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**NEUSE RIVER ESTUARY MODELING AND MONITORING PROJECT STAGE 1:
ASSESSMENT OF STAKEHOLDER INTEREST AND CONCERNS TO INFORM
LONG-TERM MODELING**

by

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Abstract

As input to water quality management models of nutrient cleanup in the Neuse, we used public meetings, written questionnaires, and personal and telephone interviews to learn what goals stakeholders have for the cleanup and how they would measure achievement of those goals. The biophysical features of the Neuse that concern stakeholders most are clear water with healthy oxygen levels, water-based recreation and edible shellfish and finfish. Notably, just as high or higher on stakeholders' list of concerns are procedural aspects of the cleanup, including fair and efficient allocation of the costs of nutrient reduction among sources, decisions based on sound science, avoidance of excessive regulation, and balance among economic development and environmental goals. We also asked respondents about their experience of previous public involvement efforts. They prefer informational meetings and discussions that offer two-way exchange of information to public hearings, which too often lapse into one-sided polemics.

(Keywords: stakeholder analysis, public involvement, objectives hierarchy, water quality management, public values)

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Summary and Conclusions

Like many other mid-Atlantic and southeastern watersheds, the Neuse River has been subject to increasing human population pressure, both directly through urbanization and industrialization and indirectly through intensified land use for agriculture and recreation. Over historic time, the consequence has been increasing nutrient loads in the river, particularly nitrogen, leading to eutrophication in all its manifestations: murky water, algal blooms, fish kills, and outbreaks of pathogens such as *Pfiesteria piscicida*. In order to reverse this degradation, users of the river have been directed to reduce nitrogen loading by 30%, but the details of who is to reduce, how and where and how much, remain controversial.

One of the mechanisms for evaluating what nutrient-reducing actions would effectively and efficiently improve water quality is a university/state partnership to monitor and model water quality in the Neuse River, called ModMon. To ensure that the water quality parameters that are being measured by the monitoring effort and predicted by the modeling effort are meaningful to the public and to the decision makers who will choose among nutrient management strategies, we undertook a public involvement program to identify the features of water quality that are most important to those concerned with cleanup of the Neuse.

Through a combination of public meetings, written and telephone surveys, and personal interviews, we learned a great deal about public interests regarding the Neuse River. Some of the values were tangible and/or measurable; others, such as fairness, were less so. The measurable interests we found strongest evidence for were:

- protecting the livelihood of fishermen by
 - ensuring ample fish/shellfish supply,
 - ensuring edibility of seafood, and
 - ensuring public confidence in seafood safety;
- maintaining property values;
- maintaining regional economic development;
- maintaining income from tourism;
- increasing water clarity and aesthetic appeal;
- ensuring safe recreation (fishing, swimming, boating); and,
- reducing submerged aquatic vegetation (SAV).

These goals, and the others that appear in Appendix D, should prove useful to the Neuse River Estuary Modeling and Monitoring (ModMon) team in choosing output parameters for the project's long-term phase. Some other values, especially that of frequent, two-way communication and public education, may be useful in furthering another of the project's goals for that phase: establishing an ongoing relationship with the public. We note that many of the interests expressed by Neuse stakeholders refer to socioeconomic goals for the river and its cleanup, rather than biophysical goals such as oxygen levels. These socioeconomic goals have not been part of the traditional repertoire of water quality modeling. Nevertheless, these are the parameters of most interest to stakeholders, to members of the general public, and to decision makers. Some of the concerns that excited the most emotion among respondents were procedural: fairness in allocating the costs of cleanup among the various sources of pollution and

cost-effectiveness in prioritizing actions according to their anticipated water quality benefits. Definitions of fair allocation may vary according to self-interest, but many respondents believe that those who pollute should bear the cost of cleanup and that participation in cleanup activities should be widespread throughout the Neuse watershed and among stakeholders. Stakeholders are concerned about the Neuse and willing to help clean it up, but they want to know that their efforts are well-placed and part of a comprehensive plan.

Recommendations

1. In biophysical models of Neuse water quality management, use output measures that are important to stakeholders, including water clarity, healthy oxygen levels, and safely edible shellfish and finfish.
2. Extend the biophysical modeling effort into the socioeconomic realm, in order to respond to stakeholders' interests in the ramifications of water quality for human activities, including recreation, tourism, economic development and human health.
3. When choosing among cleanup strategies, treat procedural aspects seriously; stakeholders care deeply about fairness, efficiency and widespread participation.
4. To maintain active involvement by stakeholders and the general public, emphasize public education on personal responsibility for cleanup and choose public involvement formats that foster two-way communication between the public and decision makers.

Introduction

Neuse River water quality has been the focus of scientific research, newspaper headlines, legislation, and public conversation for many years. The Neuse basin encompasses a variety of land uses and stakeholder groups. Human populations in the region have increased steadily, putting pressure on the river system, including discharges of pollutants from both point and non-point sources and sedimentation from runoff. The problems of the Neuse have been among the most formidable, and most debated, of North Carolina's environmental challenges. As one Neuse Basin resident told us, "the average citizen does not know what to believe. He hears from the farmer that [the farmer] didn't and doesn't pollute. You hear from the cities that [the] waste they dump, you can drink. The hog farmer argues that the hog waste does not smell or pollute." As a result of such mixed messages, and as different groups advocate their perspectives more often and more forcefully, others become frustrated with the entire problem and are increasingly unwilling to become involved in solving it.

In 1997, the N.C. General Assembly passed legislation authorizing the N.C. Environmental Management Commission to adopt measures to improve water quality in nutrient-sensitive waters. Acting on recommendations from university scientists, the EMC developed a set of rules aimed at reducing nitrogen loading to the Neuse Estuary by 30% of the 1995 baseline. While the 30% reduction goal was based on scientific research, scientists could not predict how much water quality improvement the reduction would accomplish or how quickly improvement would be reflected in conditions that people care about. The Neuse River Estuary Modeling and Monitoring (ModMon) Project was funded by the N.C. Department of Environment and Natural Resources to shed light on these questions.

Coordinated by the UNC Water Resources Research Institute, the ModMon project includes researchers from several North Carolina universities and from the state Division of Water Quality (DWQ), and a few scientists from the industrial sector who serve in an advisory capacity. It can be subdivided into two components: short-term and long-term. The short-term model, which was to be completed and calibrated by the end of 1998 and adapted via subsequent monitoring, describes only the Neuse estuary using a small set of input parameters and water quality output measures. The long-term model is still in its preliminary stages but will include the entire basin and use a much larger set of inputs and outputs.

One aspect of the long-term component that distinguishes ModMon from other similar projects is its goal of incorporating public input into the modeling process. To be most useful in evaluating alternatives for cleaning up the Neuse, the features of water quality that are monitored and modeled should include those that are most important to members of the public and the decision makers who represent them, not just traditional measures such as nutrient concentrations or chlorophyll content. In this report we describe an assessment of interests and concerns from members of the public across the entire Neuse Basin, to inform both modeling and decision making. In addition to gathering information on stakeholder concerns, we also scrutinized the processes by which public input has been received, so that we can design improved methods for public participation in future stages of ModMon, in particular, and Neuse water quality management, in general. In this part of the study, we utilized the framework of procedural justice

theory (Lind and Tyler 1988), a branch of social psychology concerned with perceptions of fairness in decisionmaking processes involving authorities.

Methods

Data Collection.

To reach as many people from as many stakeholder groups as possible, we chose to use a combination of assessment formats including public meetings, telephone and personal interviews, and written surveys. We identified potential participants through several means. Most were supplied by DWQ, from whom we acquired lists of attendees at prior Neuse-related meetings and a list of all the wastewater discharge permit holders in the Neuse watershed. We sought other names via a snowball sampling technique (Goodman 1961); that is, we asked our original contacts to suggest other potential participants and then contacted those as well, until we had a cross-section of Neuse interest groups that included nonprofit organizations representing environmentalists and recreationists; industries and municipalities discharging wastewater into the Neuse; and representatives of state, federal and local agencies concerned with Neuse management. We also attempted to insure a broad geographical representation throughout the Neuse watershed. These sources ultimately generated a pool of 240 individuals, all of whom received an introductory mailing. The introductory mailing included a letter describing the goals of the ModMon project, the role of public input, and the several means by which recipients could share their interests and insights with us (Appendix A). We also included a brief multiple-choice and short-answer survey to help us better understand participants' primary concerns and their level and type of Neuse-related involvement (Appendix B). Third, we included a reply card on which recipients could indicate their willingness to complete phone or written surveys, as well as whether or not they planned to attend either of our first public meetings, both on June 16, 1998. Finally, we included a map to the meeting site, Wayne Community College in Goldsboro.

We received 60 surveys and 59 completed reply cards. On the reply cards, 13 respondents indicated that they would participate in a phone interview, 18 agreed to a written survey, and 18 checked both the phone and written options. In addition, 14 people said they expected to attend the daytime meeting and 6 the evening meeting on June 16. Thirteen opted to attend no meeting at all, and 19 checked that they would attend one of the meetings later in the summer.

Because the content of the phone and written surveys was the same, and because the written surveys were easier to administer, we conducted phone interviews, mostly with those who had specifically requested them, totaling 23. We distributed 35 written surveys and, despite written reminders, received only 27 back. We conducted a series of nine formal and several informal interviews with Neuse Basin residents, mostly in the lower Basin in order to extend our sample geographically. We provided short written questionnaires on meeting format and procedures to those who attended the public meetings (Appendix C).

