay to improve water quality. It will also be necessary to determine if people expect some form of technological fix to become available for solving most problems. On the other hand, the public may feel that fundamental social and political changes will be needed to protect the resources.

Management Needs and Alternatives

We asked the opinion leaders a number of questions that directly or indirectly sought their opinions about the effectiveness and acceptability of alternative management strategies. Their ideas are summarized in this section. These leaders recognized the need for some new initiatives. They also thought that existing programs would be greatly improved by additional resources and innovative implementation strategies. Several respondents suggested the need for better coordination among the various commissions as well as greater consistency among various policies and programs. These leaders recognized the need for an innovative mix of management alternatives. Regulations and fines are important, but they are not needed for everything. At the same time education and moral persuasion will not be enough to motivate everyone. The biggest challenge will be to come up with the most effective, efficient, and equitable mix of management strategies.

The opinion leaders recognized the important role of government policies and programs. State level guidance and oversight will be very important. Local

governments tend to be more susceptible to pressure from local interest groups. State policies must establish a uniform framework. There is a need for a more comprehensive management system, based on the best available scientific evidence, rather than political influence or economic efficiency. They felt that too many management decisions have not been based on scientific merit. Management must consider the complex interrelationships among land and water resources.

One important management strategy will be to strengthen current water quality and coastal management policies and programs. These leaders felt that we have adequate regulations for protecting water quality. They believe there is too little enforcement of current water quality or coastal management regulations. Regulatory agencies have too few staff for adequate enforcement. Monitoring is often inadequate to identify violations. Present regulatory programs must be carried out more efficiently and effectively. They also noted that penalties for violations are often so small that they provide little deterrent against pollution or improper land use. Monitoring to determine management effectiveness will also be needed. The opinion leaders indicated that additional research will be needed to evaluate the effectiveness of different alternatives as new management strategies are implemented. Concerns were raised that current policies and regulations were too complex for most people to understand or participate in effectively. The public may not understand how they can influence decisions.

Leaders felt that current regulations were too limited in scope. They agreed that nonpoint source pollution control must be significantly improved and felt that new land use and management regulations should be considered. At least, existing ones should be strengthened. The most pressing areas would include policies to more effectively deal with runoff from agricultural land, urban areas, and forestry. This reflects the recognition that many problems affecting the water resources are the result of land use in the surrounding watersheds. Planning and zoning at the local level will be increasingly important for dealing with land use problems.

Several other sources of pollution were mentioned as needing stronger regulations. Poorly maintained or improperly sited septic systems were recognized as serious problems. These leaders argued that discharge from boats represented localized sources of water pollution. Marina siting was also recognized as a problem that currently receives inadequate attention. They thought over-fishing or use of certain fishing practices caused problems. The leaders mentioned the need to limit access to and over exploitation of the fisheries. Trawling in the estuaries was seen as a serious threat to future fisheries productivity.

The opinion leaders thought fragmentation of authority and inadequate cooperation may present serious barriers to effective management. Many federal, state, and local agencies have responsibility for land and water management. They called for more coordination or consolidation of existing programs. The leaders felt

that current coastal management efforts (e.g., CAMA) are unable to deal with serious land use problems in the watershed. Because many problems result from land use outside the 20 CAMA counties, they urged that the authority of the CRC be extended to the entire watershed. The leaders also thought that the CRC should be given authority over agriculture and forestry in the CAMA counties.

Opinion leaders recognized the need for new development controls and growth management. They mentioned the desirability of lower density development and agreed that heavy industry would not be appropriate for the region. The leaders, however, noted that no one type of growth will be either least or most appropriate for the whole area. All growth must be properly managed and regulated to ensure that any development has a minimal effect on the natural environment. Some areas (e.g., Currituck Banks) may need extreme restrictions on development compared to other inland areas. Development should be limited in sensitive natural areas.

Preservation of natural areas was seen as an important management alternative. These leaders thought that wetland protection will be very important for improving water quality. They noted the need to balance development and conservation of natural areas. Specific natural areas must be evaluated on an individual basis to determine the best means for protection. The societal and ecological importance of a particular area must be evaluated. Areas must be of a reasonable size and integrity. Important areas will likely require public acquisition or regulation to prevent development. Other natural areas may be best protected through some combination of education and financial incentives. Several respondents also suggested some form of water use zoning, similar to land use zoning. Water resources need to be protected for their highest use. For example, if an area is highly suitable for fisheries, it should not be used for a marina (which could be built in an area not suitable for fisheries). Such water zoning could also help reduce conflicts between recreation and commercial users.

These opinion leaders agreed that education will be an important component of any effective, long-term management strategy. Without public support, developed through life-long education, major problems won't be solved. The public needs to recognize their role in both causing and solving problems. Concerned citizens need to understand and take advantage of opportunities to become involved in water quality and coastal management decisions. Educational efforts, including media coverage, have been very successful in broadening the base of concern for the environment. Not enough education has focused on the actions needed to solve the problems.

The leaders noted that the public will usually not become informed and involved until a major issue threatens their financial situation or lifestyle. People must become motivated to change their own behavior and become more involved in the political process related to resource management. The public needs to learn what power they have to influence decisions. People must realize that little will be done unless they

encourage their political representatives to increase funding for resource management. People need to understand the economic aspects of environmental pollution and protection. Citizens need to learn that tradeoffs between growth and the environment will be necessary in many cases. Education needs to focus on three broad areas: what are the resources; what are the reasons for concern over resources; and what needs to be done to protect the resources. Education must be based on good science, rather than conjecture.

The leaders agreed that education must be more proactive. It will be necessary to reach out to the public, because many people do not come to government agencies for information. University scientists, state government, and the N.C. Cooperative Extension Service are viewed as highly credible sources of information. They felt education should take a number of forms. It needs to start early in the school systems. Adults will rely on the mass media for much of their information. Political officials and industry leaders (especially at the local level) also need education to better understand their contribution to the problems and solutions. Everyone must understand that natural systems are reaching their limits. People must learn to accept responsibility for their own actions. Education must be aimed at developing an environmental ethic based on the notion of recycling and problem prevention.

The opinion leaders agreed that alternative management strategies will require balancing public and private interests. Many important, but possibly competing, goals must somehow be accommodated. More comprehensive approaches for protecting public trust rights are needed. Resources must be allocated so all groups pay a fair share for use of public resources. Conflicts between groups need to be identified and managed. Policies must strike a delicate balance between consistency and flexibility. Local officials need some discretion, but at the same time greater state oversight is needed. Some mechanism is needed at the local level to make decisions about the future so that citizen's interests are best accommodated. The political process must make greater use of research-based facts to balance competing uses. Most policies are now developed under pressures from various interest groups. This system will not necessarily lead to the most effective, efficient, and equitable resource management systems. Enforcement and implementation of existing policies are also greatly influenced by political pressure groups.

The leaders felt that fundamental social and political changes will be needed to solve the most serious problems. For example, society needs to determine the extent to which people have an inherent right to manage their land in a way that degrades the environment. If landowners do not have this right, they should be prohibited from doing so. However, if people do have such rights then financial incentives or compensation will be appropriate. These and other important policy questions must be carefully considered before effective management strategies can be developed.

TELEPHONE SURVEY RESULTS

In this section we present the results of the telephone survey conducted with the public in the Albemarle Pamlico Estuarine study area. The results are presented in five main sections. First, we discuss the sample characteristics. Second, we describe where people get their information about water quality, as well as how much trust they have in the information they receive from different sources. Third, we describe respondents' current levels of awareness and knowledge related to water quality and other natural resource issues. Fourth, we present results related to problem perception. We describe how the public feels about the causes and consequences of water quality problems affecting the estuaries. Finally, we discuss the survey results related to public policies and management. In all cases we present the weighted results for the whole sample. We do not present differences between subgroups. Any statistically significant differences between subgroups are described in the final section of this report.

Sample Characteristics

As shown in Table 1, the sample conforms to expectations with regard to the distribution within the subareas. Slightly over forty percent of the sample was located in the drainage basin, 32 percent in the sound and the remaining 26 percent was located in the counties along the coast. The distribution of the sample by residence shows that 36 percent of the sample lived in rural areas, 25 percent lived in small towns, 14 percent lived in suburbs, and the balance (25 percent) lived in cities.

Other demographic characteristics of interest include gender, race and age. About 55 percent of the sample was female and 45 percent male. This represents the proportions in the population. This was expected given the fact that the interviewers were instructed to select respondents to obtain a balance of men and women. In the case of race, 78 percent of the sample was white and 22 percent was black and other races. Over one-fifth of the sample was under 30 years of age and 10 percent was 70 years of age and over. The ten year age categories between these two extremes ranged from 11 percent of the sample aged 60-69 to 24 percent aged 30-39.

Variations in attitudes and knowledge about environmental quality have been associated with such socioeconomic characteristics as education and income. The respondents were asked to report their highest grade in school completed. Table 1 shows that six percent of the sample had finished eight years or less, 29 percent had graduated from high school, 16 percent graduated from college and 11 percent had taken some graduate work or held a graduate degree. The distribution of the sample by family income appears to approximate a normal distribution. Around 4 percent of the sample had family incomes under $5,000 and nearly the same relative number had incomes $80,000 and over. Each of the three categories from $10,000 to $40,000 contained about one-fifth of the sample.

Table 1. Sample Characteristics

Location of A/P Study Area	
Drainage Basin	42%
Sound	32%
Coast	26%
Residence	
Rural Area	36%
Small Town	25%
Suburb	14%
City	25%
Gender	
Male	45%
Female	55%
Race	
White	78%
Other	22%
Age	
Under 30	22%
30-39	24%
40-49	19%
50-59	14%
60-69	11%
70 and over	10%
Education	
Eight Years or Less	6%
9th through 11th	15%
High School Grad	29%
Some College	17%
Associate Degree	8%
Bachelor's Degree	16%
Some Graduate Work	3%
Graduate Degree	8%

Household Income	
Under $5000	4%
5001 to 10,000	8%
10,001 to 20,000	20%
20,001 to 30,000	21%
30,001 to 40,000	20%
40,001 to 50,000	11%
50,001 to 60,000	9%
60,001 to 80,000	4%
80,001 to 100,000	2%
Over 100,000	1%
Use A/P System for Recreation	
Yes	36%
No	64%
Use Other Coastal Water for Recreation	
Yes	46%
No	54%
Recreational Use of Sounds and Other Coastal Waters	
Swimming	71%
Fishing	68%
Boating	25%
Passive	15%
Environmental Activism	
Donated Money	29%
Attended Public Meeting	11%
Active Member of Group	6%

As part of the background information on the respondents, we were interested in whether respondents use the Albemarle-Pamlico Estuarine system (APES) and other coastal waters for recreational purposes. The results reveal that only 36 percent of the sample used the APES for recreational purposes, but 46 percent used other coastal waters for recreational purposes. The APES was defined in the interview as follows: "Now I would like to ask you about the Albemarle Sound, Pamlico Sound, and the rivers that flow into these sounds (such as the Neuse and Tar Rivers). These sounds or estuaries are the large water bodies in the Eastern part of the state inside the Outer Banks from Morehead City to the Virginia State line. Core Sound and Bogue Sound are also included in this area." Other coastal waters included any other coastal waters in North Carolina (e.g. around Wilmington). For those respondents using the APES or other coastal waters for recreation, the major uses were swimming (71 percent) and fishing (68 percent). One-fourth used the waters for boating and about 15 percent reported that they used the areas for passive activities such as bird watching and walking.

The level of environmental activism was measured by asking respondents whether they donated money to any resource conservation or environmental groups, whether they attended a public hearing or meeting, and whether they were an active member of any environmental groups or organizations. Nearly one-third of the sample donated money, 11 percent attended a meeting, and six percent were active members of a group. This level of participation seems to be consistent with levels of participation reported in other studies.

Sources of Information

We wanted to find out where respondents got their information about water pollution. We asked a question in the following form: "How much information on water pollution have you gotten from each of the following sources?" We asked if they had received a lot, some, or no information for each of nine different sources. These results are shown in Figure 4. Most respondents got information from the mass media. In fact, 92 percent got some or a lot of information from television, and 81 percent got a lot or some information from newspapers. Almost three quarters (71 percent) got a lot or some information from other people (e.g., their neighbors or friends). About two thirds got information from magazines. Just over half of the respondents received information from radio or from books.

We found that respondents did not get as much information directly from several of the formal groups. For example, 44 percent of the respondents got information from environmental groups about water pollution. Just over a third (35 percent) got information from government publications. Only about one fourth of the respondents got any information about water pollution from elected officials. It is important to realize that much of the information people receive about water pollution

from the mass media does, in fact, come from groups such as environmental organizations or elected officials.

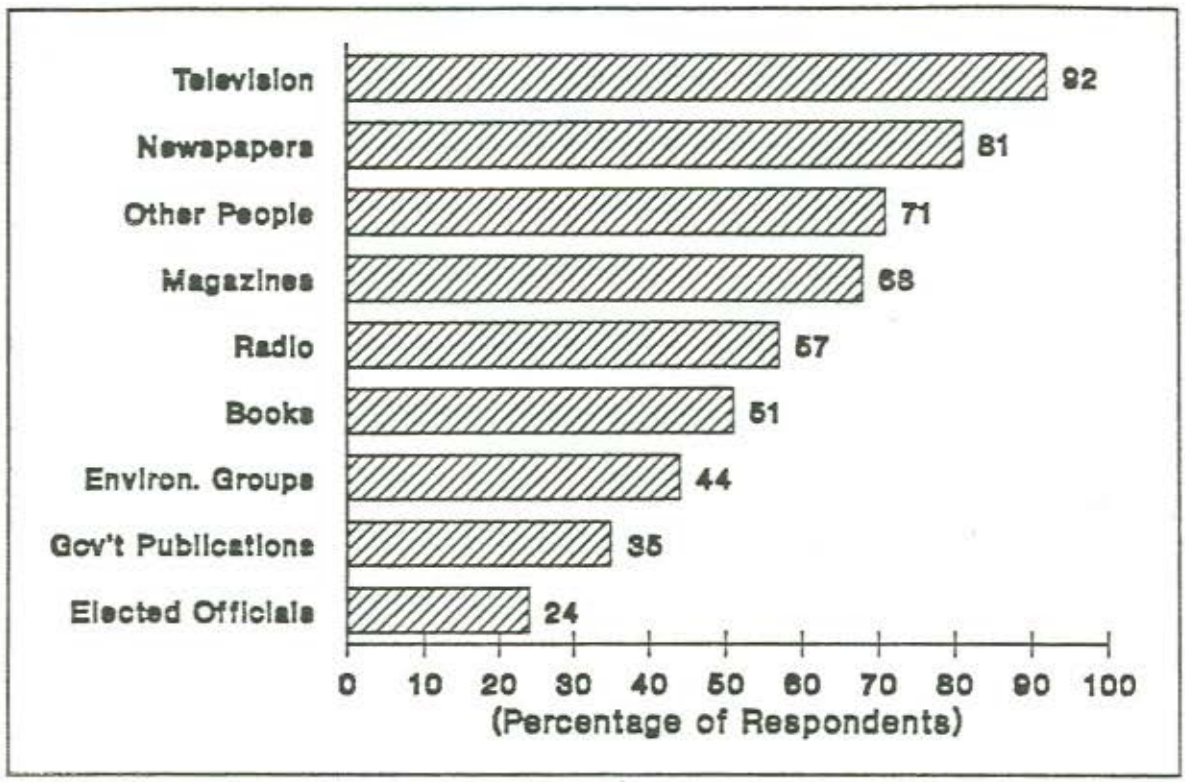

Figure 4. Sources where respondents got a lot or some information about water pollution.

Next, we were interested in finding out how much confidence or trust respondents have in statements about water quality made by a number of different groups. To do this we asked the following question, "Different groups often make statements about water pollution. Would you have a lot of trust, some trust, or no trust in a statement about water pollution made by _____?" We then read each of the nine groups shown in Figure 5. Most respondents have either a lot of trust or some trust in water quality statements made by university scientists. Environmental organizations were seen as trustworthy by 92 percent of the respondents. Several other groups also appear to have quite high creditability: 82 percent of the respondents would trust fishing groups and 77 percent would trust farm groups.

