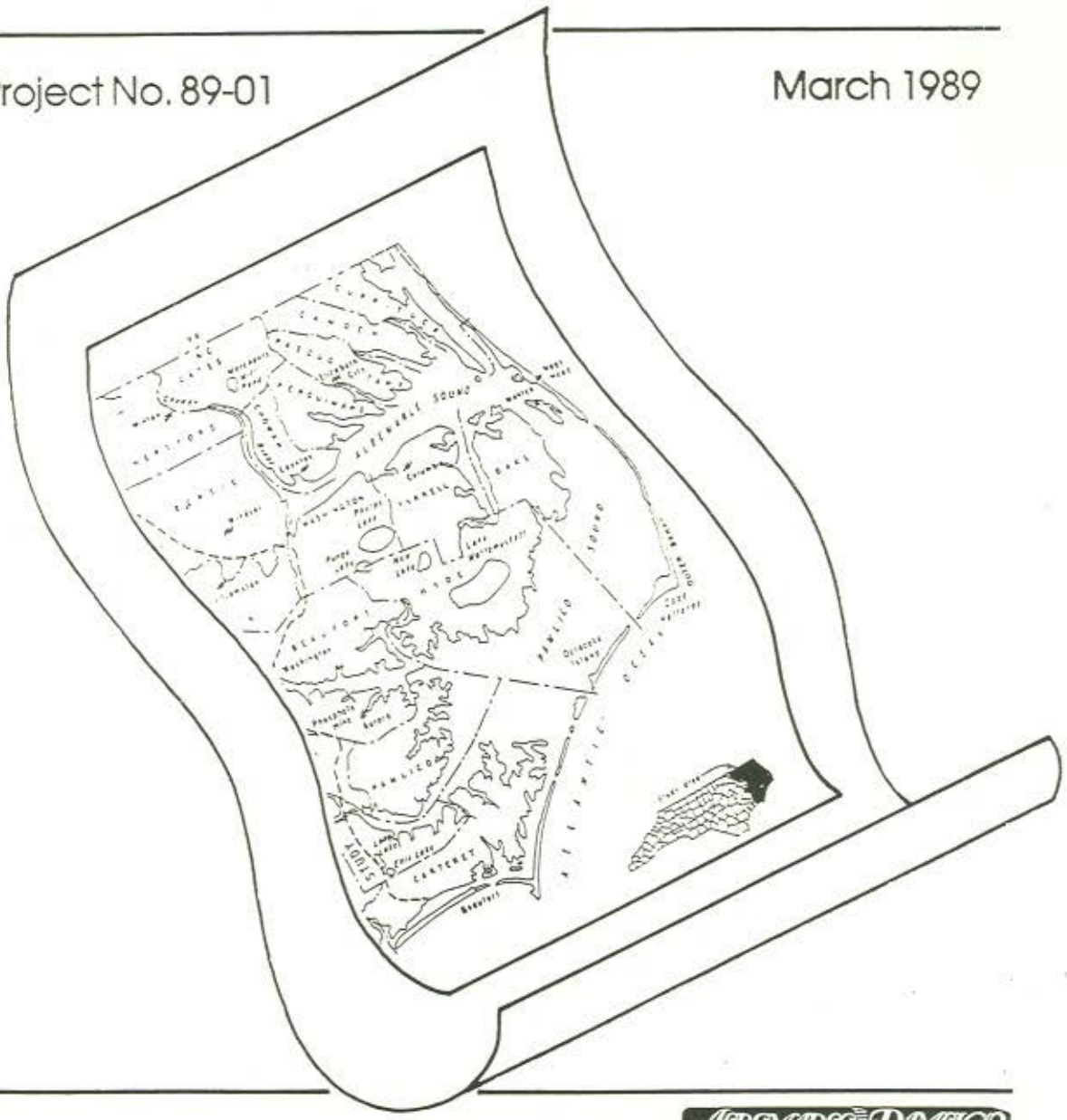
PROGRESS REPORT FOR 1989

Project No. 89-01

March 1989



Funding Provided By
North Carolina Department of Natural Resources and Community Development
Environmental Protection Agency National Estuary Program