Data Analysis

Questionnaires. The three questionnaires (introductory, meeting participant, and extended written or phone survey) resulted in both numerical and verbal data. We summarized the numerical responses to closed-end questions by tallying the number of responses in each category. For closed-end questions with a Likert-type scale response (e.g., ranging from strongly agree to strongly disagree), we calculated an average response. For some such questions, we

computed separate averages for different classes of respondents, e.g., those who held discharge permits vs. those who did not. We summarized the verbal data from open-ended questions and from comment sections both by entering the respondents' own words in our database and by tallying the number of comments that expressed essentially the same idea. We could assign codes to these verbal responses for further text analysis but have not yet done so. We do not generally have large enough sample sizes to make statistical tests a meaningful way to analyze these data. In some cases (e.g., meeting participants), even full participation would not give a large enough sample to make statistical testing a sensible tool to use.

Public meetings. We took copious notes during the public meetings and then produced rough transcripts from these notes. We then prepared written summaries of the interests and concerns expressed during the meetings, grouped by category of interest (e.g., economic, recreation, fairness). We sent these summaries to the meeting participants for their additions and corrections. From these corrected summaries, we have prepared several iterations of a composite objectives hierarchy, listing goals for water quality management in the Neuse expressed by any participants, more specific aspects of each of those goals, and, finally, measurement criteria that could be used to assess how well particular management strategies might achieve each of those goals (e.g., Appendix D). A composite objectives hierarchy (Keeney 1992, Gregory and Keeney 1994) provides a framework for organizing the diverse goals and interests expressed by all stakeholders. The framework helps to identify the major themes represented (e.g., public health, ecosystem health). It helps to distinguish goals that are ends in themselves (e.g., healthy fish populations) from objectives that may be means to reach these overall goals (e.g., adequate dissolved oxygen levels). It helps differentiate substantive objectives (e.g., clean and clear water) from process objectives (e.g., participation by all stakeholders in cleanup efforts). And, it helps to specify observable measures for the underlying goals that are being pursued (e.g., number of lesions on fish as an indicator of fish health). These criteria, when used as the output measures of water quality models, then form the link between what is of interest to the public and their representatives and the technical analysis of water quality management alternatives.

We also prepared a summary of each public meeting that emphasized our observations of both content and tone of the meetings from the perspective of procedural concerns (concerns that procedures, as opposed to outcomes, may not be fair [Tyler 1990, Tyler and Lind 1992, Lind and Tyler 1988]). Some features of procedure that are important to acceptance of policy that result from those procedures include (1) representativeness (who attended and how effectively they communicated their interests, inclusion of all affected parties [Lind and Tyler 1988]); (2) voice (who spoke up to express their opinions and needs [Lind and Tyler 1988], feedback on whether they believed their input had been taken into account by decisionmakers); (3) bias on the part of decisionmakers or facilitators (inappropriate discrimination or consideration of irrelevant issues in making a decision; decisions not made on a factual basis [Lind et al. 1993]; and (4) attitudes toward authorities (endorsement of the legitimacy of policy makers [Tyler 1990, Tyler and Lind 1992], in this case, state government agencies, legislators, enforcement personnel). These summaries, along with survey questions on experiences with public involvement, form the raw data for our analyses of procedural justice concerns (e.g., whether citizens feel that their views have been heard and considered, whether they were treated with respect by authorities and by fellow citizens, whether decisionmaking is responsive to factual information and is correctible in case of error, whether policymakers are perceived as having legitimate authority).

Results and Discussion

Introductory Survey

We received about a 25% return on our initial inquiries, a relatively high rate for a mail survey without follow-up reminders. The responses we received on our introductory survey revealed that about half who answered lived near the Neuse. Half were holders of wastewater discharge permits. About one-fifth identified themselves as ecologists or environmentalists; respondents also included a few farmers, professors, and extension agents. Just over 20% noted that they recreated on the Neuse occasionally.

A majority of the respondents (64%) were members of an organized group that dealt with the Neuse in some capacity, although this was frequently an aspect of their work rather than an avocational pursuit. The groups most often referenced in this category were the Lower and Upper Neuse Basin Associations and the Neuse River Foundation. Most had participated in some decision-making process affecting the Neuse in the past, as would be expected from the method by which we acquired their names. Over two-thirds had attended a public meeting, and 20-30% indicated that they had talked to the media, completed surveys, or been interviewed by phone. Only a few had not participated in any such processes, citing insufficient time or lack of knowledge about how to get involved.

Of those who had participated in various formats involving the public in the past, we inquired which format they preferred. The most frequently given response, written in by 16 people, was an informational presentation, especially when followed by a discussion. Respondents justified this preference by explaining that informational presentations were less adversarial, putting everyone "on the same page," as one respondent said. By first learning common information and then having a discussion based on that information, people felt that a meaningful dialogue could result, in which there was less room for the one-sided advancement of personal agendas typical of public hearings.

Opportunity for dialogue was clearly important to our respondents, because the second most preferred format was discussion alone. Respondents explained that they appreciated the opportunity to express their views or ask questions and that they liked having exposure to a variety of viewpoints. The importance of genuine dialogue was emphasized even more by contrast later, when we asked about respondents' least-preferred formats. Other preferred formats which were mentioned by one or a few people included public hearings, although most who chose this added some caveat to their choice; workshops, because they were informative; focus groups, because they can facilitate openness in discussion; tours showcasing Best Management Practices; and structured panel discussions followed by a question-and-answer period, similar to informational presentations.

In addition to our questions about the most preferred formats, we also asked those we surveyed which formats they preferred least. Again, respondents showed through their answers that dialogue with each other and with decision-makers was very important. A large majority wrote that they least liked public hearings, because of the one-way nature of the communication in this setting. First, this format often does not allow attendees to ask questions of presenters. Second,

because hearings generally conclude with a series of public comments but no response or discussion from the audience, many felt that hearings spread misinformation, at best, or, at their worst, become opportunities for the advancement of personal agendas. Finally, people were dissatisfied with public hearings because of the lack of concern or response they perceived on the part of state agencies; in other words, they felt that hearings were a formality unlikely to bring about substantive change.

The next part of the survey asked respondents to rank their level of agreement with three statements: "I feel the state has tried to identify citizens' concerns about the Neuse River," "I am satisfied with the amount my voice has been heard on this issue," and "All the right people have been involved in making decisions about the Neuse." The ranking scale ranged from 1 ("strongly disagree") to 5 ("strongly agree"), and we calculated averages for each statement across all respondents, for wastewater discharge permit holders alone, and across all other respondents. For all three statements, the dischargers' and non-dischargers' averages were essentially the same. Overall, the respondent pool slightly agreed (average: 3.16) that the state had tried to identify citizens' concerns; disagreed slightly (average: 2.83) that their voices had been adequately heard, and disagreed slightly more (average: 2.42) that the right people had been involved in decision-making processes.

To clarify who respondents felt was missing, we asked them to list individuals or groups they felt had been excluded from the process in the past. Their responses were not at all unified, including all of the following at least once: legislators, agriculture, local planners, health departments, the "average" citizen, resource managers, small towns (one respondent specifically mentioned the Gorman community), landowners, absentee landowners, fisheries, recreational boaters, educators, small permittees, the development community, and "those who disagree with DWQ." So that we could rectify some of these perceived oversights, we also asked respondents to suggest persons or groups we should contact. Very few did so, but we added the few who were suggested to our list of participants. In general, we tried to make sure that our assessment was inclusive, considering the groups suggested by our initial respondents, as well as others recommended by other sources.

Public Meetings

The optimal way to find out people's interests, we felt, was to speak to them face to face. Therefore, during the summer of 1998 we convened four public meetings at three locations across the Neuse Basin. We originally intended to hold two (one in the afternoon, one in the evening) on a chosen Tuesday in each of the months of June, July, and August; however, anticipated low turnout caused us to cancel the evening meetings in both July and August. Attendance was moderate: we had nine at the June afternoon meeting in Goldsboro, two in the same location that evening; ten in New Bern in July, and eight in Raleigh in August. In addition to the general public, our meetings were sometimes also attended by one or more members of the ModMon modeling team, who listened to the interests that were voiced and answered participants' questions as needed.

In every case, the participants at our meetings came from a variety of professional backgrounds. They represented several municipalities within the Neuse Basin, industry, the NC Cooperative

Extension Service, DWQ, the US Fish and Wildlife Service, the Environmental Defense Fund, a New Bern law office that represents mostly corporate clients on Neuse-related issues, and members of the Neuse River Foundation. In addition to their professional capacities, many participants lived near or recreated on the Neuse River.

Each meeting was run according to the same general schedule. Lynn Maguire opened each meeting, introducing herself, any modelers present, and Karin Maloney. Maloney facilitated the meeting from that point on, while Maguire took notes to enable us to reconstruct a summary afterwards. After reviewing the meeting schedule and asking participants to introduce themselves, Maloney explained in basic terms how a mathematical model might be used for water quality management, then she briefly introduced attendees to the ModMon project. We did not think it necessary to go into much detail for the purposes of these meetings; rather, we explained only what was necessary for participants to understand the kind of information we wanted from them and what would be done with it in the future. Specifically, we said we were interested in their interests and goals pertaining to water quality management on the Neuse and ways success in achieving those interests could be measured. After answering any questions about what had been covered so far, the discussion commenced.