In general, about three quarters of the respondents reported either a lot of trust or some trust in statements about water quality made by government agencies. There appears to be very little difference in trust among the three different levels of government. Figure 5 indicates that state government may be trusted more than

federal government but these differences do not appear to be significant. It is clear, however, that the public has relatively little trust in statements made by two other groups. Only about one third of the respondents will trust statements made by industry or developers. People may recognize that these groups have strong vested interests and will, therefore, not be considered unbiased.

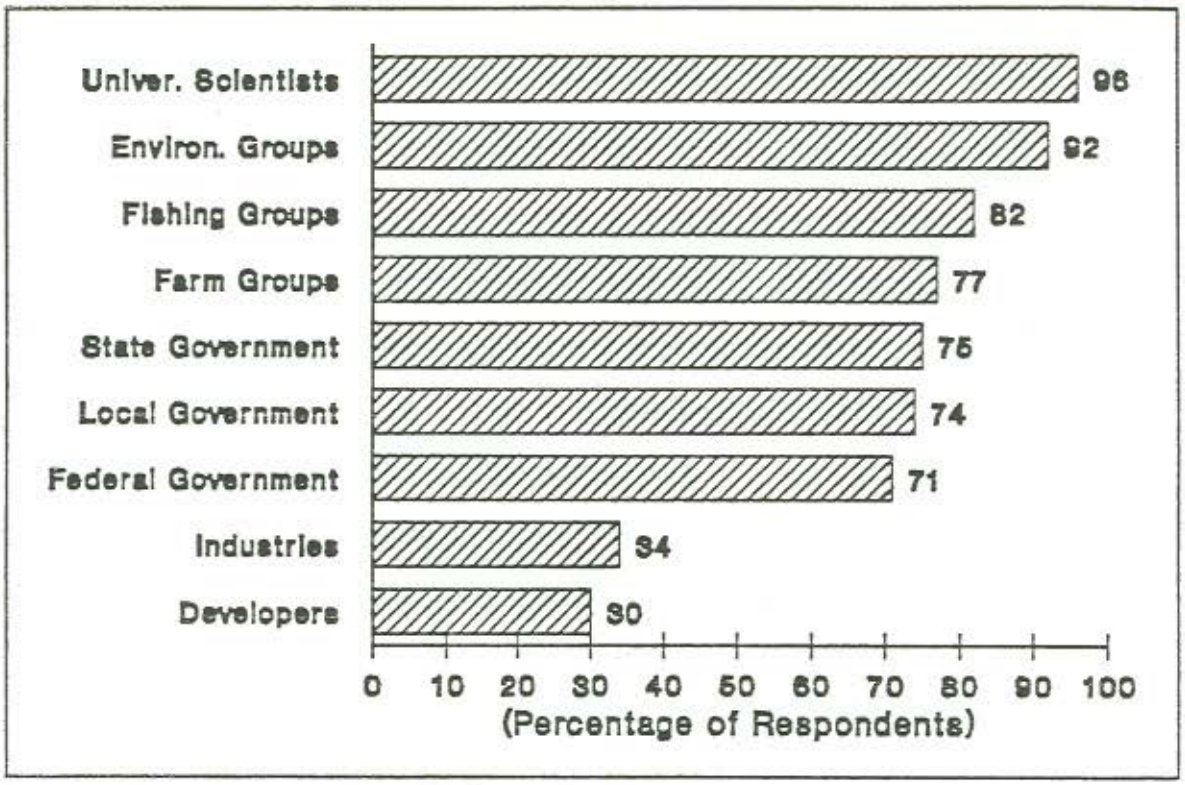

Figure 5. Sources where respondents reported a lot or some trust in statements about water pollution.

We were also interested in learning whether or not people would be interested in and receptive to more information about water pollution. Respondents were asked, "Would you like to know more about water pollution?" It is encouraging to see that 83 percent of the respondents said that they would like to know more. On the other hand, only 15 percent said they would not like to know more about water pollution. A few respondents weren't sure whether they wanted more information.

Awareness and Knowledge

It is important to measure respondents' awareness of and knowledge about different government programs or agencies. To do this, we asked respondents the

following question: "Many different government agencies and programs are involved in water quality and coastal management. Have you ever heard of _____?" We then read each of the items shown in Figure 6. About three quarters of the respondents had heard of the Division of Marine Fisheries. Just under two thirds (63 percent) had heard of the Division of Environmental Management. Slightly over half had heard of the Division of Coastal Management. Around one third had heard of the Coastal Area Management Act or CAMA, Albemarle Pamlico Estuarine Study, and the North Carolina Agricultural Cost Share Program. Only 10 percent had heard of the Swampbuster program which is a provision of the 1985 Farm Bill.

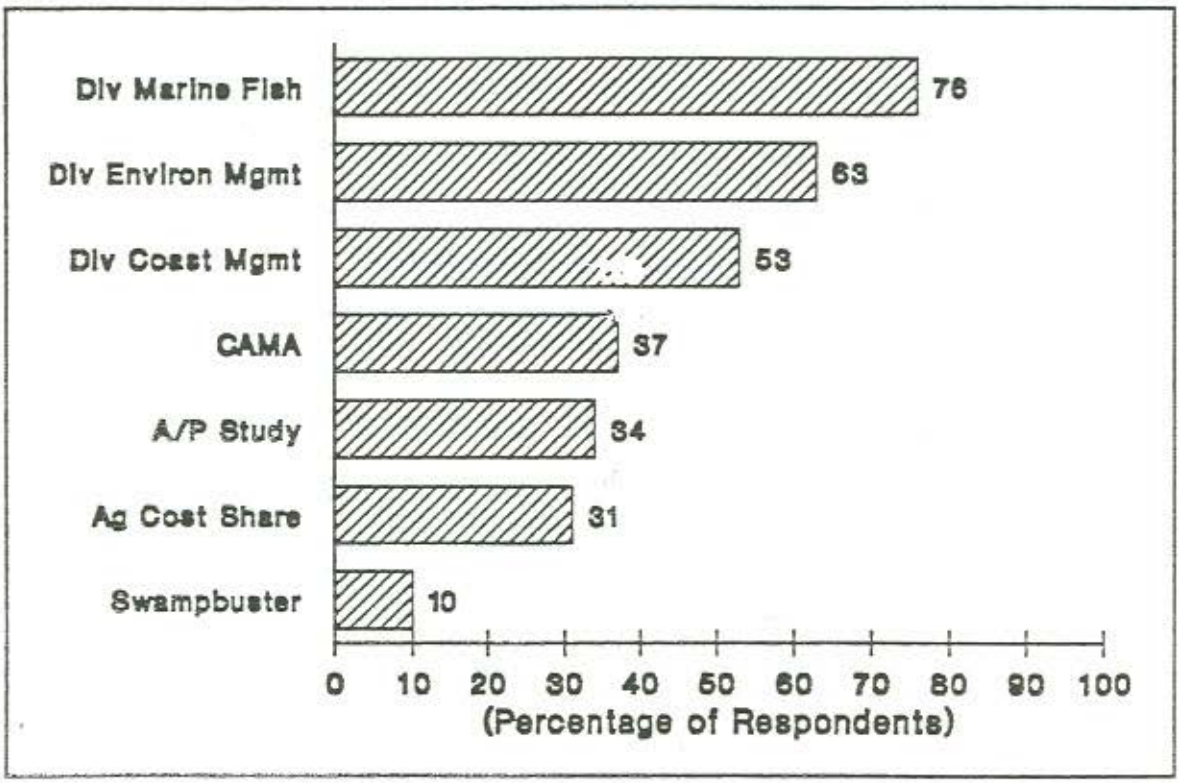

Figure 6. Respondents who had heard of government agencies and programs.

We also wanted to measure respondents' knowledge related to different issues associated with the estuaries. We developed a set of questions that could be answered on a yes or no basis. We asked respondents, "As far as you know do any species of salt water fish spend part of their lives in the sounds?" We found that just over half (54 percent) were correct in saying "yes" to this question. About 10 percent answered negatively. In fact, over a third (37 percent) said they did not know the answer to this question. On another fishing related point, we asked respondents, "Do you think certain fishing practices can cause problems for fish habitat?" In this case, we found that almost three quarters (72 percent) did recognize the impact of fishing practices on fish habitat. Only 12 percent said practices do not affect fish habitat. A number of respondents (16 percent) said they did not know.

We also wanted to determine if respondents knew the value of wetlands. It is important to realize that we defined wetlands to include "marshes and swamp land that have water on or near the surface". This is a narrower, and less technical definition than the ones used by regulatory agencies. First, we asked, "Do you think wetlands are important as a habitat for birds and other wildlife?" We found that almost all (94 percent) recognized the value of wetlands as habitat. To determine whether respondents knew a more subtle value of wetlands, we asked, "Do you think wetlands are important for maintaining or improving water quality?" In this case, just over two thirds (67 percent) said yes. Almost one quarter (22 percent) said they did not know whether or not wetlands are important for maintaining water quality.

We were also interested in finding out if respondents understood some of the implications of land use and related issues on water quality. We asked respondents, "Do you think land use has a major affect on water quality in the Albemarle and Pamlico Sounds?" In this case, most (85 percent) knew that land use has a major affect. About 10 percent said they did not know. Only 6 percent thought land use does not have an effect. To determine whether or not people understood the notion of a watershed we asked, "Do you think some of the water quality problems in the Albemarle and Pamlico Sounds are caused by pollution from inland cities in North Carolina such as Raleigh or Greenville?" In this case, three quarters of the respondents answered affirmatively. Only 8 percent said no. Almost one fifth (17 percent) did not know the answer to this question. As a final indication of knowledge, we asked respondents a rather complex question: "As far as you know can fresh water create a pollution problem for the sounds?" In this case, less than half (47 percent) knew fresh water could create a pollution problem. One fourth thought fresh water could not create a problem. Over one fourth (28 percent) said they did not know the answer to this question.

Environmental Values and Beliefs

We wanted to have a reliable and valid method of assessing the extent to which respondents held environmental values and beliefs. To do this we used a well-established attitude scale known as the "New Environmental Paradigm" scale (Dunlap and Catton, 1979). All twelve items are of the Likert scale format. Respondents were asked to respond to each statement in terms of their level of agreement (i.e., strongly agree, agree, disagree, or strongly disagree). Results for each individual item are shown in Table 2. These twelve items represent three main underlying dimensions of environmentalism: balance of nature; limits to growth; and human control over nature.

The first set of items assesses respondents' concerns over social impacts on the balance of nature. Almost all (over 90 percent) respondents either agreed or strongly agreed that such impacts are of major concern. Almost everyone believed "The balance of nature is delicate and easily upset." Almost as many agreed that "When humans interfere with nature it often produces disastrous consequences." People are almost unanimous in their conviction that "Humans must live in harmony with nature in order to survive." Agreement appears strongest with the statement that "Mankind is severely abusing the environment."

The second dimension of environmental values covered by this scale involves respondents' attitudes about limits to growth. Again, responses clearly indicate strong environmentalism. However, these are not held as strongly as those relating to balance of nature. The highest level of agreement was with the statement that "To maintain a healthy economy we will have to develop a 'steady state' economy where industrial growth is controlled." Over 80 percent also agreed that "The earth is like a spaceship with only limited room and resources." Over three-quarters felt "There are limits to growth beyond which our industrial society cannot expand." Three-quarters believed that "We are approaching the limit of the number of people the earth can support."

Table 2. Items for New Environmental Paradigm scale

		Strongly Disagree	Disagree	Agree	Strongly Agree
BALANCE OF NATURE					
a.	The balance of nature is very delicate and easily upset.	0	5	66	29
b.	When humans interfere with nature it often produces disastrous consequences.	1	7	69	23
c.	Humans must live in harmony with nature in order to survive.	0	2	66	32
d.	Mankind is severely abusing the environment.	0	4	56	39
LIMITS TO GROWTH					
e.	We are approaching the limit of the number of people the earth can support.	1	25	60	15
f.	The earth is like a spaceship with only limited room and resources.	1	15	64	20
g.	There are limits to growth beyond which our industrial society cannot expand.	1	18	68	14
h.	To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled.	1	4	80	16
PEOPLE OVER NATURE					
i.	Mankind was created to rule over the rest of nature.	13	48	38	2
j.	Humans have the right to modify the natural environment to suit their needs.	12	49	37	2
k.	Plants and animals exist primarily to be used by humans.	10	54	35	1
l.	Humans need not adapt to the natural environment because they can remake it to suit their needs.	19	64	17	0

The final set of items in this scale involved respondents' beliefs about the extent to which people should control or use nature for their own purposes. In this case, **disagreement** with a particular statement reflects environmental beliefs or values. This dimension appears to reflect less environmental orientation than the other two sub-scales just discussed. However, once again environmentalism is still reflected by a majority of responses. The strongest belief involves 83 percent disagreement that "Humans need not adapt to the natural environment because they can remake it to suit their needs." Almost two-thirds disagreed that "Plants and animals exist primarily to be used by humans." About 60 percent disagreed with two similar statements: "Humans have the right to modify the natural environment to suit their needs." and "Mankind was created to rule over the rest of nature." Overall, responses to these twelve statements indicate a very high level of environmental values and beliefs among North Carolina citizens.

Perception of Problems

We were interested in determining respondents' concerns about water pollution. We asked respondents about four different reference points for this concern: the state of North Carolina; the Albemarle-Pamlico Estuarine system; their own county; and their home drinking water. These results are shown in Figure 7. We first asked respondents, "In general do you think water pollution is a serious problem, somewhat of a problem, or not a problem **in North Carolina?**" We found that about two thirds felt water pollution is a serious problem in North Carolina. Just under a third (30 percent) felt water pollution was somewhat of a problem. Only five percent believed water pollution was not a problem in North Carolina. The results were very similar when we asked about water quality problems **in the Albemarle-Pamlico Estuarine system.** Almost two thirds felt water pollution was a serious problem and about a third felt it was somewhat of a problem in the A/P system.

However, as shown in Figure 7, respondents were less convinced that water pollution represented a serious problem as the point of reference got closer to home. When asked, "In general do you think water pollution is a serious problem, somewhat of a problem, or not a problem **in your own county?**", just over a third (37 percent) felt water pollution was a serious problem. About the same number said pollution was somewhat of a problem in their county. In fact, one quarter (25 percent) said water pollution was not a problem in their county. The differences are particularly striking when we asked, "Do you think water pollution is a serious problem, somewhat of a problem, or not a problem for **your own drinking water?**" In this case, only 15 percent felt that water pollution was a serious problem. Only one quarter felt it was somewhat of a problem. Almost two thirds (60 percent) said water pollution did not pose a problem for their own drinking water.