ALBEMARLE-PAMLICO

THE ALBEMARLE-PAMLICO ESTUARINE STUDY

PROGRESS REPORT FOR 1989

by

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Program Director

March 1989

A/P Study Project No. 89-01

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INTRODUCTION

The Albemarle-Pamlico Estuarine Study (A/P Study) is jointly funded by the State of North Carolina and the Environmental Protection Agency and is intended to effectively manage valuable resources in the major estuaries of northeastern North Carolina. It combines information acquisition with development of potential management alternatives to ensure the long-term productivity of these estuarine waters.

The A/P Study area encompasses approximately 30,880 square miles including northeastern North Carolina and southeastern Virginia (Figure 1). This includes five rivers (Chowan, Roanoke, Alligator, Pamlico and Neuse Rivers) and four sounds (Currituck, Albemarle, Pamlico and Core Sounds). Some of the most productive nursery areas in the world are found within the Albemarle-Pamlico estuarine system. The system has the second largest surface water area in the United States and some 92 percent of the fish caught in North Carolina come from these waters. Albemarle and Pamlico Sounds are the key regional resources base for commercial fishing, tourism, recreation, and resort development in North Carolina.

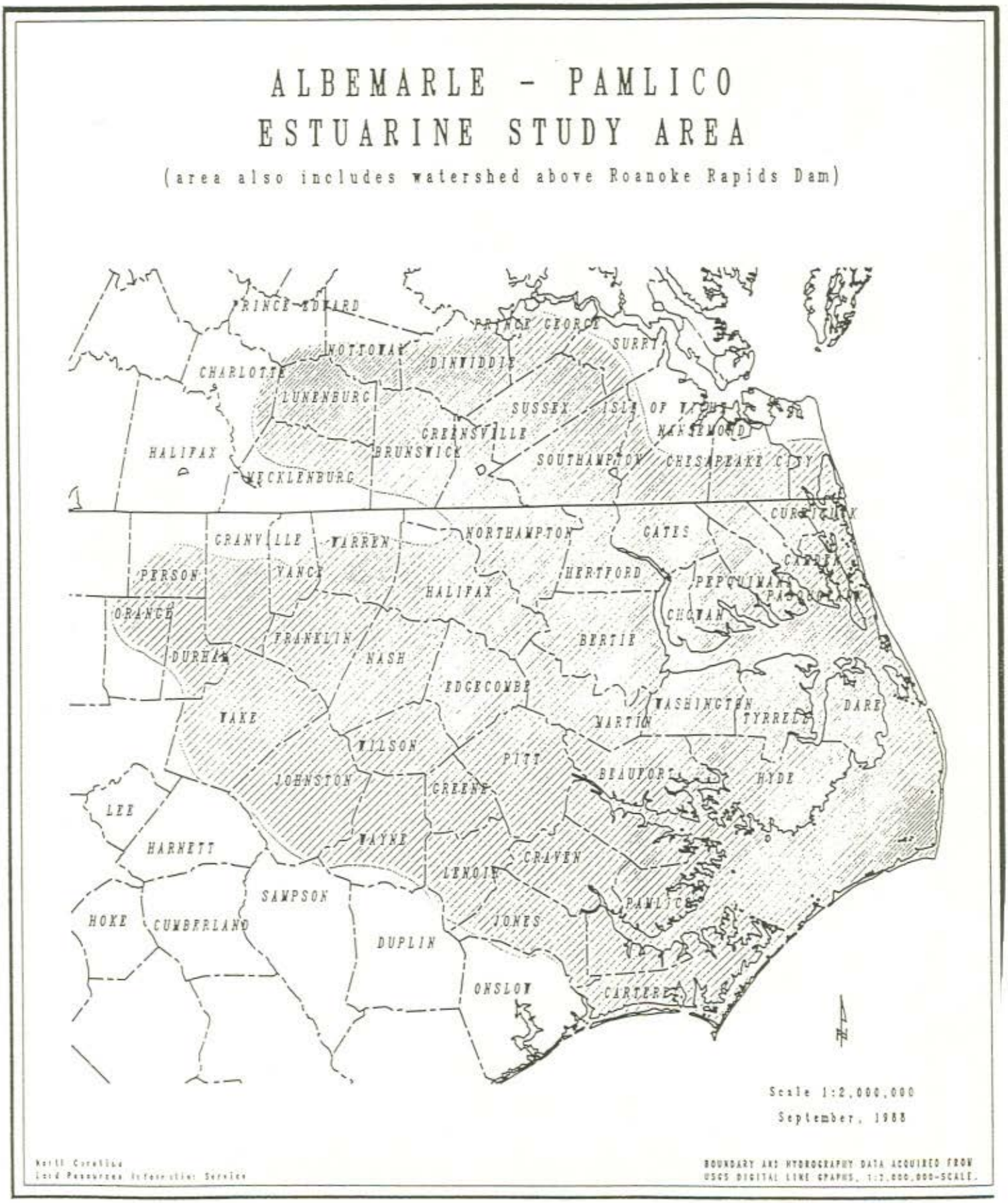
Although these estuarine areas do not display the severe problems evident in some other areas, similar warning signals are present. General declines in finfish fisheries have occurred since 1980. Outbreaks of fish diseases like red sore disease and ulcerative mycosis, crab diseases and large-scale fish kills have occurred throughout the region. Massive blooms of blue-green algae typically occur each year in tributaries of the sounds. Also, the disappearance of rooted aquatic plants from the central part of the Pamlico River appears to be similar to disappearances in other more troubled estuaries.