Because several attendees, particularly at the first meeting, had been to technical meetings related to ModMon's short-term modeling phase, they were initially uncomfortable with the breadth of input we requested, since it didn't fit in with what they already knew about the project. They were familiar with the more narrowly focused short-term model, which predicts a few water quality measures, such as chlorophyll and nitrogen concentrations in the estuary; they were surprised to be asked about recreational, aesthetic, and socioeconomic goals as well. The extensive modeling backgrounds of some participants were potentially limiting, as well, since they were very familiar with the more technical parameters that water quality models generally contain and were sometimes uncomfortable that we were seeking more qualitative, nontraditional output measures.

Participants' prior familiarity with ModMon produced most of the questions we received before the discussion began, sometimes to the frustration of those who had no such previous exposure. Many had questions about the parameters and data used in the short-term phase; these questions had arisen as a result of the presentations they had attended in the past. The presence of any member of the ModMon team at our meetings provided an opportunity to resolve those latent questions that participants were unwilling to pass up. This put us in the awkward position of having to choose between spending extended time on issues unrelated to our own interests in order to satisfy the often pressing concerns of a portion of the group, and moving the discussion to the issues at hand as quickly as possible. Because some questions had to be answered in order for participants to be comfortable with our portion of the process, we spent whatever time was needed to address those. However, whenever possible, we did our best to convince questioners to postpone their unrelated questions until they could talk to the modelers individually, either during the break or at the end of the meeting.

A summary of the interests voiced at each of these meetings appears in Appendix D. In the discussion that follows, we have combined the material from all participants at all meetings and divided it into seven major categories: modeling, citizen involvement, cultural concerns,

economic concerns, “striking a balance,” recreation/health, and fairness. Each of these can be viewed as its own objectives hierarchy, containing a combination of ends objectives, means objectives, process objectives, and measurement criteria.

Modeling. With respect to the modeling, itself, participants at the meetings were most concerned with which parameters were included, how those parameters were defined, what the model’s level of spatial resolution was, and what role the model would play in the decision-making process overall. Specifically, we heard that the model should consider available, rather than total, nitrogen; that it should predict both the magnitude and duration of hypoxia (this was linked to a concern about the continued health of fish populations); and that the roles of groundwater, riparian wetlands, lakes, and reservoirs should be investigated and incorporated. The role of lakes and reservoirs was also a key concern related to the model’s spatial resolution. This was brought up by an employee of the City of Durham, who pointed out that Durham receives water from two reservoirs in the Neuse Basin, and that he hoped the model would predict both the quantity and *quality* of their water, rather than limiting such predictions to the estuary alone. Also an issue of spatial resolution, participants stated that the model should account for local variation in slope, soil type, flow rate, and other parameters affecting the environmental impacts of both nutrient discharge sites and buffer strips intended to mitigate nutrient pollution.

Citizen involvement. In participants’ discussions of citizen involvement in cleaning up the Neuse, a few themes were emphasized repeatedly. Public education was clearly paramount: people believed that the public should be thoroughly educated about the Neuse and their own impacts on it. Attendees felt this would increase popular recognition and ownership of the problem. In addition, they also told us repeatedly that the public should be told how much improvement they could expect to occur in the river over what general time frame, in order to make it less likely that citizens would become discouraged about the condition of Neuse—or, perhaps worse, cynical about restoration efforts there—merely because their expectations were unrealistic in terms of speed and magnitude of recovery. So that citizens and legislators could better envision improvements in the river under several different management intensities, one participant suggested that computer-generated images be created to illustrate the predicted results.

Another oft-suggested way to reduce public discouragement was increasing feedback individuals receive, particularly after they participate in citizen-involvement efforts. (This, of course, applies to our meetings, as well!) Whether they receive feedback via some kind of letter or newsletter, as some suggested, or whether they can watch, on their daily weather report, how the water quality in their local tributary changes day by day, as others hoped, virtually everyone agreed that feedback is an essential ingredient for maintaining an involved public. Keeping the public involved is all the more important because, as meeting participants frequently reminded us, the “public,” in this context, also includes legislators. Once people have participated, it is important to let them know their participation has made a difference. This was illustrated to us particularly well by a frustrated gentleman who, with his wife, had collected data for the Albemarle Pamlico Estuary Study (APES) years previously and still didn’t know if the data had been used for anything. Particularly when they had such firsthand knowledge of previously collected data, people were interested in whether and to what degree the ModMon project availed itself of previous studies.

We asked attendees to be specific about what sorts of things they thought could be used to grab public attention. They had a few suggestions, emphasizing again that tactics connecting public water quality to individual actions were likely to be most successful in engaging public attention—in other words, people should be involved in protecting their *own* water supplies. Examples of these included the “Know Your Ecological Address” program that teaches grade school children about their watersheds, and storm drain painting campaigns that remind us that substances dumped in the marked drains will eventually be deposited in the Neuse. One attendee from the NC Cooperative Extension Service told the group that the CES’s Neuse Education Team runs a series of focus groups to help different interest groups understand the Neuse’s situation and their responsibilities under the Neuse River Nutrient Sensitive Waters Rules. Those meetings tend to emphasize the nitrogen cycle, he explained. Other groups, perhaps, could organize something similar.

Cultural concerns. Only a few cultural concerns were mentioned at any of the meetings. Most notably, one participant pointed out that the Neuse has had cultural significance to both European and Native American populations. Other cultural goals included a desire to reduce the hostility often rampant among differing interest groups (which, of course, is much more an issue of the public involvement process than it is of the model or modeling process) and a desire to improve the river’s aesthetic qualities.

“Striking a balance.” We coined the “striking a balance” category to describe issues not necessarily unique to the July meeting, but framed eloquently there. At that meeting, attendees spent a significant amount of time discussing how to create a balance between humans and the environment and what such a balance would look like. In particular, several agreed that such a balance would be characterized by sustainability of both human operations and ecological processes. At least one individual felt that it would require both a commitment from dischargers to lessen their impacts on the river and a heightened commitment from people living upstream in the Basin. Two other critical balances embedded within concerns for the linked human/ecological system were (1) those between the costs (and benefits) of preventing future pollution and the costs of cleaning up pollution when it does occur, and (2) those between environmental health and economic development. These comments neither identified specific interests nor offered particular solutions; however, they are valuable because they yield insight into public perceptions of the Neuse River issue, revealing which conflicts or tradeoffs seem most salient and most frustrating to some members of the public.

Recreation/health. Several participants expressed interests related to recreational activities they enjoy. Because these are often intimately related to human and environmental health concerns, we grouped the two together. In general, people wanted the water to be safe for prolonged-body contact activities, such as swimming and water-skiing. They also wanted the fish they caught to be safe for eating. Other desires related more to inconvenience than to danger. These included reducing the amount of submerged aquatic vegetation to a level appropriate for fish propagation, but not compromising the water’s navigability; getting rid of “slime” on fishing nets; and increasing the clarity of the water for aesthetic reasons.

Clear water also has environmental/biotic benefits, of course, and it was one of the most frequently mentioned interests in that category. In particular, participants were concerned about algal blooms creating hypoxic conditions and shading benthic communities. Since water is consumed by all species, including humans, others were interested in attributes such as taste, odor, and smell. The health of fish populations was another commonly voiced concern, which different people suggested be measured according to number of species, species population size, amount of suitable habitat (taking into account anoxic or hypoxic conditions, among other attributes), and number of fish killed (apparently by disease or toxic conditions) or found with lesions.

One attendee from the US Fish and Wildlife Service emphasized the Neuse's role, especially between Quaker Neck and Cherry Hospital, as a spawning ground for anadromous fish such as striped bass, river herring, American shad, and alewife. Because these species migrate upstream to spawn and the young return downstream at specific times of the year, the timing (mid-spring and early summer are especially deleterious) and location (problematic especially at the estuary mouth) of hypoxia events are critical. Both fish and shellfish were also mentioned as valuable for their role as indicators of environmental health, worth protecting for that reason as well as for their intrinsic value.

Economic concerns. The economic concerns voiced at our meetings were numerous. Participants, particularly those representing municipalities, were concerned about the total cost of cleaning up the Neuse and about the distribution of that cost among stakeholders. (The distribution concerns will be discussed separately, but are mentioned here because of their close relationship to expressed economic values.) The Neuse is economically valuable in several respects. First, the fish and shellfish found there form a large part of the East Coast's commercial seafood industry. Second, the many recreational activities that take place there have monetary value. Third, the Neuse is the focus of a substantial amount of tourism, which employs many and could potentially promote larger-scale economic development. Fourth, river condition bears strongly on property values, especially on the waterfront. All of these issues were raised by meeting participants. One participant even wondered whether the Neuse could be restored to the point where it might someday be valuable as a water supply to Craven County, supplementing declining groundwater supplies there.

In addition to minimizing the total cost of cleaning up nutrient pollution in the Neuse, several people were interested in maximizing the efficiency of cleanup expenditures. This led to a discussion of the point/non-point system of permit-trading currently being tested in the Tar-Pamlico region. One attendee at the Raleigh meeting was quite familiar with it and explained some of the complications that had been encountered there that might also be present in the Neuse. Chief among these, apparently, were (1) that the system was quite restricted in terms of who could trade with whom, (2) that regulators were having difficulty determining how much pollution could be discharged for how long under each permit, (3) and that, since non-point reductions are notoriously difficult to measure, the effectiveness of the system as a whole was likewise hard to determine. The complications of the Tar-Pamlico system did not appear to diminish interest in efficiency as a goal but demonstrated some potential problems with one way of pursuing permit-trading.