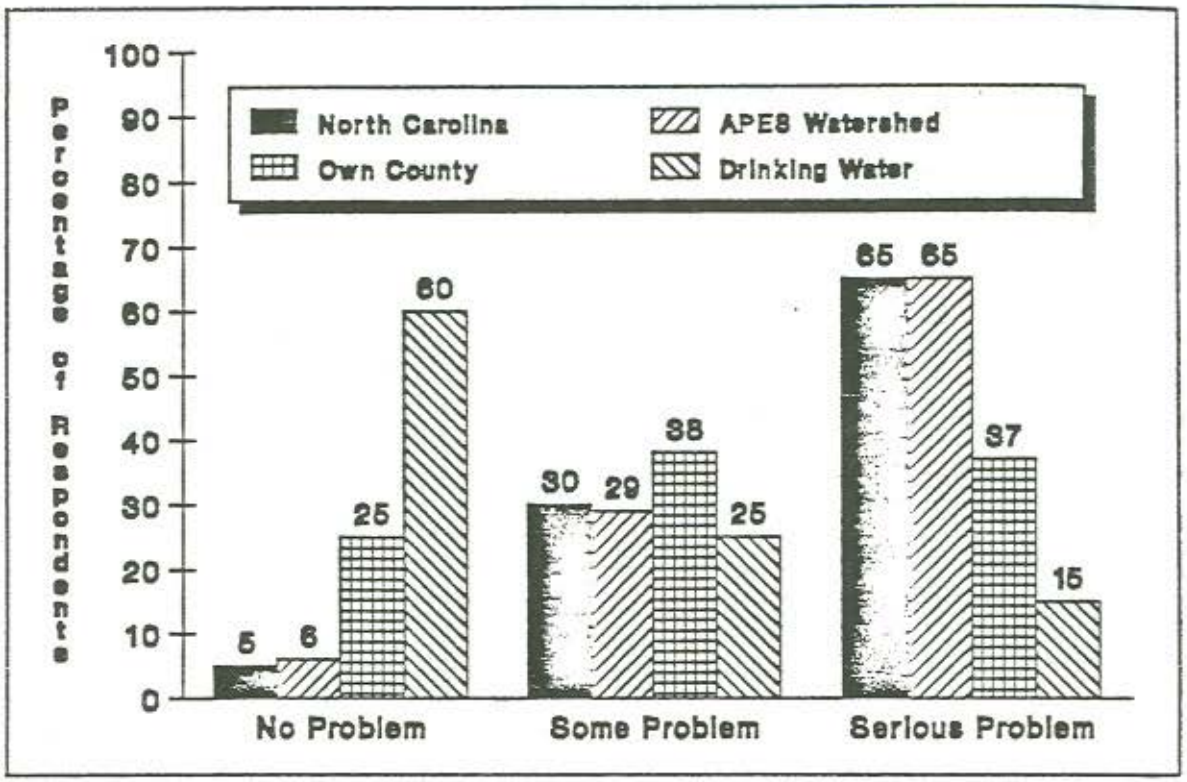

Figure 7. Perceived relative severity of water pollution problems.

We asked two questions to learn what people thought were the main causes of water pollution. We initially asked, "What do you think are the major causes of water pollution in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina?" Respondents were able to mention as many answers as they wanted to this open-ended question. After they had volunteered an initial answer, we probed by saying, "Can you think of any other major causes of water pollution?" We then combined some responses into the basic categories shown in Figure 8. The most common response to this question was related to industrial discharge or industrial waste. In fact, over half (57 percent) mentioned something to do with industry. The next most common response involved litter or garbage. Over a third (36 percent) mentioned litter, trash, or garbage.

Five other causes were mentioned by a sizeable number of respondents in response to this open-ended question. About one fifth (22 percent) mentioned something to do with agriculture, (either livestock waste or runoff from cropland). Less than one fifth (16 percent) mentioned something to do with city sewer systems. Another twelve percent reported either boating or marinas. Twelve percent mentioned the use of home or lawn chemicals as a major cause of water pollution. It's interesting to note that ten percent of the sample mentioned oil spills as a major cause of water pollution in the sounds.

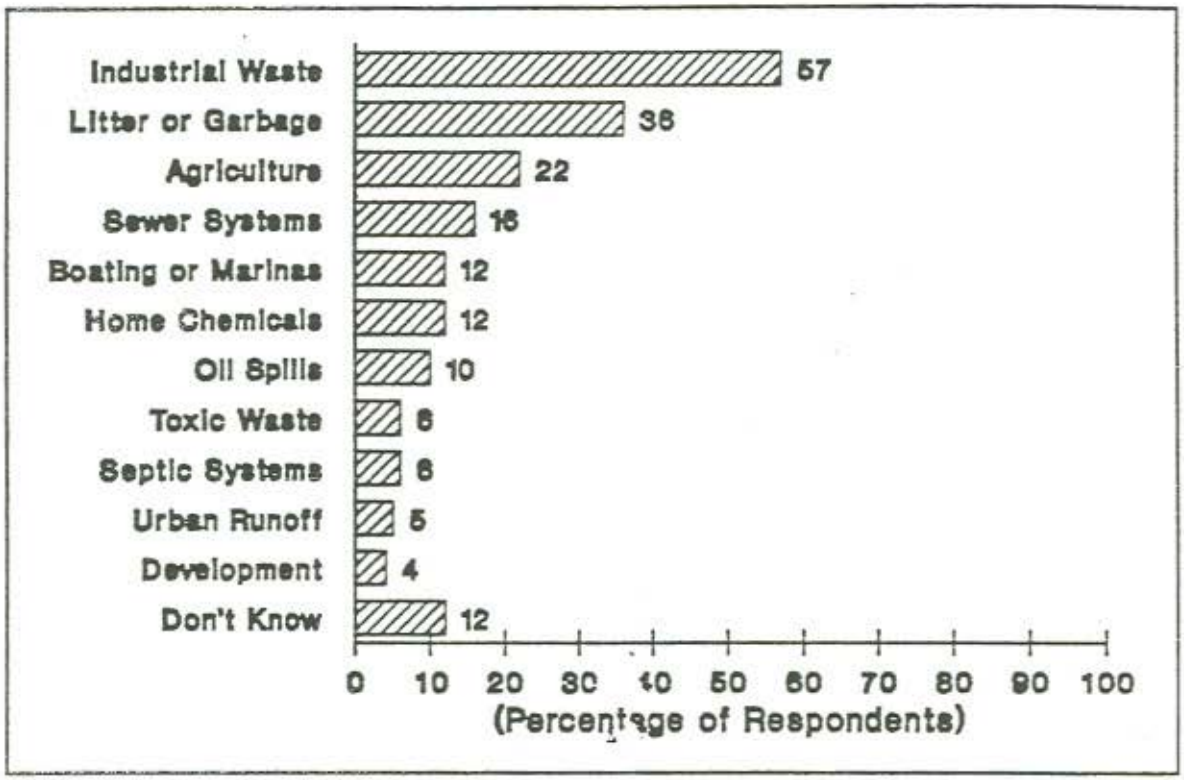

Figure 8. Respondents' perceptions of relative severity of different causes of water pollution (open ended question).

Respondents also mentioned several other miscellaneous causes of water pollution. We found that six percent of the respondents mentioned toxic waste. Another six percent mentioned home septic systems as a cause of pollution. A few mentioned some kind of runoff from paved areas as a cause of pollution. Only four percent of the respondents specifically mentioned shoreline development as a major cause of water pollution. It is interesting to note that 12 percent of the respondents admitted they could not identify any major causes of water pollution.

We next were interested in finding out how people actually rank four specific causes of water pollution. We asked the following: "I am going to read you four possible causes of water pollution that may affect the Albemarle Sound, Pamlico Sound, or other coastal waters of North Carolina. These are agriculture, city sewer systems, industry, and shoreline development." We then asked which one they thought was the most serious cause of water pollution. As shown in Figure 9, over half (55 percent) reported that industry was the most serious cause of water pollution. Just under a quarter (23 percent) said that city sewer systems were the most serious cause and 13 percent said shoreline development was the most serious cause. Only 11 percent felt that agriculture represented the most serious cause of water pollution. On the other hand, when we asked, "Which is the least serious cause of water pollution," almost half (45 percent), felt agriculture was the least serious cause of water pollution. One third felt shoreline development was the least serious cause.

About 15 percent said city sewer systems were the least serious cause. Only five percent said industrial waste was the least serious cause of water pollution.

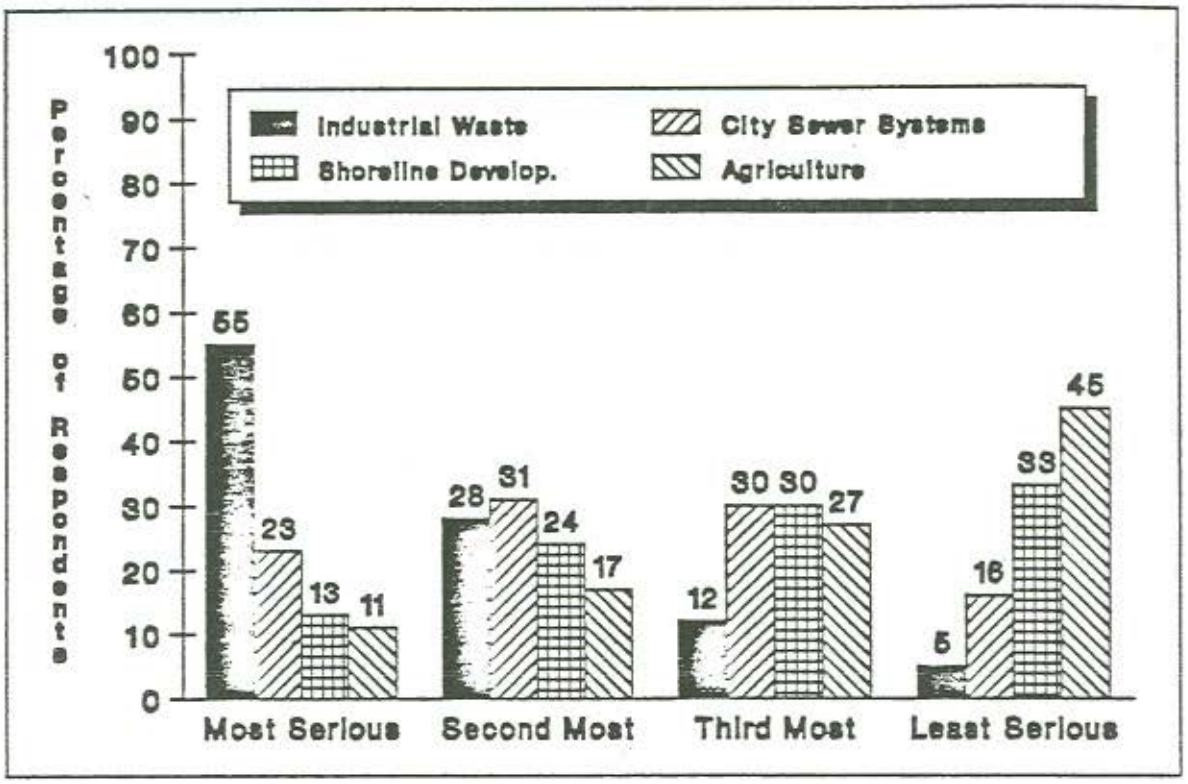

Figure 9. Respondents' perception of relative severity of different causes of water pollution (closed ended question).

We also wanted to determine what it was about water pollution that people were concerned about. We asked respondents, "Now I'd like to ask you about some effects of water pollution. Please tell me how much of a problem each of the following is in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina." Then for each of the potential effects shown in Figure 10 we asked, "Is this a serious problem, somewhat of a problem, or not a problem?" It's clear that many people (66 percent) feel that diseased fish represent a serious effect of water pollution. Another 58 percent said damage to natural areas represented a serious problem associated with water pollution. One half of the respondents said that reduced catches of fish or closing of shellfishing areas were serious consequences of water pollution. Two other effects were seen as rather serious concerns. Almost half (48 percent) said that not being able to swim was a serious problem associated with water pollution. Another 46 percent felt that odors or other nuisance problems represented a serious consequence of water pollution.

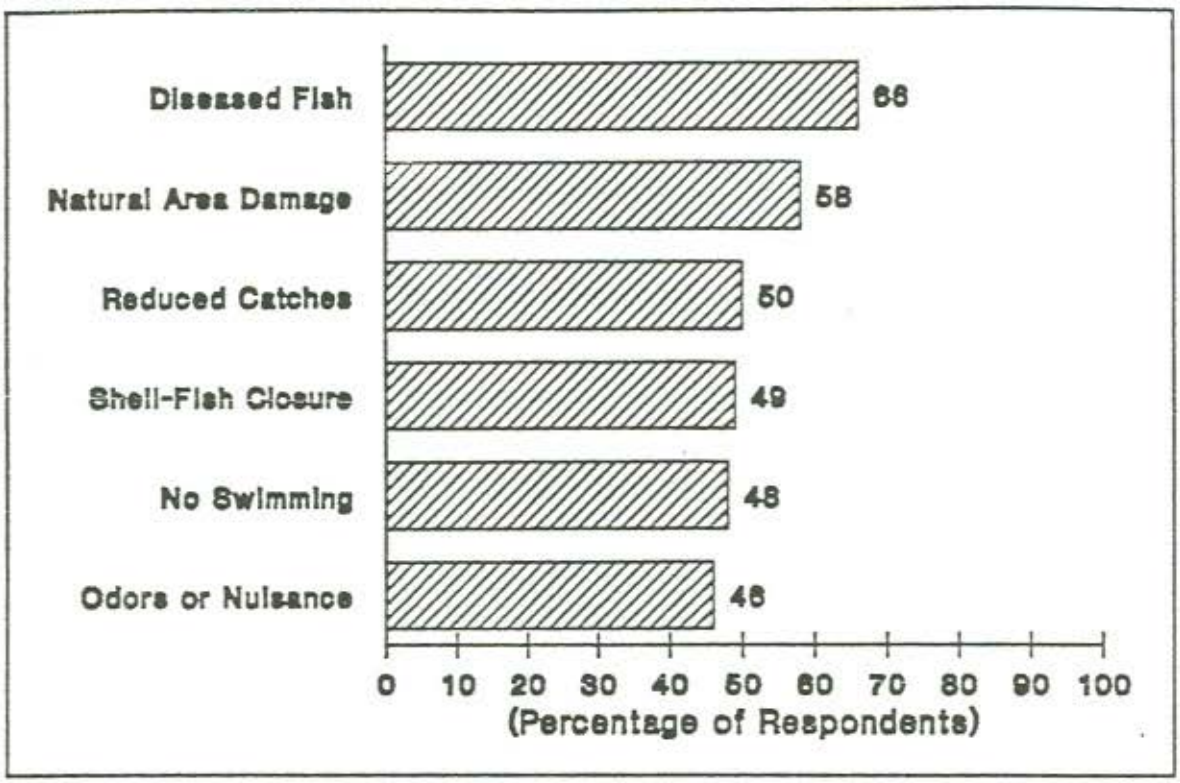

Figure 10. Effects of water pollution perceived to be a serious problem.

We were also interested in finding out how people rate the quality of fishing in the Albemarle and Pamlico Sounds, as well as in other coastal waters. We only asked these two questions of the 413 respondents who reported that they did fish in these waters. Results of these two questions are shown in Figure 11. We first asked, "How would you rate fishing **today** in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina. Would you say fishing is excellent, good, fair, or poor?" Respondents who fish were clearly not satisfied with the quality of fishing today. In fact, over one third (38 percent) said fishing today was poor. Another 41 percent rated fishing as fair. Only 18 percent of the respondents thought fishing today was good. Very few (two percent) rated fishing today as excellent.

For comparison, we asked, "How would you rate fishing **five years ago** in the Albemarle Sound, Pamlico Sound, or other coastal waters of North Carolina?" Again, we used the same four categories. In this case, we find that respondents have a much better perception of fishing in the past than they do of fishing today. As shown in Figure 11, only 4 percent of the respondents considered fishing five years ago to be poor. Just 15 percent said it was fair. In fact, the majority of people (62 percent) who fished said fishing five years ago was good. One fifth (19 percent) said fishing was excellent five years ago. This represents almost a complete reversal over a five year period in terms of people's assessment of the quality of fishing.