Fairness. The most pressing concerns related to cleanup cost, and perhaps the most complex, were those pertaining to the distribution of costs among stakeholders. Most believed that the cost incurred by each source should be proportionate to its contribution to nitrogen pollution. Some felt that, to be truly fair, an allocation would have to be based on a precise knowledge of the contributions of every source, and were displeased about being held responsible for amounts of pollution they were not convinced were accurate. Others acknowledged that, even if it were possible to reach a level of certainty about sources of pollution, the parties responsible for some sources, such as urban runoff, would probably remain unclear. A few argued that the allocation that was the most effective in producing water quality improvement would be the most fair, because everyone's interests would be compromised if cleanup money was not spent where it would make the most difference¹.

We found that participants' perceptions of our meeting procedures (as revealed by after-meeting surveys) were generally positive, with the weakest point being the extended time that was sometimes spent trying to address participants' questions about ModMon before the discussions began. When we observed that this was causing some to become frustrated, we tried to minimize it.

Extended Written Surveys and Phone Interviews

Because not everyone interested in participating was willing or able to attend a public meeting, we devised an extended survey that would help us ascertain their interests in more detail than the introductory survey. We put this survey into two forms, a written booklet and a similar phone script (Appendix E). These were administered to the respondents from the introductory survey who had indicated that they wished to participate via one of these methods. No significant differences were evident in the demographic composition or interests of the two pools of respondents, so they will be described together here.

The first section of the survey covered material to help us understand our respondents' relationship to the Neuse. We found that most of them had lived in the Neuse Basin for at least 5 years, and many had lived there at least 10 years. During their time there, few said that they had noticed a change in the river's condition firsthand; those who had observed a change were most likely to characterize it as "a slight decline." It is possible that more would have noticed a change if they had spent more time on the river: we found that, on average, our respondents recreated on the Neuse only 1-2 times per year. They go there slightly more often for non-recreational purposes, particularly job-related responsibilities such as conducting educational workshops, conducting research, or inspecting effluent from a plant that discharges into the river. Overall, however, few of our respondents spent time at the Neuse on more than a monthly basis.

The water sports they enjoy most often, whether on the Neuse or not, include swimming (81%), sport fishing (46%), motorboating (38%) and sailing (31%). Over half (63%) claimed that the Neuse's condition did not affect their choice to recreate there, but the sizable minority that remained cited as deterrents algal growth, fish kills, water quality issues in general, and a lack of solid information about the river's safety.

¹ For a thorough treatment of fair cost allocation in the Neuse, see <http://www.env.duke.edu/courses/env316/neuse.htm>

Respondents' most common link to the Neuse, cited by 73%, was membership in some organized group. The most frequently mentioned groups were the Lower Neuse Basin Association and the Neuse River Foundation. Some of the others included the Sierra Club, Triangle J Council of Governments, NC League of Municipalities, NC Cooperative Extension Service Neuse Education Team, and Cities of Raleigh and Havelock. Of the other types of relationships mentioned, more were involved with the Neuse via their jobs than in any other way; nearly as many lived near it or recreated on it. These connections, of course, do not all bring about equal involvement, since a job involving the river might be more likely to keep someone in consistent contact with the river than would living nearby. Fifteen percent of respondents stated that their livelihoods depended directly on the Neuse.

In order to assess respondents' perceptions of various formats for public involvement in water quality decision making, the survey's next section sought to examine how often respondents had participated in public-involvement processes in the past. We found that, on average, they were involved in some such process (whether at work, a group meeting, a public hearing, or any other way) on about a monthly basis, and had been involved for at least five years. The interests they said they had most actively advocated ranged from the general ("water quality, health of the river") to the specific ("encourage farming practices that minimize discharges of animal wastes into river"). Other concerns mentioned included fair treatment of wastewater discharge permit-holders, a dearth of public education, appropriate use of buffer areas, overfishing, hydrologic restoration, and the need for science-based decision-making. Most originally became involved because of their job responsibilities; some had become more involved with the Neuse over time as their job responsibilities increased, because of increased concern over the Neuse's condition, or in response to newly drafted or proposed regulations. Only three individuals said they had not been involved in any Neuse-related processes, citing lack of time, lack of knowledge of the situation, or lack of trust in decision-makers as reasons for not participating.

For those who had participated, predictably, most (88%) had participated in public hearings, probably the most common and accessible type of involvement for interested persons. It was more surprising to find that only about 13% fewer had participated in workshops, informational presentations, and organized discussions. A few had also taken part in focus groups, field demonstrations, or rule-making.

The responses we received to our questions about most- and least-preferred formats for public involvement mirrored closely what we had heard in our introductory survey: people prefer two-way processes such as focus groups or informational presentations with discussions and, again, overwhelmingly dislike public hearings for essentially the same reasons as given before. We inquired about what made a process satisfactory, in general, and found that, in addition to meaningful dialogue, people preferred processes in which scientific soundness was emphasized and where the subject matter was clearly defined and the discussion structured. They disliked unmoderated processes (often perceived as inaccurate, unfocused, unbalanced or politicized), as well as those that were adversarial, excessively emotional, or lacking in scientific grounding.

Because we were interested specifically in participants' experiences with facilitated meetings, we asked a series of questions about those, but only a few had been to any. Those who responded

were generally positive but nonspecific about their experiences, believing that they and others had been treated fairly and that the facilitators were unbiased.

As we had done in the introductory survey, we included a series of statements to be ranked according to a Likert scale, this time ranging from -3 (“Disagree”) to 3 (“Agree”). For the extended survey, the statements we made were “The State of North Carolina has managed the Neuse well so far,” “The State has gotten enough public input in managing the Neuse,” “The State takes public input seriously,” and “The State is not biased towards any group in its management.” We calculated average scores across all respondents and found that people slightly disagreed that North Carolina had managed the Neuse well (average: -0.62), mildly agreed that it had gathered enough public input to do so (average: 0.80), and were very slightly disinclined to believe public input was taken seriously (average: -0.27). The strongest response was aroused by the question about whether decision-makers were biased: respondents stated that decision-makers were biased, with an average score of -1.23. The follow-up question, which asked respondents to name the groups that appeared to be favored, drew varied replies; there were allegations that decision-makers favored everyone from farmers to fishermen to (most frequently) environmentalists.

Next, in response to a couple of comments we received on the introductory survey, we explored the issue of which stakeholders are commonly perceived as legitimate participants in management decisions for the Neuse. We asked first whether respondents perceived any group as excluded from the decision-making process. Only four replied that they did. The groups these four said were excluded were local governments, unaffiliated grassroots interests, the general public, and (from one apparently disillusioned individual) “rational people.” These exclusions were attributed to these groups’ lack of initiative, lack of technical experience, lack of faith that anything would be accomplished if they got involved, and lack of awareness of the process itself. In a follow-up question, we offered a list of possible stakeholders and asked respondents to indicate which were entitled to participate in Neuse-related decision-making processes. Everyone agreed that residents of the Neuse Basin were entitled, and most also felt that dischargers (96%), commercial fishermen (85%), recreationists (77%), local environmental groups (73%), developers (69%), and absentee landowners (58%) were legitimate participants. Half felt that local professional groups were legitimate participants, and fewer than half believed that external environmental groups (46%) or vacationers (46%) should have a say in the Neuse’s management. Of those who felt these groups should be weighted unevenly, most felt that input from residents should be considered most important. Some others argued for higher priority on scientists’ opinions, because of their presumed objectivity. Finally, we asked whether any of the groups particularly did *not* belong in the decision-making process. Environmentalists were by far the most common response; others mentioned repeatedly included developers, vacationers, and recreationists. To put all these responses in perspective, we asked people to describe, on the same -3 to 3 Likert scale (in this case, “not important” to “most important”), how important public opinion should be in the decision-making process as a whole. The responses averaged to 0.72, signifying mild to moderate importance.

Because of the central role of mathematical modeling in the future management of the Neuse, we were interested in the public’s level of comfort with this methodology. Therefore, we constructed a set of four statements about modeling to be ranked from -3 (“Disagree”) to 3

(“Agree) on another Likert scale. Most respondents felt comfortable that they understood what a mathematical model was (average: 1.84). Respondents were less sure that they trusted the modelers to be unbiased (average: 0.44), but fairly trusting that the modelers would use the best science they had available (average: 1.24). Their faith in the validity of the model’s output was correspondingly weak (average: 0.48). This result seemed consistent with the general skepticism and perceptions of imbalance that pervaded the survey responses.

The next section of the survey contained a list of interests, gleaned from the first public meeting, and asked respondents to rank each as “definitely not important,” “neutral,” “somewhat important,” “very important,” and “most important.” We asked them to choose the last ranking no more than twice, in order to make their priorities clearer. The interests, and their average rankings, coded from 1 to 5 to represent ascending importance, appear below (Table 1).

Table 1. Rankings of stakeholder interests in the Neuse River from 50 written and phone surveys.

Scale: 1= least important, 5= most important.