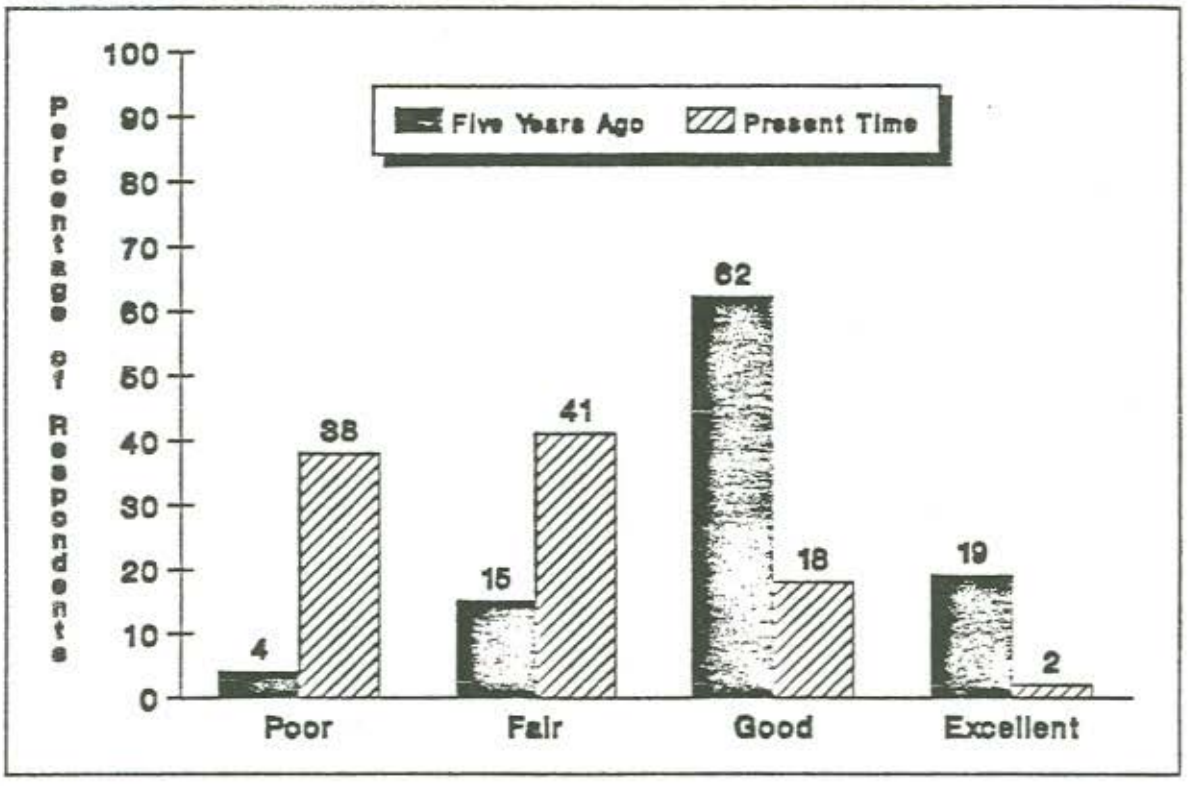

Figure 11. Changes in perceived quality of fishing in A/P system and other coastal waters. (Only the 413 respondents who fish)

As another indication of the people's perception of the problems, we asked respondents about wetland conversion. In this case, we posed the question as follows: "Wetlands include marshes and swamp lands that have water on or near the surface. Do you think the filling or the drainage of wetlands is a serious problem, somewhat of a problem, or not a problem?" The results for this question are shown in Figure 12. It's clear that people are concerned about problems associated with wetland conversion. Almost half (48 percent) felt the filling and drainage of wetlands was a serious problem. Almost one third (29 percent) felt that such conversion was somewhat of a problem. Only eight percent of the sample believed the filling and drainage of wetlands was not a problem. It is important to note that 15 percent of the respondents did not have an opinion on this particular question.

The next set of questions examines people's attitudes about conflicts that may occur over the use of land and water resources in the coastal area. The lead-in to these questions was as follows: "The Albemarle Sound, Pamlico Sound, and other coastal waters have many uses, some of which may conflict. People have different opinions about how these conflicts should be resolved." One of the first tradeoffs we posed involved the conflict between agriculture and wildlife habitat. In this case, we asked, "If there is a conflict between food production and wildlife habitat in a wetland area, which one should be restricted?" Figure 13 shows that over half of the respondents (56 percent) said that food production should be controlled. Only one

fourth (25 percent) felt that the control should be aimed at wildlife habitat. Some (six percent) of the respondents argued that both should be controlled (even though this was not a choice given them in the question). A sizeable number (13 percent) said that they did not know which one should be controlled.

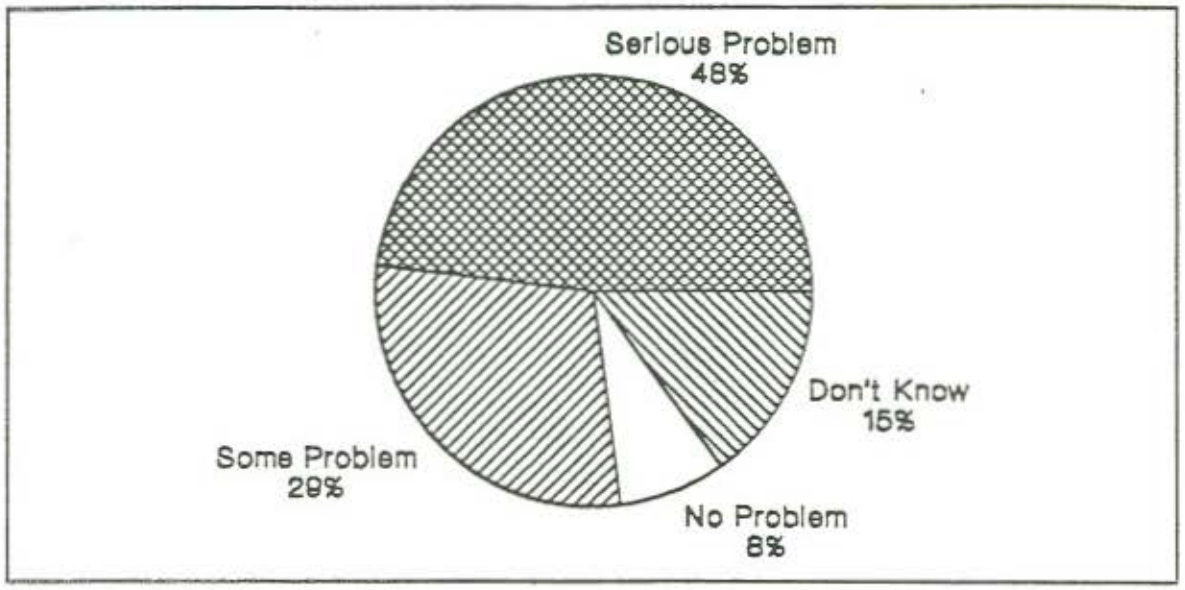

Figure 12. Perceived severity of problems related to the filling or drainage of wetlands.

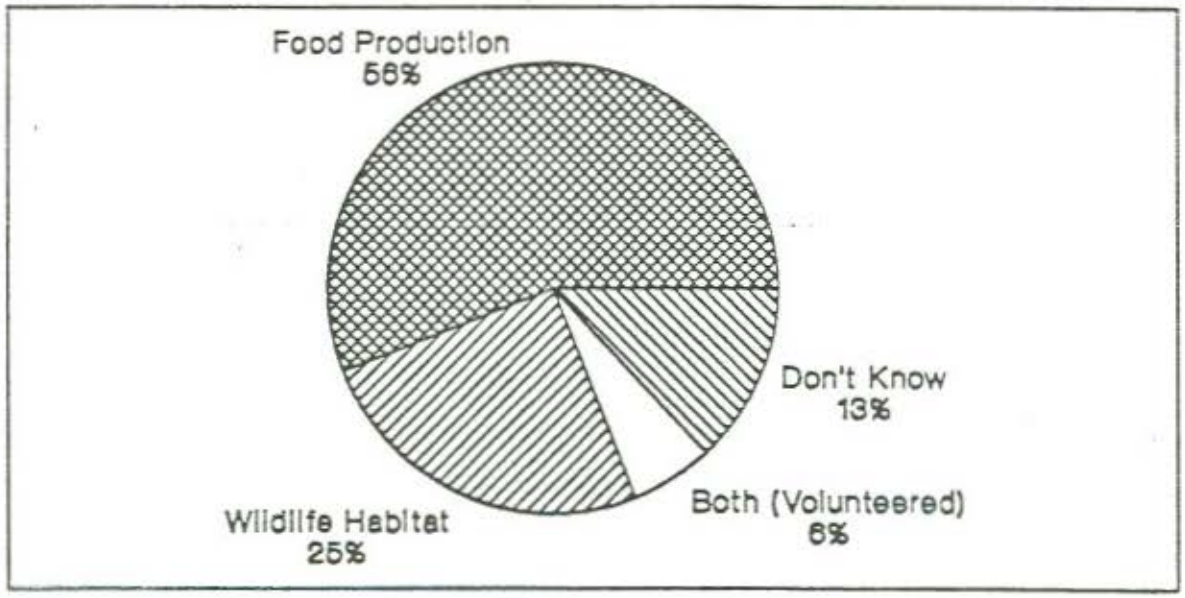

Figure 13. If conflict between food production and wildlife habitat in wetland, respondents' opinion about which should be controlled?

On another question we asked, "If there is a conflict between sport fishing and commercial fishing in an area which should be controlled?" As indicated in Figure 14, the public was rather divided on this particular issue. About half (45 percent) said it would be better to control sport fishing. On the other hand, about a third (33 percent) recommended control of commercial fishing. In this case 14 percent volunteered that both should be controlled. About one tenth did not have an opinion about which one to control.

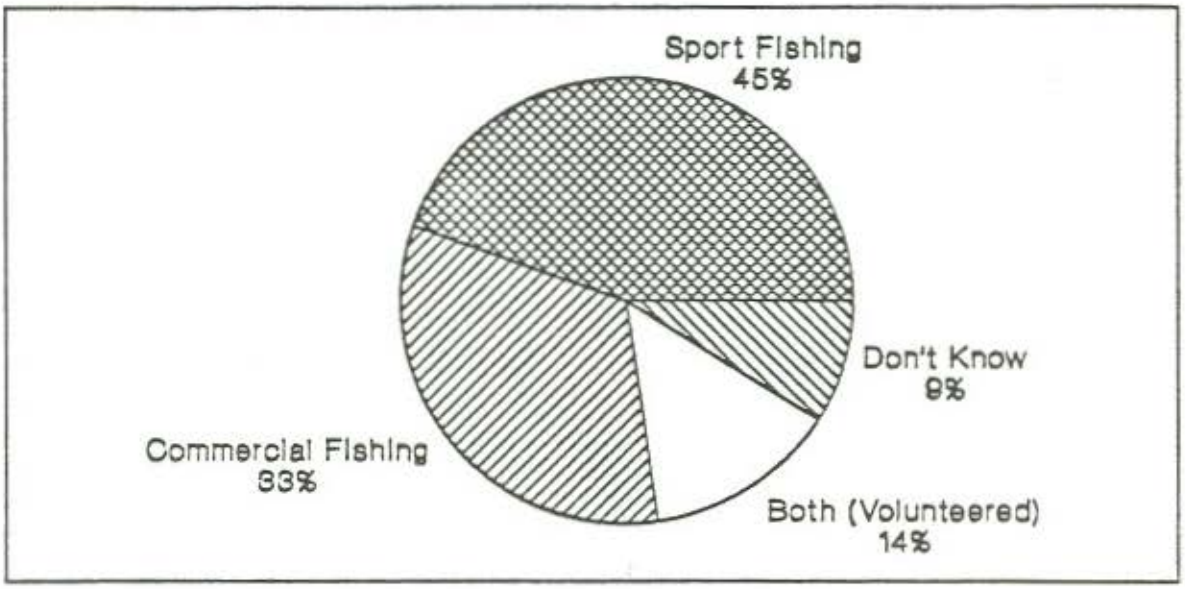

Figure 14. If commercial and sport fishing conflict, respondents' opinion about which one should be controlled.

We also asked about another potential conflict that might occur over resources in the coastal area. We asked, "If there is a conflict between housing development and recreation on a section of shoreline which should be controlled?" In this case respondents were clearly in favor in controlling housing development (Figure 15). Almost two thirds (63 percent) of the respondents thought the housing development should be controlled, rather than recreation. Only 20 percent felt that recreation should be controlled. Some (nine percent) felt both should be controlled. Others (seven percent) said they did not know.

As a final question involving resource use conflicts we asked respondents, "In your opinion which is more important: private landowners rights to use the land as they see fit or government land use regulations to control water pollution." Figure 16 shows that respondents clearly favor one side of this issue over the other. We found over half (58 percent) believed land use regulations to control water pollution were more important. On the other hand, less than one fourth (23 percent) felt that private landowners rights to use their lands were more important. Just over 10 percent volunteered that both were important and eight percent said they did not know.

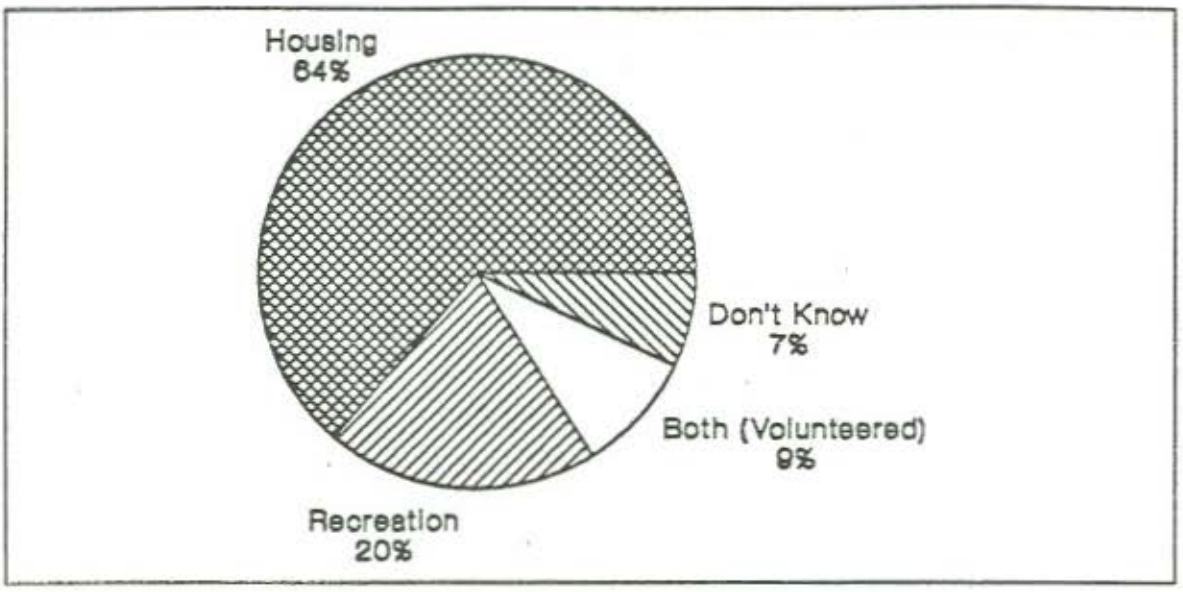

Figure 15. If conflict between housing development and recreation, respondents' opinion about which should be controlled?

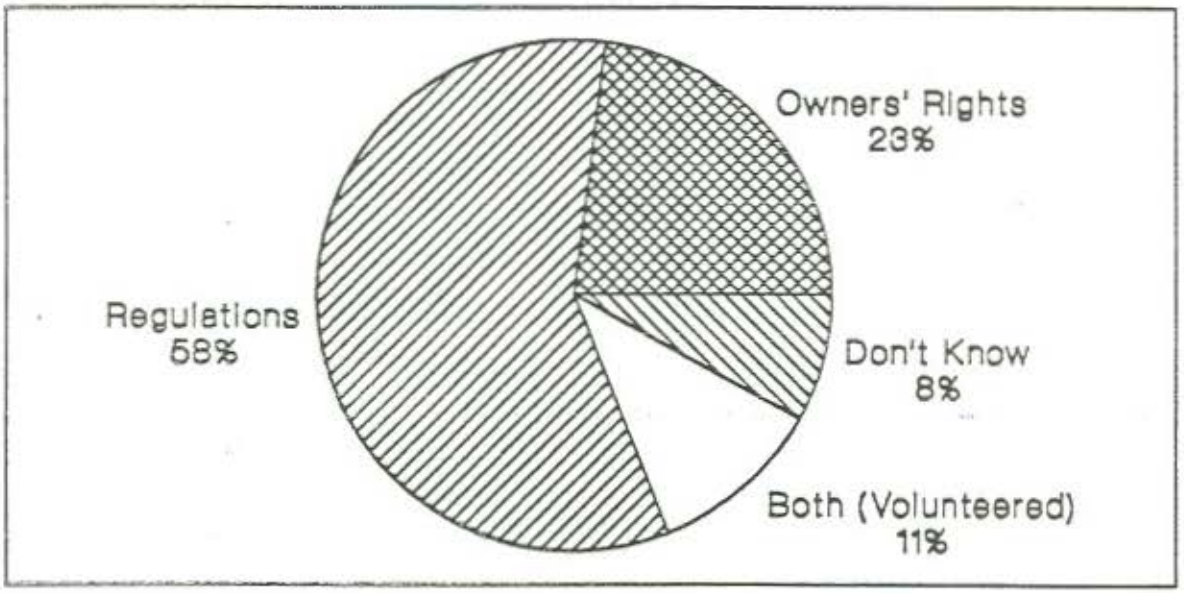

Figure 16. Respondents' opinion about importance of private land owners' rights versus land use regulations to control water pollution.

Policies and Management

The final area we wanted to assess with our survey involves public attitudes about government policies to manage natural resources and control water pollution problems. We asked respondents, "In your opinion is government doing too much, too little, or the right amount to control water pollution from each of the following?" In this case, we asked about seven specific potential causes of water pollution. Results are shown in Figure 17. Considering the responses to the earlier questions about pollution problems, it's not surprising that respondents were most likely to feel government is not doing enough to control water pollution from industrial waste. In fact, 83 percent of the respondents thought government is doing too little in this area. Most respondents also felt that government was doing too little to control water pollution from shoreline development and municipal sewer systems. About two thirds of all respondents felt government is doing too little to control water pollution from rural nonpoint sources of pollution. Two thirds (67 percent) said government is doing too little to control pollution from agriculture cropland. About the same number (66 percent) felt too little is being done to control pollution from livestock waste. Just under three quarters (63 percent) felt government is doing too little to control pollution from forest land. As a final point, we note that 60 percent of the respondents felt government is doing too little to control water pollution from household septic tanks.

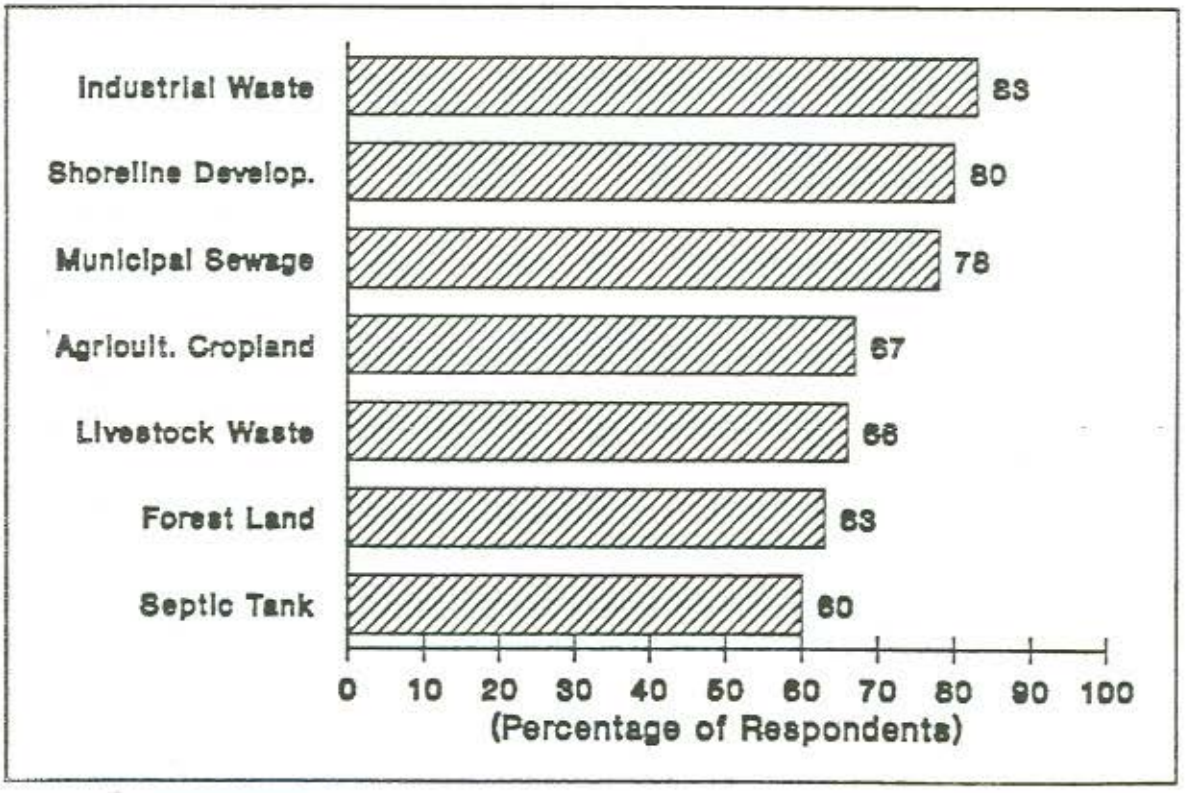

Figure 17. Belief that government is doing too little to control water pollution.

We also wanted to find out how respondents felt, in general, about government response to water pollution problems. We asked, "Do you think there is too much, too little, or the right amount of enforcement of existing water pollution regulations?" In this case, almost all respondents (90 percent) believed there was too little enforcement of existing regulations. Only 9 percent felt there was a right amount. In fact, only one percent of the respondents thought there was too much enforcement of existing water pollution regulations. On a related point we asked, "Does state government spend too much, too little, or the right amount of money to control water pollution?" Like the previous question, most (83 percent) respondents felt state government spends too little on water pollution control. Only ten percent felt the government spends the right amount. In this case, seven percent felt too much money was being spent on pollution control.

We wanted to explore respondents' ideas about who should pay any costs associated with water pollution control. We asked, "When industries produce waste water should the state or the industry pay the clean-up cost?" In this case almost all (93 percent) of the respondents said the industry should pay the clean-up cost. Only five percent said the state should pay. Very few (one percent) said both should pay and an additional two percent said they did not know. We find the same general response when we ask, "When cities produce waste water should the state or the cities pay the clean-up cost?" Again, almost all (91 percent) said the cities should be responsible for paying the clean-up cost. In this case, three percent said the state, and four percent said both should pay.

One of the major goals of Phase II will be to assess people's willingness to pay and change behavior to improve management of the Albemarle-Pamlico system resources. During Phase I we wanted an initial assessment of how much citizens might be willing to pay for improved water quality. Results of this line of questioning are shown in Figure 18. To do this we asked "Suppose that the state started a program to control water pollution in coastal areas that would require a tax increase of $25.00 per year per household. If this were placed on a statewide referendum, would you vote yes or no?" Those who said yes were asked if they would pay $50.00 per year. Finally, if they said yes to $50.00 they were asked if they would pay $100.00. Only one-third of all respondents said they would not pay at least $25.00. In fact, almost one-fifth of all respondents would pay $100.00 more per year.

We were interested in learning how much citizens themselves felt they should be doing to improve and protect environmental quality. We asked, "Do you think effective long range solutions to environmental problems depend more upon changing lifestyles to fit into nature or developing better technology to make nature fit our lifestyles?" In this case, most respondents felt that lifestyle changes will be needed more than the development of better technology. Almost two thirds (64 percent) reported the need for lifestyle changes. Less than one quarter (21 percent) felt there's a technological fix or solution available. We did find, however, that 15 percent of the respondents voluntarily said that both are needed. This response, along with the information presented earlier in Table 2, clearly shows that most people recognize the need for basic social change as a requirement for sustained environmental protection.

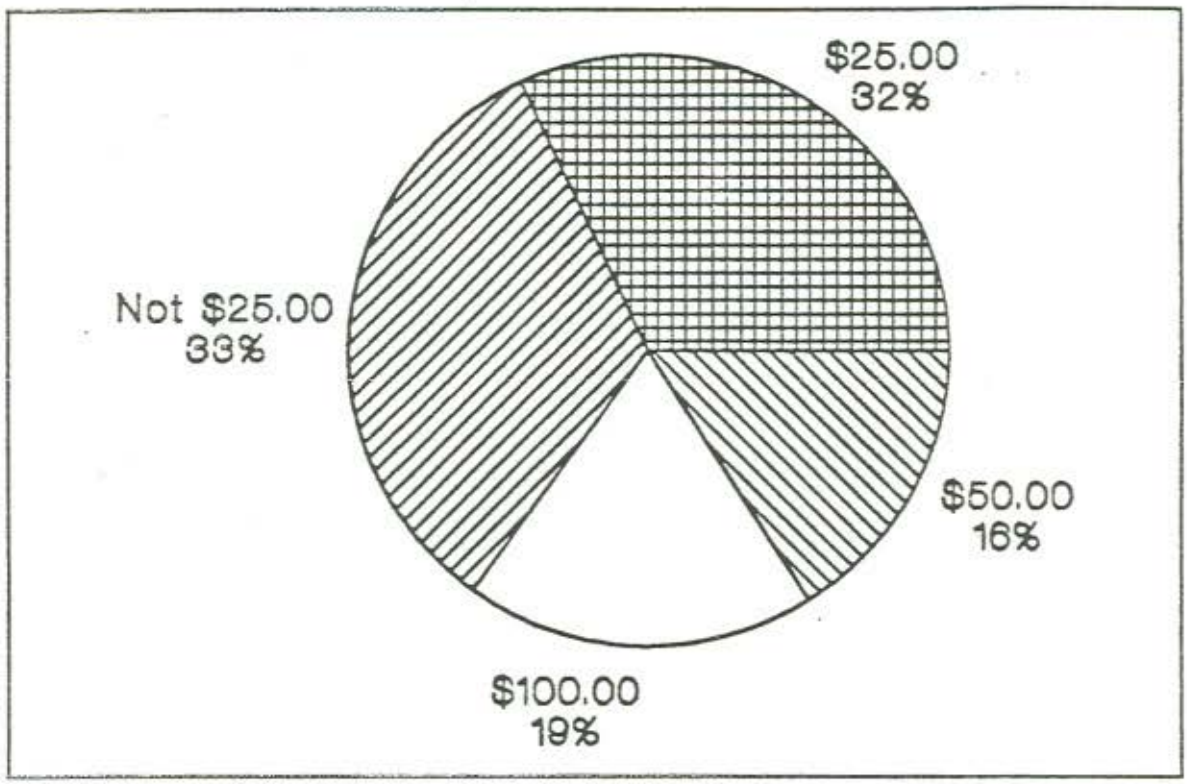

Figure 18. Amount respondents would be willing to pay in higher taxes to improve water quality.

On a final point, we wanted to learn whether or not respondents felt they had enough opportunity to help shape environmental management decisions. We asked, "Do average citizens have too much, too little, or the right amount of opportunity to influence government decisions about the environment?" We find, in fact, that most people (69 percent) felt that average citizens have too little opportunity to influence government about the environment. Just under one third felt there was the right amount of opportunity. Only one percent felt there was too much citizen influence over environmental decisions.

CONCLUSIONS AND IMPLICATIONS

In this final section we summarize some of the major findings from our first year's work. We discuss some implications for educational programs and public policies aimed at managing the Albemarle-Pamlico Estuarine system. We present our major conclusions in the same basic order that the results were presented in the previous section. It is important to realize that we will provide more detailed recommendations in our final report submitted at the end of Phase II.

We also present an initial assessment of relationships between selected sets of variables. Our theoretical model was illustrated earlier in Figure 2. At this point we examine possible relationships between respondents' background characteristics and the major attitudes of interest. We also analyze possible inter-relationships between the various attitudes that we measured. This preliminary assessment uses bivariate correlation analysis to determine the direction and strength of relationships among selected sets of variables. In all cases we consider results to be statistically significant at the level of $p = .01$. This reflects a more conservative analysis than the conventional level of $p = .05$. Interested readers can contact the authors for details on this analysis. Multivariate analysis of these relationships will be presented in the final report at the end of Phase II.

Sources of Information

Most respondents had received quite a lot of information about water pollution. This information came from a number of different sources. In terms of relative use of information sources, the mass media clearly play a major role in providing citizens with water quality information. Almost everyone received information from television and newspapers. On the other hand, relatively few people had gotten information from the government or environmental groups. People do receive information from such groups or agencies indirectly through the mass media. This is an important finding in that the types of information provided through mass media channels may be somewhat superficial and could tend to focus on dramatic problems and controversial issues. The emphasis will be on news stories rather than in-depth education. More in-depth education focused at specific target audiences is clearly needed.

Certain groups of respondents had received more information about water pollution than had other groups. Respondents with higher education and income levels had received more information about water pollution. Men had received more information, as had recreational users of the Albemarle-Pamlico Estuarine system or other coastal waters. Environmental activists and those who held environmental values and beliefs were also likely to have received more information. Respondents from counties bordering the sounds had received more information than respondents living in the drainage basin counties. This indicates that information will need to be targeted more directly to reach people with lower socioeconomic status, as well as groups that are not already committed to environmental issues. We also see the need to use appropriate media channels (i.e., non-print) for people with less education.

We found considerable variation among different information sources in terms of perceived credibility. University scientists were seen as most credible. This is likely due to their perceived expertise, as well as their unbiased perspective. Environmental groups were also seen as credible, probably because they are seen as representing the public interest, rather than private interest. Quite a few groups, including government agencies, are given a relatively high level of credibility. On the other hand, statements from those groups that are seen as having a private, vested interest (i.e., industry and developers) tend to be viewed with considerable suspicion.

Certain groups of respondents expressed greater overall trust in sources of information about water pollution than did other groups. People who had higher education and income levels were more likely to express more overall trust in information sources. Women and minority respondents also expressed more trust. Respondents who held stronger environmental values and beliefs reported less trust in information. It is interesting to note that the amount of information received was not related to trust level. People with lower socio-economic status appear to have less confidence in information and will, therefore, be more difficult to reach. This presents challenges for educational programs. Appropriate spokespersons need to be identified and recruited.

On an encouraging note, we found that most people were interested in learning more about water pollution. It is clear that more money and effort should be provided to enhance educational programs and organizations. We can recommend that media channels be used to reach the greatest number of people. However, it will be important that followup mechanisms are available for those who are interested in more information. Whenever possible, university scientists and representatives of environmental groups should be featured spokespersons. These groups could benefit from some assistance in building better working relationships with the media. This may be especially true for the scientists who may have trouble translating technical information for the public.

Awareness and Knowledge

Although the public has received a good deal of information about water pollution issues, this does not necessarily mean everyone will have a lot of knowledge about resource management issues and activities. However, again the results of this survey are generally encouraging. We found that most respondents were fairly knowledgeable about certain major issues and policies.

For example, respondents tend to have a basic understanding of the notion of a watershed. Many do recognize that land use can have a major effect on water quality. Respondents also were quite aware of the valuable roles that wetlands play as wildlife habitat and for improving water quality. In terms of name recognition, at least, respondents had some familiarity with many of the government programs and agencies associated with the estuaries.

One area where respondents were not very knowledgeable involves issues associated with freshwater drainage and the associated impacts on estuarine water quality. Less than half of all respondents knew that freshwater can cause pollution problems for the sounds. On a related point, very few had heard about the swampbuster provision of the 1985 Farm Bill. This indicates that if people are informed about a problem (i.e., freshwater impacts) they also need to be told about the policies and programs (i.e., swampbuster) that are set up to address the problems.

Certain groups of respondents expressed greater awareness of government programs and policies, as well as more knowledge about resource management and related issues. As expected, respondents with higher education and income levels had greater awareness and knowledge. White respondents also tended to have greater awareness and knowledge. Men and older respondents expressed more awareness about government programs and agencies, but these groups did not have any more knowledge about natural resources. Recreational users also reported more awareness and knowledge. Respondents living in the sound counties were more likely to have heard of government programs and agencies than were respondents who lived in the inland drainage basin.