Interest	Average Ranking
Decision-making based on sound science	4.52
Healthy oxygen levels	4.00
Water safe for swimming and recreation	3.96
Fair allocation of cleanup costs	3.92
Confidence in safety of seafood	3.80
Avoiding excessive regulations	3.68
Shellfish beds open for harvest	3.36
Good supply of commercial fish	3.32
No more Pfiesteria	3.25
Clear water	3.23
Good supply of sport fish	3.16
Protecting plant and animal species for their own sake	3.13
Limit development around river	3.00
Pristine ecosystem	2.96
Sandy river bottom	2.52
Waterfront property	2.16

The two most highly ranked interests were “decision-making based on sound science” and “healthy oxygen levels.” “Waterfront property” was considered to be of least importance. We

included a follow-up question asking those who had indicated that they valued fair allocation of cleanup costs (which many evidently did, since it was ranked 3.92 on our scale) to explain in more detail what fairness meant to them. Most advocated some sort of “user pays” scheme, where all who contribute to the Neuse’s pollution also contribute proportionally to its cleanup. Some contrasted their ideals with perceived unfairness, including unequal distribution of cleanup costs downriver versus upriver and, likewise, to point versus non-point sources. Most definitions of fairness were quite simple, with one respondent simply stating that a fair allocation would “determine where the pollution is occurring and charge those responsible.”

Hoping that the previous questions would have enabled respondents to gather their thoughts and clarify their priorities regarding the Neuse, we then presented them with an open-ended question: “Now that you’ve had a chance to think about some of the things that are important to you, please tell us in a paragraph or so (a) what the river would be like in the *best-case scenario* that you think might be achievable and (b) how you, personally, would benefit if the river were this way.” Few wrote much and many of the responses were quite general. Two unusually detailed responses said:

(a) I would like to have the river healthy for swimming, fishing and not worry about diseases or infections. (b) I’m a sail maker and my customers sail, fish, and swim in the river. If they are afraid of getting sick, they will stop coming here.

The best-case scenario for the Neuse River Basin would be a sustainable system. The restoration of the river would be our first task and then, upon completion, the basin would be subjected to rules and regulations that would ensure that its conditions be sustained by best management practices by all parties. There is a level of use and development that the river can handle and we need to work toward it. For the Neuse River Basin to reach its sustainable level, all parties from upper to middle and lower river basin will need to be involved, including shell fishing in the sound. Personally, if this occurred, I would know that my sewer bill fairly reflected the expense of my treatments.

The remainder of the written answers echoed what had been said elsewhere in the survey. In particular, respondents emphasized the importance of holding all polluters responsible, educating the public, and achieving a level of water quality high enough to permit all kinds of recreation.

Personal Interviews

The final component of our assessment was a series of personal interviews, most of which were conducted by Karin Maloney during a two-day trip to the lower Neuse Basin. The purpose of these interviews was to diversify the geographic representation of our respondents and seek out some interest groups who had been described by other respondents as important, but who had not appeared in our sample previously. Maloney spoke with the manager of a New Bern seafood restaurant, the owner of a marine supply store; the dockmaster of the Oriental Marina; others at the marina, including local residents who worked there, such as boatbuilders and sailmakers, and others vacationing, including a New Bern attorney and his family spending the evening at the

marina in their yacht. These interviews provided new information about the lower Basin, which had not been reflected in our public meetings or surveys.

Two conflicting influences are at work in the lower Neuse Basin: first, pollutants discharged everywhere upriver are concentrated here in the estuary; second, the estuary is where most people in industries directly dependent on the river (e.g., boating, fishing) live and work. Respondents reported tension between one faction of the population, who are very upset about the host of water quality problems, whether observed or merely rumored, and another faction, mostly made up of people who work on and in the river on a day-to-day basis, who are equally upset about the negative press the river has received. Members of the second group swim and fish in the river almost daily and eat the fish they catch. Suffering no ill effects themselves, they are angered by the persistent publicity which contradicts their experience and threatens their livelihood, keeping tourists away and encouraging them to buy seafood elsewhere. Predictably, individuals with this perspective are unlikely to participate in public-involvement forums assembled to solve high-profile problems whose legitimacy they do not recognize. The small sample of people interviewed does not allow us to estimate the prevalence of either perspective, merely to confirm that both exist in that region. In general, the concerns and interests described by interviewees were identical to those gathered elsewhere in our assessment; only this fear of media attention and its damaging effects on the local economy, striking even some who believed the river's troubles were genuine, seemed unique to this region. Perhaps this tension between those who believe the Neuse is in peril and those who think it is doing fine were at the root of the emphasis at the New Bern public meeting (the one closest to the estuary) on "striking a balance."

Biophysical Measures and Beyond

One of the purposes of this work was to elicit information on stakeholders' goals for the Neuse cleanup and operational measures for evaluating achievement of these goals to guide the water quality modeling effort. The ModMon modeling staff conceived these, at least initially, as being biophysical measures. Indeed, we gleaned quite a rich suite of such measures from our respondents (Table 2):

Table 2. Biophysical measures proposed by stakeholders for achievement of Neuse River cleanup goals (* indicates most often mentioned).

Water quality

Physical/chemical

- *Clarity
- Taste, odor
- Chlorophyll
- *Oxygen
- Toxins (e.g., heavy metals)

Biological

Plant

- Algae levels
- *Submerged aquatic vegetation (intermediate levels considered optimal)

Animal

Fish

- *Abundance
- Diversity
- Fish kills
- Lesions
- Size of harvest

- *Shellfish (edible)

Microbes

- Fecal coliform
- Other pathogens – e.g., *Pfiesteria*

Ecosystem health

- Forested area
- Diversity of plants and animals
- Green space

We would like to emphasize, however, that these biophysical measures are only a fraction of the interests expressed by our respondents, and they are not necessarily the ones that excited the most emotion. As we mentioned in our summary and conclusions earlier in this paper, the socioeconomic ramifications of water quality loom large in stakeholders' minds, as do procedural concerns for fairness and efficiency of cleanup strategies. Stakeholders also stressed the need for public education to motivate widespread participation in cleanup efforts throughout the watershed and by all contributors to pollution of the Neuse.

The message for modelers seems clear: Citizens are interested in biophysical aspects of the health of the Neuse watershed, but they are at least as interested in the socioeconomic and cultural ramifications of water quality conditions. Comprehensive models to guide the choice of management actions to clean up the Neuse should extend their reach to model these broader consequences of water quality remediation.

The message for policy makers seems clear, too: Citizens care deeply about the Neuse and about the cleanup program. They want broad involvement in decisions about what actions should be taken and who should pay for them. They want two-way communication between citizens and policy holders, and they want to know that their opinions have been taken into account when decisions are made. They want to be sure that actions taken will improve water quality efficiently and that the costs will be allocated fairly amongst those who contribute to pollution. Satisfying these concerns will be more difficult, but perhaps also more important to the ultimate success of water quality improvement in the Neuse, than the most sophisticated of biophysical models.

Study Caveats and Ongoing Related Research

Although the number of citizens who responded to our surveys or attended public meetings was modest, the rate of response was comparable to or higher than other such solicitations of public input to resource decision making. It is clear that the original pool of potential respondents included those most likely to have a stake in water quality management decisions, as compared to the general public. It is also clear that many of those who attended meetings or responded to surveys have a higher level of professional or personal involvement in Neuse watershed management than the general public. Therefore, the opinions expressed by these respondents should be viewed as indicative of what a subsection of the most involved citizens believe is important in cleaning up the Neuse. It should not be construed as a sample representing what the average member of the public believes is important.

The implications for decision making are mixed: The opinions of the most involved and best informed citizens are certainly important. These are the people who are most likely to speak out for or against particular proposals, and these are the people most likely to become constructively engaged in implementing water quality improvements. Other efforts to involve members of the public in water quality modeling (e.g., the Chesapeake Bay Program, Catawba River Watershed Analysis and Risk Management Framework, and the Patuxent River portion of the Chesapeake program) have focused mainly on identified stakeholders, although some have made their models accessible to at least some members of the general public via computer networks (Chesapeake Bay Community Watershed Model 1998, Chen et al. 1997, Costanza and Ruth 1998).

On the other hand, the opinions of the far larger segment of the population that does not generally respond to surveys, attend meetings, or otherwise speak up about public policy issues are important, too, in a system based on democratic decision making. Reaching this “silent” portion of the population is difficult, time-consuming and expensive, and the returns are uncertain. In a study on citizen attitudes toward management of national forest land in the Chattooga watershed (Maguire 1995), special efforts to reach the “silent” fraction of the population and compare their views to those of key stakeholders showed few systematic differences in the opinions expressed by the silent versus the vocal groups. They were equally wide-ranging in their views, debunking assumptions about monolithic attitudes among the silent group.

In a follow-up study to this one, funded by the National Science Foundation, Lind and Maguire are studying public involvement in water quality rule-making in both the Neuse and the Tar-Pamlico watersheds. In addition to analyzing archival data from these rule-making processes for evidence of procedural justice concerns, we will be conducting large-scale written surveys both of those who participated actively in the rule-making processes and those who live in the region and would likely be affected by rules for nutrient management, but have not participated in meetings or workshops. This is a much larger study, with a substantial fraction of the budget devoted to financial compensation to survey respondents, in order to motivate responses from segments of the population that would otherwise be unlikely to speak up. The focus of the follow-up study is specifically on citizen’s perceptions of the rule-making processes, rather than on the substantive interests of citizens in water quality cleanup, which complements the emphasis in this study on substantive goals and measurement criteria.