Environmental activists had heard more about government agencies and programs, but did not express greater knowledge. People who held more environmental values and beliefs also reported more awareness and knowledge. Higher levels of awareness and knowledge were also positively related to greater use of information. This relationship appears stronger for awareness than for knowledge. Finally, there is a positive relationship between awareness and knowledge levels. These results again support the importance of an enhanced effort at broad-based education. Such efforts must be targeted to reach the groups with the least knowledge.

Perception of Problems

Most respondents expressed strong concerns over water pollution problems in North Carolina and in the Albemarle-Pamlico study area. They were less concerned over pollution as it got closer to home (i.e., in their own county or for their own drinking water). This may indicate a tendency on the part of a number of respondents to feel that water pollution is "somebody else's problem". People who received their water from a public water supply may be particularly likely to feel that some organization is responsible for ensuring the safety of their own drinking water.

Many respondents expressed a lot of concern over the potential impacts of water pollution. They worried about the potential impacts of pollution on recreational benefits, such as fishing. Many were equally concerned about the nonuse or aesthetic benefits of clean water and natural area protection. Most fishermen, in fact, perceived that the quality of fishing has declined dramatically in just five years. Educational efforts must describe the whole range of water quality problems and solutions. People need to better understand their own dependence on clean water as well as the societal importance.

Several findings clearly indicate that most people mainly associate water quality problems with point source pollution, especially industrial waste discharge. This type of pollution is more visible and tends to capture media attention when a spill or other discharge adversely affects a water body. This coupled with the fact that respondents get most of their information from television and newspapers suggests that nonpoint sources of pollution, associated with land use, will tend to be less readily understood as causes of pollution. In this case, perceptions clearly are not in line with the available scientific information. This indicates the need for educational programs that promote better understanding of the actual causes of water pollution. Individuals need to appreciate their own role in causing and solving water pollution problems.

We find that certain respondents expressed more concern over water pollution problems and the associated effects. Men and respondents with higher education levels expressed more concern about pollution problems, but not about the effects. White respondents expressed more concern over both problems and effects than did minority respondents. Recreational users also reported greater concern about the problems, but did not perceive the effects to be any more serious. We find that environmental activists were more concerned about pollution problems. Those with stronger environmental values and beliefs were more likely to express greater concerns over both pollution problems and effects. Respondents who lived in the drainage basin counties were more likely to express concern over the effects of pollution than were respondents living in the coastal counties. This, in general, indicates that concerns cut across most segments of the population.

A number of related behaviors and attitudes appear to influence problem perception. Respondents who had received more information about water pollution were more concerned about both problems and effects. Higher levels of trust were negatively related to concern over pollution, indicating that people who trust information were more likely to feel problems are being addressed. People who expressed greater awareness of government programs or agencies were more concerned about problems and effects. The same is true for respondents who had more knowledge about resource management problems and issues. Overall, this is an encouraging indication that education and information programs can have a positive influence on increasing awareness of and concern for problems.

Policies and Management

Conflicts over the use and management of scarce and fragile natural resources will likely become increasingly evident as resource use intensifies. When asked to choose between management of such resources for the common benefit and management of these resources for private benefit, most respondents believed that public benefits need to be protected. This is true even when asked to balance private land owners' rights with the public interests. When these results are coupled with the strong environmental values and beliefs respondents expressed, we can definitely conclude that respondents will support environmental protection even at the expense of economic growth and private land owners rights.

Respondents clearly feel that far too little is being done to control pollution problems. In particular, they feel that the government is doing too little to control pollution from all the different sources. Furthermore, most agreed that there is far too little enforcement of existing water pollution regulations. Many respondents feel that the state government should spend more money on controlling pollution. There are also indications that a majority of people would, themselves, be willing to pay higher taxes to support such programs. However, most respondents clearly feel that polluters should mainly be responsible for paying any increased costs of pollution control. People need to learn that we all pay for pollution control even if the payments are indirect (i.e., through higher priced products and services).

Certain groups of respondents were more likely than others to believe there is too little enforcement of existing government regulations. Respondents with higher education and income levels were more likely to feel there is too little enforcement of existing regulations. Younger respondents were also more likely to want more enforcement. Respondents who expressed stronger environmental values and beliefs were also more likely to believe there was too little enforcement of existing laws. People who had received more information about pollution were also more concerned about inadequate enforcement. Knowledge about resource management issues and problems was also positively related to concern over too little enforcement of regulations. Respondents who expressed greater concern over pollution problems and effects were also more likely to believe that there was too little enforcement of existing regulations. This indicates that information and knowledge are prerequisites for action.

We also can give a preliminary assessment of what types of people will be more likely than others to accept higher taxes for new efforts to control pollution. More in-depth analysis of this particular issue will be included in Phase II of this project. Certain groups of respondents appear more willing to pay higher taxes for pollution control. These include those with higher education and income. Men, whites, and younger respondents also expressed greater willingness to pay. Recreational users were more willing to pay, as were environmental activists and people with stronger environmental values and beliefs. People who were better informed about pollution, as well as those with greater awareness and knowledge, were also more willing to pay. Respondents who were more concerned about pollution problems were also more likely to express greater willingness to pay.

These results mean educational programs must be developed and targeted to specifically reach those groups who are less willing to support new initiatives. Furthermore, our results indicate that the public is very concerned and knowledgeable about natural resource problems and management issues. In fact, the public may exceed the expectations of elected officials in terms of their interest, concern, and knowledge. Further analysis of the results of this study will be made available to resource managers, political officials, and concerned citizens.

REFERENCES

Battelle Ocean Sciences and Technology Division
1987. Summary Report of Survey Findings for the Bay/Delta Project (Report to the San Francisco Bay Estuary Project). Duxbury, MA: Battelle.

Buttel, Frederick H.
1987. "New Directions in Environmental Sociology." Annual Review of Sociology 13: 465-488.

Center for Environmental Studies
1987. Narragansett Bay Issue Assessment: Public Perceptions (Report to the Narragansett Bay Project). Providence, Rhode Island: Brown University.

Cotgrove, S.F.
1982. Catastrophe or Cornucopia: The Environment, Politics, and the Future. New York, NY: Wiley and Sons.

Cummings, R.G., D.S. Brookshire, and W.D. Schulze
1986. Valuing Environmental Goods: An Assessment of the Continent Valuation Method. Totowa, NJ: Rowman and Allanheld.

Dunlap, Riley E. and William R. Catton, Jr.
1979. "Environmental Sociology." Annual Review of Sociology 5: 243-273

Fishbein, Martin and Icek Ajzen
1975. Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley Publishing.

Gilmore Research Group
1988. Puget Sound Water Quality Tracking Survey (Report to the Puget Sound Water Quality Authority). Seattle, Washington: Gilmore Research Group.

Grossman, Gary M. and Harry R. Potter
1986. "Differential Indicators of Environmental Attitudes in a Community Context: Leadership, Participation, and Social Base Considerations." Paper presented at the Annual Meetings of the Rural Sociological Society, Salt Lake City.

Heberlein, Thomas
1981. "Environmental Attitudes." Zeitschrift fur Umweltpolitik. 4: 241-270.

Heberlein, Thomas
1989. "Attitudes and Environmental Management." Journal of Social Issues. 45(1): 37-57.

Milbrath, Lester W.
1984. Environmentalists: Vanguard for a New Society Albany, NY: State University of New York Press.

Mitchell, Joseph C.
1987. "Public Awareness of the Chesapeak Bay Cleanup Program: A Survey of the Richmond, Virginia Area." Virginia Journal of Science. 38(1): 35-41.

Munda, Jotham O. and Steven E. Hastings
1987. An Analysis of Community Attitudes Toward Growth and Development in the Inland Bays Area of Delaware Newark, Delaware: Agricultural Experiment Station, University of Delaware.

Murch, Arvin W.
1974. Environmental Concern: Personal Attitudes and Behavior toward Environmental Problems. New York, NY: MSS Information Corporation.

Oskamp, Stuart
1977. Attitudes and Opinions. Englewood Cliffs, NJ: Prentice Hall, Inc.

Owens, David W.
1985. "Coastal Management in North Carolina: Building a Regional Consensus." APA Journal (Summer): 322-329.

Rogers, Everett
1983. Diffusion of Innovations (Third Edition). New York, NY: The Free Press.

Rokeach, Milton
1968. Beliefs, Attitudes, and Values: A Theory of Organization and Change. San Francisco, CA: Jossey-Bass Inc. Publishers.

Tschetter, Paul D.
1989. Characterization of Baseline Demographic Trends in the Year-Round and Recreational Populations in the Albemarle-Pamlico Estuarine Study Area. Raleigh, N.C. Albemarle-Pamlico Estuarine Study.

Van Liere, Kent D. and Riley E. Dunlap
1980. "The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations, and Empirical Evidence." Public Opinion Quarterly 44 (2): 181-197.

APPENDIX

Telephone Survey Instrument
Interview Guide

Telephone Number (919) - ____ - _____

1990 NORTH CAROLINA ALBEMARLE - PAMLICO ESTUARINE STUDY

Respondent Name
(to be used for Call Backs):

_____

Identification Number:_____ (1-4)

Card 1 (5)

INTERVIEW START TIME: : - INTERVIEW END TIME: :

CONTACT STATUS

TIME												
DATE												
STATUS												

STATUS CODES

A M	ANSWERING MACHINE	C L	CAN'T LOCATE	O S	OUT OF SERVICE
B G	BUSINESS/GOVERNMENT	H I	HOUSEHOLD INELIGIBLE	P C	PARTIALLY COMPLETED
B S	BUSY SIGNAL	I N	INSTITUTIONALIZED	R F	REFUSAL
C B	CALL BACK/APPOINTMENT SET	N A	NO ANSWER	T I	TERMINATED INTERVIEW
C I	COMPLETED INTERVIEW	N L	NO LISTING	W N	WRONG NUMBER

I N T R O D U C T I O N

Hello, my name is _____. I am calling from North Carolina State University. We are conducting a survey to find out what citizens think about water quality and water pollution in North Carolina.

Your phone number was selected at random. All information you give us will be kept confidential. Have I reached (READ TELEPHONE NUMBER DIALED)?

(IF NO: STOP INTERVIEW - REDIAL) (IF YES - CONTINUE)

Are you 18 years old or older?

1. . . . . Yes [CONTINUE]
2 . . . . . No

(IF NO:) May I speak to someone who is over 18?
(REPEAT INTRODUCTION)

Do you live in this home 6 or more months out of the year?

1. . . . . Yes [CONTINUE WITH Q1]
2 . . . . . No

(IF NO:) Is there any other adult member who lives in this household 6 months or more out of the year?

1. . . . . Yes [ASK TO SPEAK TO THAT ADULT AND REPEAT INTRODUCTION]
2 . . . . . No [TERMINATE CALL]

IF UNAVAILABLE, OBTAIN A NAME AND SCHEDULE A CALL BACK

1. In general, do you think water pollution is a serious problem, somewhat of a problem, or not a problem <u>in North Carolina</u>?

SERIOUS PROBLEM	1	(6)
SOMEWHAT OF A PROBLEM	2	
NOT A PROBLEM	3	
DO NOT KNOW	8	

2. In general, do you think water pollution is a serious problem, somewhat of a problem, or not a problem <u>in your county</u>?

SERIOUS PROBLEM	1	(7)
SOMEWHAT OF A PROBLEM	2	
NOT A PROBLEM	3	
DO NOT KNOW	8	

3. Do you think water pollution is a serious problem, somewhat of a problem, or not a problem for <u>your own drinking water</u>?

SERIOUS PROBLEM	1	(8)
SOMEWHAT OF A PROBLEM	2	
NOT A PROBLEM	3	
DO NOT KNOW	8	

++

Now I would like to ask you about the Albemarle Sound, Pamlico Sound, and the rivers that flow into these sounds (such as the Neuse and Tar Rivers). These sounds or estuaries are the large water bodies in the Eastern part of the state inside the outer banks from Morehead City to the Virginia state line. Core Sound and Bogue Sound are also included in this area.

4. Do you or anyone in your household use the Albemarle Sound, Pamlico Sound, or the rivers that flow into them for fishing, swimming or for other purposes?

YES	1	(9)
NO	2	
NOT SURE OR DON'T KNOW	8	

5. Do you or anyone in your household use any other coastal waters in N.C. for fishing, swimming or for other purposes?

YES	1	(10)
NO	2	
NOT SURE OR DON'T KNOW	8	

(IF NO TO 4 & 5) SKIP TO QUESTION 10-PAGE 3

(IF YES TO 4 OR 5 ASK QUESTION 6)

6. What purposes do you or anyone in your household use the water for? (DO NOT READ, CIRCLE ALL MENTIONED)

FISHING	01	(11-12)
SWIMMING	02	(13-14)
SAILING, CANOEING, OR ROWING	03	(15-16)
WATER SKIING	04	(17-18)
JET SKIING	05	(19-20)
WIND SURFING	06	(21-22)
ENJOYING THE SCENERY	07	(23-24)
BIRDING OR NATURE WATCHING	08	(25-26)
WATERFOWL HUNTING	09	(27-28)
OTHER (SPECIFY BELOW)	__	(29-30)
_____	__	(31-32)

(PROBE) Do you use the area for any other purpose? (DO NOT READ, BUT CIRCLE ALL MENTIONED ABOVE)

IF FISHES ASK Q7 (IF DOES NOT FISH GO TO Q10)

7. Have you ever fished for commercial purposes?

YES	1	(33)
NO	2	

8. How would you rate fishing <u>today</u> in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina? Would you say fishing is Excellent, Good, Fair, or Poor?

EXCELLENT	1	(34)
GOOD	2	
FAIR	3	
POOR	4	
DON'T KNOW	8	

9. How would you rate fishing <u>five years</u> ago in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina? Would you say fishing was Excellent, Good, Fair, or Poor?

EXCELLENT	1	(35)
GOOD	2	
FAIR	3	
POOR	4	
DON'T KNOW	8	

10. Do you think water pollution is a serious problem, somewhat of a problem, or not a problem in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina?

SERIOUS PROBLEM	1
SOMEWHAT OF A PROBLEM	2
NOT A PROBLEM	3
DO NOT KNOW	8

11. What do you think are the major causes of water pollution in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina?

(DO NOT READ, BUT CIRCLE ALL MENTIONED)

CITY OR TOWN SEWER SYSTEMS	1
HOUSEHOLD SEPTIC SYSTEMS	1
RUNOFF FROM CROPLAND	1
LOGGING OR TIMBER HARVEST	1
LIVESTOCK WASTE	1
RUNOFF FROM URBAN OR PAVED AREAS	1
DISCHARGES OR DUMPING FROM BOATS	1
BOAT TRAFFIC	1
SHORELINE DEVELOPMENT	1
INDUSTRIAL WASTE DISCHARGE	1
MARINAS	1
MINING	1
OIL SPILLS	1
ACID RAIN	1
LITTER OR GARBAGE	1
HOME LAWN AND GARDEN CHEMICALS	1
FRESHWATER DRAINAGE	1
TOXIC WASTE	1
HOUSEHOLD ITEMS SUCH AS CLEANERS	1
MEDICAL WASTE	1
OTHER (SPECIFY)_____	__
_____	__
DON'T KNOW	8

(PROBE) Can you think of any other major causes of water pollution? **(DO NOT READ, CIRCLE ALL MENTIONED ON ABOVE LIST)**

12. I am going to read you four possible causes of water pollution that may affect the Albemarle Sound, Pamlico Sound, or other coastal waters of N.C. (START WITH HIGHLIGHTED TERM): They are: (READ ITEMS AND ASK) Which of these do you think is the most serious cause of water pollution? which is the next most serious, next? and which is the least serious cause of water pollution?

	MOST SERIOUS	SECOND	THIRD	LEAST SERIOUS	
Agriculture	1	2	3	4	(60)
City Sewer Systems	1	2	3	4	(61)
Industry	1	2	3	4	(62)
Shoreline Development	1	2	3	4	(63)

13. Now I'd like to ask you about some **effects** of water pollution. Please tell me how much of a problem each of the following is in the Albemarle Sound, Pamlico Sound, or other coastal waters in North Carolina. (READ STATEMENT AND ASK):

*Is this a serious problem, somewhat of a problem, or not a problem? REPEAT FOR EACH ITEM.

		S	SW	N	DK	
a.	Closing of shell-fishing areas*	1	2	3	8	(64
b.	Reduced catches*	1	2	3	8	(65
c.	Diseased fish*	1	2	3	8	(66
d.	Odors or other nuisance problems* . . .	1	2	3	8	(67
e.	Not being able to swim*	1	2	3	8	(68
f.	Damage to natural areas*	1	2	3	8	(69

Next, I'd like to ask you about wetlands. Wetlands include marshes and swamp lands that have water on or near the surface.

14. Do you think the filling or the drainage of wetlands is a serious problem, somewhat of a problem, or not a problem?

SERIOUS PROBLEM	1	(70
SOMEWHAT	2	
NOT A PROBLEM	3	
DON'T KNOW	8	

15. Do you think wetlands are important for maintaining or improving water quality?

YES	1	(7
NO	2	
NOT SURE OR DON'T KNOW.	8	

16. Do you think wetlands are important as a habitat for birds and other wildlife?

YES	1	(7
NO	2	
NOT SURE OR DON'T KNOW.	8	

17. As far as you know, do any species of salt water fish spend part of their lives in the sounds?

YES 1 (73)
NO 2
NOT SURE OR DON'T KNOW. 8

18. Do you think certain fishing practices cause problems for fish habitat?

YES 1 (74)
NO 2
NOT SURE OR DON'T KNOW. 8

19. As far as you know can fresh water create a pollution problem for the sounds?

YES 1 (75)
NO 2
NOT SURE OR DON'T KNOW 8

20. As far as you know do developers need to get permits before they can build along the coast?

YES 1 (76
NO 2
NOT SURE OR DON'T KNOW. 8

21. Do you think land use has a major effect on water quality in the Albemarle and Pamlico Sounds?

YES 1 (77
NO 2
NOT SURE OR DON'T KNOW. 8

22. Do you think some of the water quality problems in the Albemarle and Pamlico sounds are caused by pollution from inland cities in N.C. such as Raleigh or Greenville?

YES 1 (78
NO 2
NOT SURE OR DON'T KNOW. 8

BLANK (79-80

DUPID (1-4
CARD 2 (5

23. How much information on water pollution have you ever gotten from (READ ITEM)?

* Have you gotten a lot, some, or no information?

		L	S	N	DK	
a.	Newspapers*	1	2	3	8	(6)
b.	Books*	1	2	3	8	(7)
c.	Magazines*	1	2	3	8	(8)
d.	Television*	1	2	3	8	(9)
e.	Radio*	1	2	3	8	(10)
f.	Conversations with people*	1	2	3	8	(11)
g.	Government publications*	1	2	3	8	(12)
h.	Pamphlets from environmental groups*	1	2	3	8	(13)
i.	Elected officials*	1	2	3	8	(14

24. Would you like to know more about water pollution?

YES	1	(15
NO	2	
NOT SURE OR DON'T KNOW	8	

25. Different groups often make statements about water pollution.

* Would you have a lot of trust, some trust, or no trust in a statement about <u>water</u> pollution made by: (READ ITEM)

		T	ST	NT	DK	
a.	Local government officials*	1	2	3	8	(16
b.	State government officials*	1	2	3	8	(1
c.	Federal government officials*	1	2	3	8	(1
d.	University Scientists*	1	2	3	8	(1
e.	Environmental groups*	1	2	3	8	(2
f.	Realtors or developers*	1	2	3	8	(2
g.	Fishing groups*	1	2	3	8	(2
h.	Farm organizations*	1	2	3	8	(2
i.	Industries*	1	2	3	8	(2

26. Many different government agencies and programs are involved in water quality and coastal management.

*Have you ever heard of (READ ITEM):

		Y	N	DK	
a.	Division of Coastal Management (DCM)*	1	2	8	(2
b.	Division of Environmental Management (DEM)*	1	2	8	(2
c.	Division of Marine Fisheries (DMF)*	1	2	8	(2
d.	Coastal Area Management Act (CAMA)*	1	2	8	(2
e.	N.C. Agricultural Cost Share program*	1	2	8	(2
f.	Swampbuster Program*	1	2	8	(2

27. Have you heard about the Albemarle-Pamlico Estuarine Study.

YES	1	(31)
NO	2	
NOT SURE OR DON'T KNOW	8	

(IF NO OR DON'T KNOW SKIP TO QUESTION 28)

27A. **(IF YES)** How did you hear about this study?
(CIRCLE ALL RESPONSES GIVEN)

TELEVISION	1	(32.
RADIO	1	(33.
NEWSPAPER	1	(34.
RELATIVES, WORD OF MOUTH/FRIENDS	1	(35.
NEWSLETTER/MAIL INSERT	1	(36
GOVERNMENT AGENCIES	1	(37
ENVIRONMENTAL GROUPS	1	(38
OTHER (SPECIFY BELOW)		
_____	__	(39
DON'T KNOW	8	(40

28. Have you ever attended a public hearing or meeting on water pollution?

YES	1	(41
NO	2	
NOT SURE OR DON'T KNOW	8	

29. Are you an active member of any environmental groups or organizations?

YES	1	(42
NO	2	
NOT SURE OR DON'T KNOW	8	

30. Have you ever donated money to any resource conservation or environmental groups or other similar causes?

YES	1	(4
NO	2	
NOT SURE OR DON'T KNOW	8	

31. Have you tried to save water in your home?

YES	1	(4
NO	2	
NOT SURE OR DON'T KNOW	8	

32. I'd like to read you a list of statements. For each statement I read, please tell me whether you Strongly Agree, Agree, Disagree or Strongly Disagree with the statement. The first statement is: (START WITH HIGHLIGHTED STATEMENT) * Do you Strongly Agree, Agree, Disagree, or Strongly Disagree with this statement?

		SA	A	D	SD	DK	
a.	We are approaching the limit of the number of people the earth can support.*	1	2	3	4	8	(45)
b.	The balance of nature is very delicate and easily upset.*	1	2	3	4	8	(46)
c.	Humans have the right to modify the natural environment to suit their needs.*	1	2	3	4	8	(47)
d.	Mankind was created to rule over the rest of nature.*	1	2	3	4	8	(48)
e.	When humans interfere with nature it often produces disastrous consequences.*	1	2	3	4	8	(49)
f.	Plants and animals exist primarily to be used by humans.*	1	2	3	4	8	(50
g.	To maintain a healthy economy we will have to develop a "steady state" economy where industrial growth is controlled.*	1	2	3	4	8	(51)
h.	Humans must live in harmony with nature in order to survive.*	1	2	3	4	8	(52
i.	The earth is like a spaceship with only limited room and resources.*	1	2	3	4	8	(53
j.	Humans need not adapt to the natural environment because they can make it suit their needs.*	1	2	3	4	8	(54
k.	There are limits to growth beyond which our industrial society cannot expand.*	1	2	3	4	8	(5
l.	Mankind is severely abusing the environment.*	1	2	3	4	8	(5

33. *In your opinion, is government doing too much (TM), too little (TL), or the right amount (RA) to control water pollution from (READ ITEM)?

		TM	RA	TL	DK	
a.	Shoreline development*	1	2	3	8	(57)
b.	Agricultural cropland*	1	2	3	8	(58)
c.	Livestock waste*	1	2	3	8	(59)
d.	Forest land*	1	2	3	8	(60)
e.	Municipal sewage*	1	2	3	8	(61)
f.	Industrial waste treatment* . . .	1	2	3	8	(62)
g.	Household septic tanks*	1	2	3	8	(63)

34. Does state government spend too much, too little, or the right amount of money to control water pollution?

TOO LITTLE 1 (64)
TOO MUCH 2
RIGHT AMOUNT 3
DON'T KNOW 8

35. Do you think there is too much, too little, or the right amount of enforcement of existing water pollution regulations?

TOO LITTLE 1 (65)
TOO MUCH 2
RIGHT AMOUNT 3
DON'T KNOW 8

36. Do average citizens have too much, too little, or the right amount of opportunity to influence government decisions about the environment?

TOO LITTLE 1 (66
TOO MUCH 2
RIGHT AMOUNT 3
DON'T KNOW 8

37. As far as you know, is all the technology necessary for controlling water pollution available now?

YES 1 (67
NO 2
NOT SURE OR DON'T KNOW 8

38. Do you think effective long range solutions to environmental problems depend more upon changing our lifestyles to fit into nature or developing better technology to make nature fit our lifestyles?

CHANGING LIFESTYLE 1 (6
BETTER TECHNOLOGY 2
BOTH (VOLUNTEERED) 3
NOT SURE OR DON'T KNOW 8

39. Suppose that the state started a program to control water pollution in coastal areas that would require a tax increase of $25.00 per year per household. If this were placed on a statewide referendum, would you vote yes or no?

YES	1	(69)
NO (GO TO Q 40)	2	
NOT SURE OR DON'T KNOW	8	

IF NO SKIP TO Q.40

39A. IF YES: Would you vote yes or no if the tax increase was $50 a year per household?

YES	1	(70,
NO	2	
NOT SURE OR DON'T KNOW	8	

IF NO SKIP TO Q.40

39B. IF YES: Would you vote yes or no if the tax increase was $100 a year per household?

YES	1	(71
NO	2	
NOT SURE OR DON'T KNOW	8	

40. The Albemarle Sound, Pamlico Sound, and other coastal waters have many uses, some of which may conflict. People have different opinions about how these conflicts should be resolved.

a. If there is a conflict between sport fishing and commercial fishing in an area, which should be controlled?

SPORT	1	(72
COMMERCIAL	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

b. If there is a conflict between housing development and recreation on a section of shoreline, which should be controlled?

DEVELOPMENT	1	(7
RECREATION	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

c. If there is a conflict between food production and wildlife habitat in a wetland area, which should be restricted?

FOOD PRODUCTION	1	(7
WILDLIFE HABITAT	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

d. When industries produce wastewater should the state or the industries pay the cleanup costs?

STATE	1	(75)
INDUSTRIES	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

e. When cities produce wastewater should the state or the cities pay the cleanup costs?

STATE	1	(76
CITIES	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

41. In your opinion which is more important--private land owners' rights to use their land as they see fit or government land use regulations to control water pollution?

LAND OWNER'S RIGHTS	1	(77
POLLUTION REGULATION	2	
BOTH (VOLUNTEERED)	3	
DON'T KNOW	8	

42. What county do you live in?_____ EDITOR CODE _____ (78-80

DUPID (1-4
CARD 3 (5

43. How many years have you lived in this county? _____ (6-7
(IF RESPONDENT ANSWERS "ALL MY LIFE:" SAY) How many years is that?

44. Is your home located in a rural area, a small town, a suburb or a city?

RURAL AREA	1	(8
SMALL TOWN	2	
SUBURB	3	
CITY	4	
NOT SURE OR DON'T KNOW	8	

45. Do you receive your water from your own well or a central water system?

OWN WELL	1	(9
CENTRAL SYSTEM	2	
NOT SURE OR DON'T KNOW	8	

46. Do you own or have part ownership in any property or a second home near the coast?

YES	1	(10)
NO	2	
NOT SURE OR DON'T KNOW	8	

47. What kind of work do you normally do on your main job? (PROBE: What are some of your main duties?)

_____

_____ EDITOR CODE _____ (11-13)

48. Do you or does anyone <u>in your household</u> presently own or operate a farm?

YES	1	(14
NO	2	
NOT SURE OR DON'T KNOW	8	

49. Are any members of your household under 18 years of age?

YES	1	(15
NO	2	
NOT SURE OR DON'T KNOW	8	

50. What is the highest grade of school you have completed?

8 OR LESS	01	(16-17
MORE THAN 8, LESS THAN 12	02	
HIGH SCHOOL GRADUATE	03	
SOME COLLEGE, NO DEGREE	04	
ASSOCIATE DEGREE	05	
BACHELOR'S DEGREE	06	
SOME GRADUATE WORK	07	
GRADUATE LEVEL DEGREE	08	

51. In what year were you born? YEAR 19 _____ (18-1

52. Would you describe your political position as: (READ RESPONSES)

Conservative	1	(2
Middle-of-the-road, or	2	
Liberal	3	
DON'T KNOW	8	
REFUSED	9	

53. Generally speaking, whether you are registered or not, do you consider yourself to be a Republican, Democrat, or Independent?

REPUBLICAN	1	(21)
DEMOCRAT	2	
INDEPENDENT	3	
OTHER (SPECIFY)	4	
DON'T KNOW	8	
REFUSED	9	

54. Which of the following categories best represents your family's 1989 total income before taxes? Please include all income sources such as wages, salaries, pension dividends, net farm income, and government payments. (READ CATEGORIES)

Less than $5,000	01	(22-23)
Between $5,001 and $10,000	02	
Between $10,001 and $20,000	03	
Between $20,001 and $30,000	04	
Between $30,001 and $40,000	05	
Between $40,001 and $50,000	06	
Between $50,001 and $60,000	07	
Between $60,001 and $80,000	08	
Between $80,001 and $100,000	09	
Between $100,001 and $200,000	10	
More than $200,000	11	

55. Are you white, black, American Indian or something else?

WHITE	1	(24)
BLACK	2	
AMERICAN INDIAN	3	
OTHER_____	4	

56. CODE RESPONDENT'S GENDER (DO NOT ASK UNLESS UNSURE):

MALE	1	(25)
FEMALE	2	

This completes the interview. Thank you very much for your time and cooperation. Do you have any comments you would like to make? (RECORD BELOW)

BLANK (26-80)

INTERVIEWING TRAINING MATERIALS:

GENERAL INSTRUCTIONS

Prepared By:

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GENERAL INSTRUCTIONS

I. INTERVIEWER'S MANUAL

A. Preparation for Interviewing

During the training session, your Supervisor will allow time for practice in the use of the Survey Schedule. However, your interviewing skills will be improved by additional preparation such as reading the Survey Schedule aloud in private several times. Rehearsing with the schedule will build self-confidence in the use of the instrument, will make the enunciation of certain words and phrases easier, and will make the interview much smoother in general. In addition, a thorough initial reading of the Q by Q instructions, as well as periodic review of this information, will improve familiarity with the instrument and reduce the chances of ongoing errors in interviewing.

B. The Introduction

The introduction is important in establishing the interview relationship and must include the following information: who you are, who is doing the survey, and how the household was selected. This will be accomplished by introducing and identifying yourself, by providing a brief explanation concerning the random sampling procedure, and by explaining the procedures used to protect the respondent's anonymity and the confidentiality of the information. However, do not go overboard; provide enough information to satisfy the respondent's initial concerns, and then proceed with the interview. Additional information can be provided during the interview, if necessary.

C. Overcoming Objections

Although refusals generally are rare, a refusal is not necessarily a reflection on you as an interviewer. Refusals occur for many reasons, and all interviewers experience refusals. Do not let refusals influence your attitude or your approach. Nothing will bring on a refusal faster than an apologetic approach, so meet each respondent with a friendly, confident attitude. Listen to what the person has to say; some people change their minds once something is off their chest. In any event, do not argue with the respondent; maintain a professional, non-judgmental attitude even when being refused.

Some respondents may say they are too busy. GIVE THEM A FAIR ESTIMATE OF THE TIME NEEDED FOR THE INTERVIEW, AND THEN TRY TO GET STARTED. Once the interview is started, most people will let you go ahead. If the respondent definitely is unwilling to be interviewed at this time, set up an appointment for a more convenient time. However, it is a good

idea not to make an appointment to do a later interview when the respondent definitely is antagonistic to participating in the survey. Such a person frequently will refuse again by failing to keep the appointment. [See the section, Persuading the Reluctant Participant, in the Getting Started instructions for more detailed information.]