Availability of Data

Persons with a need to access the raw data from this study may contact Dr. Lynn Maguire by email at lmaguire@duke.edu.

References Cited

- Chen, C.W., J. Herr, L. Ziemelis, M. C. Griggs, L. L. Olmstead, and R.A. Goldstein. 1997. Consensus module to guide watershed management decisions for Catawba River Basin. *The Environmental Professional* 19:75-79.
- Chesapeake Bay Community Watershed Model. 1998. <http://204.47.238.74/wsmc/wsmc.htm>
- Costanza, R. and M. Ruth. 1998. Using dynamic modeling to scope environmental problems and build consensus. *Environmental Management* 22(2):183-195.
- Goodman, L. A. 1961. Snowball sampling. *Annals of Mathematical Statistics* 32: 148-170.
- Gregory, R. and R. L. Keeney. 1994. Creating policy alternatives using stakeholder values. *Management Science* 40:1035-1048.
- Keeney, R. L. 1992. *Value Focused Thinking*. Harvard University Press, Cambridge, MA.
- Lind, E. A., & T. R. Tyler. 1988. *The social psychology of procedural justice*. New York, NY: Plenum.
- Lind, E. A., C. Kulik, M. Ambrose and M. Park. 1993. Individual and corporate dispute resolution: Using procedural fairness as a decision heuristic. *Administrative Science Quarterly*, 38: 224-251.
- Maguire, L.A. 1995. *Desired future conditions for the Chattooga Watershed: A qualitative analysis of diverse public opinions*. Final report to the U.S. Forest Service, October 30, 1995.
- Tyler, T. R. 1990. *Why people obey the law: Procedural justice, legitimacy, and compliance*. New Haven, CT: Yale University Press.
- Tyler, T. R. and E. A. Lind. 1992. A relational model of authority in groups. In Mark Zanna (Ed.), *Advances in experimental social psychology*, Vol. 25: 115-191. New York: Academic Press.

APPENDIX A - INTRODUCTORY LETTER TO PROSPECTIVE PARTICIPANTS

Dear [Recipient],

We are writing to ask you to contribute your opinions and insights to a new and important water quality model currently being developed for the Neuse River. The ModMon project, which stands for “modeling and monitoring” is a cooperative effort between the Water Resources Research Institute, the North Carolina Division of Water Quality, and several independent university scientists from institutions throughout the state. It has two phases, one a short-term, localized, probabilistic model looking at specific scientific parameters; the other a long-term model designed to include more qualitative parameters that are meaningful to the public throughout the whole watershed. It is for this latter phase that we are requesting your input.

Since the health of the Neuse is so dependent on those who live and work nearby, a central premise of the ModMon project is that the final model must incorporate the desires and concerns of everyone involved, whether or not they have been active in this discussion in the past. As you know, there have been plenty of debates about what should be done for the Neuse. This project will differ somewhat from what has occurred before because one of its specific goals is to seek out the voices of those who have not been heard until now and make sure they are included. Whether you have been very active or not active at all in this issue, we hope you will contribute your thoughts now. There are several ways you can do this.

First, we will be holding a series of meetings throughout the summer for the purpose of listening to your concerns. At these meetings, we want to identify the interests of as many people as possible—not the specific management steps you believe should be taken, but the factors that are important to you, that determine *why* you would prefer any management plan to any other. Whether the things you value are rooted in ecological, aesthetic, recreational, financial, or any other kind of interest, they are important to us. When we have collected them, they will be incorporated into the ModMon model so that it will be possible to judge whether or not proposed management steps will bring about the things you want to see. Details are enclosed about the next meetings, which will take place on July 13 in New Bern and August 14 in Raleigh. We hope to see you at one of them.

Another important way you can participate is by taking a few minutes to fill out the enclosed questionnaire and returning it in the stamped envelope we have provided. We will be assembling a larger, more comprehensive survey later, which we would also like to send you if you would be willing to complete it. You can let us know on the enclosed reply card whether you would like to receive that survey or not, as well as whether or not we could call you for a phone interview some time in the future. Note that your responses in all our surveys will be kept confidential, and will never be attributed to you at any time.

As you can see, we are providing a number of ways for you to share your thoughts. How involved you choose to be is up to you. However, we hope you will decide to get involved in

some way—the model being developed cannot incorporate concerns that are not voiced. Please include yours among them.

Thank you for your time and attention.

Sincerely,

Karin Maloney
Nicholas School of the Environment
Duke University

Dr. Lynn Maguire
Nicholas School of Environment
Duke University

Dr. E. Allan Lind
Fuqua School of Business
Duke University

APPENDIX B - INTRODUCTORY SURVEY

What is the nature of your connection with the Neuse River? Please check all that apply:

- Local Resident
- Discharge permittee
- Farmer
- Ecologist or environmentalist
- Recreationist (fisher, boater, etc.)
- Other (specify: _____)

Have you been active in the debate about the Neuse River on behalf of an organized group?

Yes (name of group: _____
_____ various _____)

No

If yes, has your participation been: part of your job OR outside your job

Have you participated in other decision-making processes influencing the Neuse River in the past?

Yes (please answer follow-up question) No (please answer follow-up question)

If yes, in what ways have you participated? On the blank beside each choice, please indicate the approximate number of times you have done each:

- Attended public meetings
- Completed surveys
- Talked to the media
- Been interviewed by phone
- Other (specify: _____)

If no, why not?

- Not interested
- Not enough time
- Didn't know how to get involved
- Other

Of those you've participated in, which formats have you found most satisfying? Why?

Which formats have you found least satisfying? Why?

Please circle one of the numbers below to indicate how much you agree with the following statements:

Strongly Disagree ←————→ Strongly Agree

1 2 3 4 5

I feel the State has tried to identify citizens' concerns about the Neuse River.

1 2 3 4 5

I am satisfied with the amount my voice has been heard on this issue.

1 2 3 4 5

All the right people have been involved in making decisions about the Neuse

1 2 3 4 5

Please list any people or groups you feel have been excluded from the process in the past:

Who else should we add to our list of contacts for this process?

Please use this space for any additional comments you have:

APPENDIX C - QUESTIONNAIRE FOR MEETING PARTICIPANTS

Neuse River Basin Stakeholders' Meeting - (Date)

Thank you for taking time to come share your views with us! We hope you feel our process was fair and that you were able to contribute your thoughts freely. So that we may know what we did well and what you think needs improvements, please take an additional moment to answer the following questions. Drop your completed survey in the envelope provided or return it to Karin Maloney, Duke University Nicholas School of the Environment, Box 90328, Durham, NC 27708-0328

Please circle the number that best represents your opinion about each statement:

Strongly Disagree ←—————→ Strongly Agree

Time was used well at this meeting.
-2 -1 0 1 2

My interests were heard at this meeting.
-2 -1 0 1 2

I felt respected by others who attended the meeting.
-2 -1 0 1 2

I felt respected by the facilitator of the meeting.
-2 -1 0 1 2

I trust the modelers to do their best in designing the model.
-2 -1 0 1 2

I trust that the model will be a useful tool for making management decisions in the Neuse basin.
-2 -1 0 1 2

What, in your own words, was the purpose of this meeting?

What did you think of the format of this meeting?

What should we keep the same in future meetings?

What should we be sure to change?

Were the meeting times convenient? What would have been better?

Please use the rest of this page and the back for your additional comments:

APPENDIX D - COMPILED SUMMARY OF INTERESTS FROM PUBLIC MEETINGS

Modeling Interests:

June Afternoon meeting

- Model should consider available N rather than total N
- Model will have to take an adaptive approach, respecting spatial resolution, cumulative effects, and nonlinear effects
- Model should account for characteristics of microsites where discharges occur
- Different models must be compared only under comparable hydrologic schemes
- Issue of concern: values of things like population decline and human health are difficult to specify and easy to minimize

June Evening meeting

- Groundwater component of N sources should be identified
- Contribution of riparian wetlands should be identified
 - DO
 - BOD
 - Nutrients
 - Also contributions of other types of wetlands to water quality
- Spatial resolution is crucial: how far downstream should data be gathered?
- Model should predict magnitude and duration of hypoxia

July meeting

- Model must make use of data collected in the past – avoid “going back to square one”
 - Specific data to include: USGS, DWQ
- Waiting for modeling results could be paralyzing, shouldn't be “excuse for no action”

August meeting

- Impacts of water supply lakes/reservoirs should be identified
 - These affect Durham (has 2 water supplies from Neuse Basin)
 - impacts on water quality and quantity
 - regulatory impact on dischargers
 - zoning or regulatory impact on non-point sources
 - Want to predict water quality and quantity *throughout* basin (i.e., should define upriver areas in terms of water quality; not just nitrogen trapping efficiency, etc.)
- Recognize that all buffers are not equal; account for this in model
 - varies with slope, vegetation, Q-factor per linear foot
 - implementation/enforcement of buffer rules must be straightforward
- Disposal of sediment from non-point source treatment devices

Citizen Involvement:

June Afternoon meeting

- Public will be more accepting when it has a realistic idea of when to expect to see improvement
 - Possible way to achieve this: could show four levels of population growth, technology, and cost expended for management to enhance public/legislator understanding
- If enough academics rally behind a given model or paradigm, their unity may discourage other dissent (corollary: disunity among academics tends to shake public faith in objectivity of “science” as a solution)

June Evening meeting

- Public education is essential

July meeting

- Feedback is vital: volunteers should know their efforts have been meaningful and productive
 - This could be done by creating a new newsletter or by identifying existing newsletters that would be relevant
 - Repeat participation should be invited
- Increase public involvement, perhaps via several short-term projects
 - Example: sampling of in-stream macroinvertebrates
 - Diversity and health of indicator species (e.g., caddisfly and dragonfly) could be observed by volunteers & data shared
- Equal, *personal* acceptance of responsibility for river conditions, especially from non-point sources, e.g., farms and large developments
 - Characterized by absence of finger-pointing
 - Characterized by demonstrated willingness to take corrective action without waiting for exact proof of the absolutely precise measure of their impact.
- Public should know that some fish kills are naturally caused

August meeting

- Get people involved in protecting their *own* water supply
- Hikers and fishers could learn to look for particular plant and animal species as indicators of watershed health
- Aesthetic concerns
 - Water clarity is the biggest and most obvious aesthetic concern
 - public assumes clarity is related to biodiversity
- Public should understand what sedimentation/erosion control will and won't accomplish
- What will grab public attention? - want to engage them, increase willingness to act/to be regulated
 - *Pfiesteria*
 - Connect public water quality to individual actions
 - teach cause and effect
 - “Ecological Address” is part of some grade school education programs
 - Cooperative Extension Service has used series of focus groups
 - emphasizes N cycle

- Incorporate cause-effect info into TV weather report, effects to specific water bodies, development there, etc. (would have to be put into context, especially at first)

Social Interests:

June Afternoon meeting

- No violations of Chlorophyll A standards (due to aesthetics and link to hypoxia)

July meeting

- Reduce contentiousness among interest groups
- Historic preservation
 - Cultural value is attached to river by both European and Native American populations
- Improve public access to, and appreciation of, river

Economic Interests:

June Afternoon meeting

- Cost
 - Financial
 - Experiential (e.g., “no waterfront property” is too extreme)
- Livelihood of commercial fishermen
- Property values
 - Odor is one factor

June Evening meeting

- Fish Stocks
 - Commercial value
- Cost of various management regimes is a big consideration
 - Where should money be spent? By whom? Whose responsibility should control be?

July meeting

- Neuse Basin should be recognized as a desirable place to live due to its environmental quality
 - Water should be clean
 - Low turbidity
 - Goal: SECCHI depth = water depth (i.e., water is clear)
 - Favorable activities would bring about economic development benefits
- High cost of cleanup is an issue: level and cost of cleanup must be balanced
- Tourism-based jobs should be preserved
 - These are based on clean environment
- Could Neuse River be water supply for Craven Co.?
 - Supplement/replace diminishing groundwater supply
- General need to understand and make decisions in accordance with true environmental and economic costs of actions (presumably in the form of some type of impact fees)
 - Caveat: some costs cannot be offset by dollars

August meeting

- Possibility of using a permit-trading system?
 - Tar-Pamlico system has had problems
 - Trading program extremely restricted
 - Regulators uncomfortable with trading
 - difficult to measure improvement of non-point source pollution
 - Regulated community is potentially very interested

“Striking a Balance” Interests:

July meeting:

- Create balance between humans and environment
 - Sustainability is a hallmark of this
 - Commitment from dischargers to lessen impact
 - Example: Less N, P, etc., in effluent from wastewater treatment plants
 - Controlled growth in balance with economic development
 - Upstream commitment to caring for river should equal downstream commitment
 - Scientists and public need to understand tradeoffs between cost of prevention and cost of cleanup
 - Desire public appreciation for cost/consequences of inaction
 - Growth is currently inadequately planned and inadequately controlled
 - Should maintain balance between environmental health and economic development
 - Economic indicators such as unemployment and home sales will help identify this

Recreational/Health Interests:

June Afternoon meeting

- “Like it used to be”
 - Sandy bottom
 - Clear water
- Water should be safe to recreate (swim, water-ski)
 - No violations of fecal coliform standards
- No “slime” on nets and river bottom

June Evening meeting

- Fish stocks
 - Recreational value

July meeting

- Viable (i.e., *edible*) clam and oyster populations in the New Bern area

- Water safe for swimming and water-skiing (“prolonged full-body contact”) throughout tributaries and estuary.
- Optimal submerged aquatic vegetation (SAV) for fish protection and propagation *coinciding with* navigability
- River should be suitable for boating activities
- Recreational fishing: hampered by declining fish populations (probably due to overfishing, not just water quality)
- Recreational fishing should be possible and enjoyable
 - Water clarity (although clarity ≠ safety)
 - Absence of toxic/nuisance algae or other pathogens
 - Assurance of fish edibility
 - No heavy metals!

August meeting

- Human health/safety
- Recreation: fishable, swimmable water
 - edible fish
- Reduce/eliminate excessive (semi-) submerged aquatic vegetation
 - Enable boating and water-skiing

Environmental/Biotic Interests:

June Afternoon meeting

- Water quality is a high priority
 - Fish are a measure of water quality
 - Can measure fish population sizes
 - Fish population per species (tributaries)
 - Fish health (estuary)
 - Lesions
 - Size of fish harvest
 - Can measure amount of habitat
 - Algal blooms are a measure of water quality
 - Annual oyster harvest at Oriental is a measure of water quality
- Goal: No shellfish closings
- Fisheries
 - Diversity of fish species (tributaries)
- Goal: No violations of anoxia standards (due to effect on fish populations)
- Goal: No violations of hypoxia standards

June Evening meeting

- Hypoxia is a problem because it harms anadromous fish
 - These include striped bass, river herring, American shad, alewife
 - Neuse is a spawning ground between Quaker Neck and Cherry Hospital
 - Time when hypoxia occurs is critical
 - Mid-to-late spring, early summer is bad

- Location of hypoxic water is also critical
 - At mouth of estuary, could block upstream migration
 - Could block propagule migration back downstream
- Nutrient distribution
 - Affects fish distribution
- Water quality
 - Necessary for fish survival
- Water quantity/delivery to tributaries
 - Affects habitat
 - Must consider appropriate temporal scale
 - Too much, too fast is chief concern: can lead to streambank scouring
 - Loss of streambanks
 - Can bury in-stream biota
 - May destroy/degrade habitat
- Nutrient, pesticide runoff
- Sediment control, especially in tributaries
 - Number one cause of impairment to benthic communities
 - Impacts on turbidity, mollusks

August meeting

- Water Quality
 - Taste, odor (treated only)
 - Clarity
 - Algae blooms
 - Aquatic life - indicators
 - May be cheaper than direct measure of contamination
 - May be more integrated measure of overall water quality
 - bugs
 - shellfish
 - stationary organisms
 - serve filter-feeding function
 - concentrate heavy metals and other substances
 - fish
 - species abundance (public will notice number of sport fish)
 - water column characteristic known to favor desirable species

Fairness interests:

June Afternoon meeting

- Allocation of cost of control should be fair
 - Allocation should be based on clear understanding of atmospheric, point, and non-point sources

- Allocation should be based both on total discharge and presence of effective control measures

June Evening meeting

- Restrictions on cities/costs to cities
 - Fair/efficient/appropriate allocation of cost relative to contribution
 - Consider spatial effects and point vs. non-point sources
 - Amt. of suitable wastewater treatment

July meeting

- Minimal fish kills, with none that do occur apparently the result of anthropogenic factors

August meeting

- Point sources: concern about stringency of regulation
 - Undue hammering because they are easiest to control?
- What is “fair?”
 - Allocation should be based on sound science, not just “ratcheting down”/enforcement
 - Based on accurate assessment of each source’s impact
 - Sources/responsibility are often unclear
 - Who’s responsible for urban runoff?
 - Want to allocate money efficiently; account for diminishing returns as discharge is cleaned
 - Consider point and non-point collectively
 - Public pays for all of this, ultimately
- Respect economic needs of small farmer/businessman in the face of responsible cleanup actions

APPENDIX E: EXTENDED WRITTEN SURVEY

Note: this material has been reformatted here for ease of reading, but was originally mailed out in booklet form.

Directions

*Thank you for volunteering to complete our survey! Unless the directions specify otherwise, please place a check mark next to the **one** most appropriate choice for each item.*

All surveys will be kept confidential at all times. Your responses will not be traceable to you once the survey process is completed, and the identification number on this survey will be used for tracking purposes only. After we receive your responses, they will be compiled and distributed to the researchers in the ModMon project. The entire survey should take 20-30 minutes to complete.

First, we'd like to ask you a few questions to help us understand your connection to the Neuse River:

1) Please tell us how long you have lived in the Neuse basin:

_____ 0-2 years

_____ 5-10 years

_____ 2-5 years

_____ longer than 10 years

2) Have you observed firsthand a change in the condition of the Neuse River?

_____ Yes, a severe decline

_____ Yes, a slight decline

_____ Yes, a moderate decline

_____ Yes, an improvement

_____ No, I haven't noticed a change

3) How often do you go to the Neuse River for recreation?

_____ daily

_____ a couple of times per year

_____ weekly

_____ once per year

_____ monthly

_____ less than once per year

4) How often do you go to the Neuse River for any other reason?