Most respondents will accept the brief explanation of the purpose of the survey provided on the survey cover page. There may be a few, however, who will want more information about the survey. Feel free to use the information in your Fact Sheet.

If the respondent questions the time required for interview, the expected length of the interview is about 10-15 minutes. If the respondents state that they do not have time right now for an interview, determine a more convenient time. Make very effort to telephone promptly for rescheduled appointments. Remember, however, that completion of the interview during the FIRST attempt is preferred.

D. Pacing the Interview

The pace of the interview depends on the interviewer. Maintain a calm, unhurried manner, and ask the questions in an objective and deliberate way. Do not get sidetracked into a discussion of the survey issues; besides wasting time, this may bias the respondent. Tactfully steer the conversation back to the questions if the respondent goes off on a tangent. Usually, asking the next question will be sufficient to continue the interview. The interviewer must be sensitive to the needs of the respondent in establishing the pace of the conversation. A deliberate, careful respondent will become irritated and confused if the questions are asked too rapidly. On the other hand, a quick, decisive person will be bored if you go too slowly. With a quickly paced interview, it is particularly important for the interviewer to allow adequate time for the responses. Otherwise, respondents may feel so hurried that they do not have time to think and answer fully. Begin the interview at a moderate pace, and then alter the tempo once you perceive the pace desired by the respondent.

E. Asking the Questions

Remember that an interview should be a conversation rather than a crossfire of separate questions and answers. Your interest will stimulate the interest of the respondent. However, interest in the answers to the questions does not imply evaluation of the answers. ASK THE QUESTIONS JUST AS THEY APPEAR ON THE QUESTIONNAIRE AND ASK THEM IN THE SAME WAY OF ALL RESPONDENTS. However, be careful that your efforts to be objective or neutral in asking questions do not come across to the respondent as indifference, which is to be avoided.

Generally, questions and statements printed in regular type are to be read to the respondent exactly as written. This is desirable so the questions and statements will be the same for all persons interviewed, regardless of which interviewer administers the questionnaire. This further serves to assure that respondents are responding to the same questions, thus minimizing interviewer bias. Words that are underlined or printed in bold are usually key elements of a question and should be spoken with a little extra emphasis. ALL STATEMENTS PRINTED IN CAPITAL LETTERS ARE DIRECTIONS FOR THE INTERVIEWER OR RESPONSE CATEGORIES AND ARE NOT TO BE READ TO THE RESPONDENT.

ASK THE QUESTIONS IN THE ORDER THEY ARE WRITTEN. The sequence worked out in the questionnaire provides some continuity from question to question in order to achieve a conversational flow, minimizes undesirable effects of one question upon another, and facilitates the interviewer's task.

The use of transitional statements ("Well, that's the end of that section. Now we'd like some information on...") will facilitate the flow of the interview through each part of the questionnaire.

Sometimes a respondent will answer other questions in the process of replying to a question. Although the questions must be asked in the order given, a respondent sometimes gets annoyed when asked a question they feel they have already answered. It is best to acknowledge the situation with a statement such as "We've already touched on this, but..." or "I know you mentioned this earlier, but I need to ask you again..."

Certain questions may touch on sensitive areas for the respondent, and there is a risk of losing rapport at such points. Your manner will help the respondent answer the question without a serious break in rapport; usually a matter-of-fact approach will be effective. However, it may be necessary to reassure the respondent regarding confidentiality.

Your job is to reflect the respondent's opinion or situation as accurately as possible. It is important to listen carefully to the respondent and to give them time to respond fully.

The reply, "I don't know," by the respondent is sometimes a means of gaining time to think. Do not be too quick to code a "don't know" response and move on. Allow the respondent a moment to expand on the reply, or use a neutral probe, to be sure the respondent has finished with their answer. A "Don't Know" response is perfectly acceptable if that is how the

respondent chooses to reply. The interviewer should not lead or pressure the respondent into an answer just to avoid a "Don't Know" response.

F. Probing

Getting good information is an art. In a structured interviewed, it requires being able to recognize immediately that a respondent's answer has failed to meet the objective of the question, and then being able to formulate a neutral probe to obtain the needed information. Probes by nature tend to press or challenge a respondent, and therefore have the potential to affect an interview unfavorably. It is important that good rapport exist before probes are used, and that probes be used with tact.

G. Inconsistent Replies

If a later question results in a reply which seems inconsistent with the answer to a previous question, backtrack and probe to obtain the respondent's most accurate recall. However, inconsistent replies are not necessarily incorrect, so care must be taken to investigate the inconsistency objectively. Do not influence the respondent to change an answer merely to achieve consistency.

H. Concluding the Interview

AT THE END OF THE INTERVIEW, CHECK TO SEE THAT EACH QUESTION WAS ASKED, AND THAT ALL ANSWERS ARE CLEAR AND CONSISTENT. Then clear up any questions or doubt the respondent might have about the interview. Also, convey your appreciation to the respondent for helping with the study.

I. Quality Control

The success of a study depends, to a large degree, upon the quality of the interviewer's work. Because the researcher strives to hire interviewers with extensive survey background and good references, we naturally expect the best in the completed work by interviewers. To achieve this standard, the following quality control procedures are more or less standard for most projects:

1. All interview schedules returned to the Supervisor will be thoroughly edited. If problems concerning completeness and/or consistency are noted, you will be contacted for clarification.

2. We will select a sample of respondents for a postcard or telephone verification check. The respondent will be asked to verify whether or not an interview was conducted on or near the date reported by the interviewer. Any discrepancies will be handled on an individual basis.

II. INTERVIEWER RESPONSIBILITIES

Interviewers will have full responsibilities for completing data collection assignments. The quality of the collected data will be determined by the manner in which tasks are performed and procedures followed. Studies have shown that survey respondents generally are affected more by their relationship with the interviewer than by the content of the questions asked. Therefore, interviewers must establish a positive tone in the interview so the respondent will participate willingly and provide complete and accurate information. A pleasant, business-like manner and the ability to accept the respondent and his values without making judgments are important characteristics in establishing the atmosphere of trust and confidence necessary for a successful interview.

Interviewers must be careful not to communicate their values or personal opinions, either verbally or by tone of voice, even if the respondent asks. It is extremely important for interviewers to be aware of their own negative attitudes towards certain persons, values, or behavior, and to exercise complete self-control. Also, it is necessary in maintaining the proper atmosphere to avoid showing shock, surprise, indignation, or disapproval in reacting to the respondent or to a particular response. An expression of general thanks and appreciation for the respondent's cooperation is also appropriate. However, don't overdo "rapport;" over-friendliness or concern about the respondent's personal problems may result in both a longer and a less productive interview. Therefore, it is important to acknowledge a response to a question, but avoid reacting with pleasure or approval to a particular response.

III. ETHICS AND CONFIDENTIALITY OF INFORMATION

A. Ethical Responsibilities to Your Employer

As a paid employee, you have the following ethical responsibilities to your employer:

1. ALWAYS FOLLOW THE RESPONDENT SELECTION PROCEDURES. Otherwise, the requirement for a representative random sample will not be met.

2. Do not make up responses. If you discover after the interview that a question was left out, telephone the respondent for an answer or leave it blank.

3. Do not under any circumstances make up entire interviews.

4. Keep up your enthusiasm over the length of the survey. Do not allow boredom, frustration, or fatigue to keep you from devoting the same energy and effort to your later interviews that you did to the earlier ones.

5. Avoid statements, questions, and non-verbal behavior that might influence the respondent's answer. FOLLOW THE STANDARD WORDING IN THE QUESTIONNAIRE AS CLOSELY AS POSSIBLE.

6. Report any questionnaire problems to your supervisor.

B. Ethical Responsibilities to Your Respondents

As a member of society, you have the following ethical responsibilities to your respondents:

1. When attempting to persuade a reluctant person to participate in the survey, use only legitimate reasons. Avoid over-selling.

2. Be honest with the respondent concerning the purpose and possible benefits of the survey.

3. Take all possible precautions to protect the confidentiality of the information provided by the respondent.

4. Be careful to prevent the names of survey participants from being seen by persons not directly connected with the survey.

5. What you tell the respondent about yourself must be honest, accurate, and relevant to your role as an interviewer. Do not pretend to be something you are not, or allow respondent's incorrect assumptions about you to stand.

C. Policy Statement on Confidentiality

All interviewers are expected to understand and adhere to the following statement of policy regarding confidentiality:

The rights of human subjects are a primary concern. All study procedures are reviewed to make sure that the rights of individual respondents are protected at each stage of the project. Although the researcher makes summary reports of its study findings to the project sponsor(s), and sometimes to the public, we take care not to release any data that would lead to the identification of respondents. All information that connects a particular interview with a specific respondent is recorded on a separate form, and is given special handling to maintain strict confidentiality. Each interview is identified only by a number which has no connection with the identity of the respondent.

The procedures to protect the anonymity of respondents will be undermined if the interviewer does not treat information concerning respondents with equal regard. Therefore, the interviewers are expected to maintain professional ethical standards of confidentiality regarding what they hear and observe of the respondent's home, family, and activities.

Each person associated with the project must be careful at all times to protect the study materials and the collected data from unauthorized disclosure. Survey Schedules, whether complete or incomplete, and other study materials (letters, sample lists, cover sheets, etc.) must not be exposed to anyone who is not involved in the survey. Do not leave Survey Schedules unattended on a desk or table or in an open car where unauthorized persons could see them. Do not make copies of any materials unless prior permission is given by the Supervisor or a member of the staff. The names of persons interviewed are not to be mentioned to anyone outside the study. Completed Survey Schedules must be seen only by the interviewers, supervisors, and the personnel who are directly responsible for them, and information connecting a respondent's name or address with a Survey Schedule should be known only to these persons. Discussion of the project with persons not involved in the study is permitted only when necessary and must never include specifics such as names, addresses, locations, and individual problems.

Interviewers are responsible for all materials issued to them as a part of this study and will return all materials to the Supervisor upon completion of their assignments.

GENERAL PROCEDURES

I. Cover Page

The telephone numbers of assigned households are listed on cover pages. There is one telephone number on each cover page. The cover page serves as a log of attempts to contact the household. The status codes listed represent the possible results of any given attempt to contact an assigned household. For each household the Time, Date, and Result of each contact attempt should be recorded in the Contact Results Table in the appropriate contact result box. Please note that above the Contact Results Table on each page are the telephone number and ID number for that household. (It is not mandatory that name be obtained but it is a good idea to try to get a name in a situation where a call back is likely so that you or another interviewer will know who to ask for when the callback is made.) When contact is made with an individual at the assigned number, the interviewer should begin the standard introduction for initiating conversation with the person who answers the telephone of the assigned household. Additional questions appear at the bottom of the cover page.

II. Respondent Selection

As with most surveys, this survey stresses the importance of selecting the right respondent. Selecting the correct respondent will be easy if a few basic procedures are followed.

1. Repeat the introduction as written on the cover page. "May I speak with _____?". Each of the numbers in our sample should be an appropriate target telephone number for a prospective household eligible for the interview.

AT THIS POINT - ONE OF FOUR THINGS WILL HAPPEN:

A. You will reach the correct person and begin to complete the questionnaire as indicated by the screening question.

B. You will reach the correct number but the right respondent will be unavailable. You will make an appointment to call the right person at a later time.

C. You will discover that you have misdialed and reached an incorrect number. Redial.

D. The person answering the phone will be confused. If the person answering the telephone displays confusion (ex. "You have the wrong household.") FIRST check the telephone number to make sure that you haven't misdialed and THEN continue with the introduction to inform them of the reason you are calling, who is sponsoring the survey, and why.

FINALLY, inform the person answering the phone that your "records" indicate that the number you have should be called for this survey. If they still indicate that they aren't the correct household, then terminate the interview, document what occurred and pass the cover page back to a supervisor.

2. Avoid speaking only to the person who answered the phone unless this person is the targeted respondent.

III. Contact Result Table

There is only <u>one</u> contact result table. The contact result table which appears on the cover page is used for all contacts established with an individual at the assigned household. The contact result table provides space for recording in the result of each contact or attempted contact with the assigned household. This is done by recording the status code and interviewer ID# in the spaces marked "Result" on the cover page. Below are listed the status codes and a brief explanation of each code.

AM - Answering Machine. To be used when a recording device is reached.

BG - Business or government agency is contacted instead of private household.

BS - Busy Signal. Busy signals should be checked to make sure that the proper number was dialed and that the signal is not the result of the WATTS line or the exchange being busy.

CB - Call Back or Appointment set with the farm operator. To be used when a farm operator or family member requests a call back at a specific time or during a specific time range.

CI - Completed Interview.

CL - Can't Locate/Unavailable. Unable to reach respondent. This is also recorded as not available but is more specific in that the family member doesn't know of the whereabouts of the respondent.

HI - Household Ineligible for surveying completion based on screening criteria.

IU - Institutionalized. Used when the respondent has been institutionalized or incarcerated and cannot be reached within the time frame of the study.

NA - No Answer. No answer at assigned telephone number.

NL - No Listing. If the person who answers the phone indicates a number and name for the respondent and this number is inaccurate for whatever reason.

OS - Out of Service or Disconnected. No phone company service to the assigned number.

PC - Partially Completed Interview. To be completed later. This is used only when a respondent needs to discontinue temporarily but asks to be recalled later.

RF - Refusal. Used when the initial contact person or the respondent declines to participate. Attempt to get past the initial contact - often the respondent will consent to the interview.

RI - Respondent Ineligible for survey completion based on screening criteria.

TI - Terminated Interview. Will not be completed later. This is often the result of respondent lack of interest or impatience. It is up to the interviewer to create interest in the bored respondent with lively tone of voice and persuasive conversation.

WN - Wrong Number. Used only when the interviewer dials a number incorrectly. Not to be confused with NL. Always verify the telephone number assigned when the initial contact says you have the wrong number.

Always note that for each attempt you need to record the date and time the call was attempted. This will aid in making future attempts and is important for accurate record keeping.

IV. Materials Disposition

All survey materials which may be needed by interviewers for the study are found in Room 283 of the Urban Affairs facility. This is where assignments are picked up and deposited at the beginning and end of each shift. Pencils, pads, training materials, room assignments, interviewer tips and important memoranda are all stored and posted in this room. Take care to notice all messages in this area and strive to maintain order and neatness in this activity center.

FACT SHEET

PROJECT: Public Attitudes toward Water Quality and Management Alternatives in the Albemarle-Pamlico Estuarine System.

SPONSOR: The Department of Sociology, Anthropology and Social Work North Carolina State University.

FUNDING: N.C. Department of Environment, Health, and Natural Resources/U.S. Environmental Protection Agency

PRINCIPAL INVESTIGATORS: Dr. Thomas J. Hoban

Dr. William B. Clifford

CONDUCTED BY: The Center for Urban Affairs and Community Services, North Carolina State University.

PROJECT DIRECTOR: Dr. Yevonne S. Brannon, Manager Applied Research Group (919) 737-3211

PURPOSE: To evaluate peoples' knowledge and attitudes about natural resources in the Albemarle-Pamlico Estuarine system and management alternatives designed to protect these resources. The specific objectives are: (1) to assess public understanding of the causes, severity, and consequences of water quality problems in the Albemarle-Pamlico system; (2) describe and compare the attitudes of different segments of the public about the importance of the Albemarle-Pamlico resources; and, (3) assess the nature and extent of consensus and differences among various groups of users of the Albemarle-Pamlico system.

BENEFITS: Most problems facing the Albemarle-Pamlico Estuarine system arise directly or indirectly from human activity. Pressure on the system from such activities will continue to increase. Public awareness and positive public attitudes will be necessary to improve water quality. Effective management programs require better understanding of how different segments of the public perceive issues related to this system. The information gathered in this project should enhance resource managers' understanding of the complex nature of public attitudes by providing detailed data on the nature and extent of different groups' receptivity to alternative policies and programs. Recommendations will be provided for building support for improved water quality in the system. We should also be able to identify educational needs and ways to achieve greater public involvement in decision making.

WHO WILL BE SURVEYED: Respondents will be adult (18 yrs. or older) household members.