- | | |
|----------------------------------|---|
| <input type="checkbox"/> daily | <input type="checkbox"/> a couple of times per year |
| <input type="checkbox"/> weekly | <input type="checkbox"/> once per year |
| <input type="checkbox"/> monthly | <input type="checkbox"/> less than once per year |

4b) What is/are the other reason(s)?

5) Which of the following kinds of recreation do you regularly participate in, either on the Neuse or elsewhere? (check all that apply)

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> sport fishing | <input type="checkbox"/> swimming |
| <input type="checkbox"/> sailing | <input type="checkbox"/> water-skiing |
| <input type="checkbox"/> motorboating | <input type="checkbox"/> jet skiing |
| <input type="checkbox"/> Other (specify: _____) | |

6) Does the condition of the Neuse deter you from doing any of these activities there?

- YES NO (skip to **Question #7**)

6b) If yes, what changes would be needed to make you comfortable doing these activities on the Neuse?

7) Which of the following describe your involvement with the Neuse River? (check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> live near river | <input type="checkbox"/> occupation involves river |
| <input type="checkbox"/> work near river | <input type="checkbox"/> livelihood depends directly on river |
| <input type="checkbox"/> recreate on river | <input type="checkbox"/> make legislation affecting river |
| <input type="checkbox"/> pay for cleanup of river | <input type="checkbox"/> member of group involved with river |

_____ other (specify: _____)

8a) Are you a member of any organized groups involved with the Neuse?

_____ YES

_____ NO (skip to **Question #9**)

8b) Which one(s)? _____

Now, we'd like to know a bit about your past experiences with processes where the public has had input into the management of the Neuse:

9) About how often do you participate in some kind of process affecting the Neuse?

_____ Weekly

_____ Annually

_____ Monthly

_____ Not at all (skip to **Question #12**)

_____ Every six months

10) Which specific interests or positions have you most actively advocated?

11) If you said you participate at all, when did you first become involved in this issue?

_____ within the last six months

_____ within the last ten years

_____ within the last year

_____ more than ten years ago

_____ within the last five years

11b) Why did you first get involved in this issue?

_____ because of my job

_____ because I was concerned about the river

_____ to represent a local group

_____ because someone asked me to get involved

_____ other (specify: _____)

11c) Has your level of involvement grown more or less over time?

_____ More _____ Less _____ About the same

11d) If your involvement changed, what caused it to do so? (please go to **Question #13**)

12) If you have not been involved, why not?

_____ I don't think it's important

_____ I don't think I can make a difference

_____ I don't have time

_____ I don't think the condition of the Neuse affects me

_____ I don't know enough about the Neuse

_____ other (specify: _____)

13) Which of the following processes have you participated in?

_____ Public hearings

_____ Discussions

_____ Workshops

_____ Informational presentations

_____ Focus groups

_____ Other (specify: _____)

14) Which formats have you found most satisfactory? What, in general, are the characteristics that make a process good?

15) Which formats have you liked least? What are some common problems you have experienced?

16) Were you ever at a Neuse-related meeting run by a facilitator? (If you have attended more than one, please choose the one most memorable to you for the following questions.)

_____ YES

_____ NO (skip to **Question #27**)

16b) If yes, please tell us more about the meeting:

Who convened the meeting? _____

What was its purpose?

When and where did it take place?

17) Do you know how the facilitator was chosen?

_____ YES

_____ NO (skip to **Question #18**)

17b) Was the facilitator chosen fairly?

_____ YES

_____ NO

18) How fairly did the facilitator treat participants?

_____ Very fairly

_____ Unfairly

_____ Fairly

_____ Very unfairly

19) How fairly did the facilitator treat you personally?

_____ Very fairly

_____ Unfairly

_____ Fairly

_____ Very unfairly

20) Was the facilitator biased?

_____ YES

_____ NO (skip to **Question #22**)

21) How biased was the facilitator?

_____ Very biased

_____ Somewhat biased

_____ Not biased (skip to **Question #24**)

22) Who was the facilitator most biased towards or against?

23) How did the facilitator demonstrate his/her bias?

24) How were you treated by other participants at the meeting?

25) How were you treated by state employees at the meeting (if applicable)?

26) How were you treated by modelers at the meeting (if applicable) ?

Please show whether you agree with the following statements by circling the appropriate number:

Disagree ←————→ Agree

27) The State of North Carolina has managed the Neuse well so far.

-3 -2 -1 0 1 2 3

28) The State has gotten enough public input in managing the Neuse.

-3 -2 -1 0 1 2 3

29) The State takes public input seriously.

-3 -2 -1 0 1 2 3

30) The State is not biased towards any group in its management.

-3 -2 -1 0 1 2 3

30b) If you disagreed with the previous statement, please indicate whom you think the State favors:

31) Do you think any people or groups have been excluded from the Neuse River management process?

YES NO (skip to **Question #32**)

31b) Who has been excluded?

31c) Why do you think these people/groups were excluded? (check all that apply)

- They were too controversial
- They lacked initiative to get involved
- They were unaware of the process
- They didn't think anything would be accomplished
- They lacked technical expertise
- They were deliberately excluded by the State
- They were unable to attend meetings
- Don't know

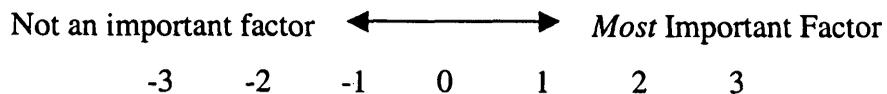
32) Which of the following groups do you think are entitled to be involved in decision-making processes about the Neuse? (check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> residents of the Neuse basin | <input type="checkbox"/> local environmental groups |
| <input type="checkbox"/> recreationists | <input type="checkbox"/> other environmental groups |
| <input type="checkbox"/> discharge permit holders | <input type="checkbox"/> local professional groups
(specify: _____) |
| <input type="checkbox"/> commercial fishers | <input type="checkbox"/> local vacationers |
| <input type="checkbox"/> absentee landowners | <input type="checkbox"/> farmers in the Neuse basin |
| <input type="checkbox"/> developers | <input type="checkbox"/> others (specify: _____
_____) |

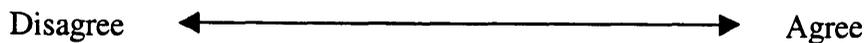
33) Should the opinions of any of these groups be weighed more heavily than others? Please explain:

34) Please list any of the above you explicitly feel should *not* be involved in decision-making processes about the Neuse:

35) How important do you think public opinion should be in the decision-making process?
(circle one)



The management of the Neuse will depend to some extent on what can be learned by developing and applying a series of mathematical water quality models. These models will be cooperatively developed by State scientists, university professors, and scientists from industry. The following statements pertain to your beliefs about these models:



36) I have a good understanding of what a mathematical model is.

-3 -2 -1 0 1 2 3

37) I trust the people developing the model to be unbiased.

-3 -2 -1 0 1 2 3

38) I trust the modelers to use the best science they have available.

-3 -2 -1 0 1 2 3

39) I trust the validity of the output produced by the model.

-3 -2 -1 0 1 2 3

Comments:

Please continue survey on the next page...

The next section is designed to help us understand the things you value and what makes them important to you.

On the chart below, please indicate how important these things are to you, with respect to the Neuse River. If something you value is not listed, please write it in one of the empty boxes at the end of the list:

Please check no more than two in this column!

	Definitely Not Important	Neutral	Somewhat Important	Very Important	MOST Important
40) Clear water					
41) Sandy river bottom					
42) Water safe for swimming and recreation					
43) Good supply of sport fish					
44) Good supply of commercial fish					
45) Waterfront Property					
46) Fair allocation of cleanup costs (see 46b)					
47) Limit development around river					
48) Shellfish beds open for harvest					
49) Pristine ecosystem					
50) Confidence in safety of seafood					
51) No more <i>Pfiesteria</i>					
52) Healthy oxygen levels in river					
53) Protecting animal and plant species for their own sake					
54) Avoiding excessive regulations					
55) Decision-making based on sound					

science					
56a)					

56b) If you indicated that fair allocation of cleanup costs is important to you, please explain in more detail what fairness should entail:

57) Now that you've had a chance to think about some of the things that are important to you, please tell us in a paragraph or so (a) what the river would be like in the *best-case scenario* that you think might be achievable and (b) how you, personally, would benefit if the river were this way.

58) What do you think should be done to make the river more like you've described?

The following demographic information will be used for statistical purposes only:

59) Name (optional): _____

60) Please indicate your age group:

- | | |
|--------------------------------|----------------------------------|
| <input type="checkbox"/> 18-25 | <input type="checkbox"/> 45-55 |
| <input type="checkbox"/> 25-35 | <input type="checkbox"/> 55-65 |
| <input type="checkbox"/> 35-45 | <input type="checkbox"/> over 65 |

61) What is your occupation? _____

62) Please indicate the highest grade you have completed:

- | | |
|--|---|
| <input type="checkbox"/> less than 8 th grade | <input type="checkbox"/> some college |
| <input type="checkbox"/> some high school | <input type="checkbox"/> college degree |
| <input type="checkbox"/> high school graduate | <input type="checkbox"/> graduate work |

Would you would like to receive a copy of our final report?

- Yes (please fill in your name and address below)
 No

Name: _____

Address: _____

Thank you very much for your input! Is there anything else you would like to tell us? Please use the rest of this page and the back of the survey for additional comments.