The A/P Study is funding information gathering efforts intended to allow better understanding of the estuarine system and management of these vital resources. Scientists are examining environmental problems to identify relationships with human activities in the watersheds draining into the sounds. These human activities include farming, land-clearing/drainage, waste disposal, urbanization and habitat conversion. Other funded projects examine the processes contributing to the problems and the best management strategy to allow continual vitality of these rich natural resources.

In addition to information gathering efforts by social and environmental scientists, the A/P Study is supporting the establishment of a geographic information management system (information that is graphically displayed), so that policy and management decisions can be based on the best available information. Finally, program funds are used to encourage public participation efforts.

The Albemarle-Pamlico Estuarine Study represents a unique opportunity for a partnership of scientists, resource managers, elected officials and citizens. By working together we can protect our natural heritage and ensure the long-term productivity of these estuaries and the established human uses they support.

FIGURE 1. A/P Study Area



PROGRAM MILESTONES AND GOAL

The Albemarle-Pamlico Estuarine Study (A/P Study) has 20 milestones to achieve in order to complete the Comprehensive Conservation Management Plan (CCMP) by November, 1992. These milestones were laid out as part of the Designation Agreement between the State of North Carolina and the Environmental Protection Agency in October, 1987 for participation in the National Estuary Program. Seven purposes as defined in the 1987 Clean Water Act amendments will be fulfilled. The Study plans to meet all of these milestones; however, based on the evolution of the program up to the present time, some timing of certain milestones have been modified (Figure 2). There are two key milestones which all the others revolve around; these milestones are the Status and Trends Document (STD) and the Comprehensive Conservation Management Plan (CCMP). The STD is the foundation for the CCMP; therefore, without good information to develop the STD, the management strategies established in the CCMP will not be valid. This is why the information acquisition portion of the Study is so important to the success of the entire program.

The A/P Study goal is to enable resource managers to better preserve the productivity of the estuarine area by expanding relevant knowledge about the impact of human uses upon its physical, biological and social systems. To accomplish this goal consensus building must be started in Phase I (development of the CCMP) by researchers, resource managers, legislators, local government leaders and the general public in order to enter the most important part of the Study which is Phase II. This second phase is the actual implementation of the CCMP. If consensus is not accomplished when the CCMP is complete, then Phase II may not be realized.

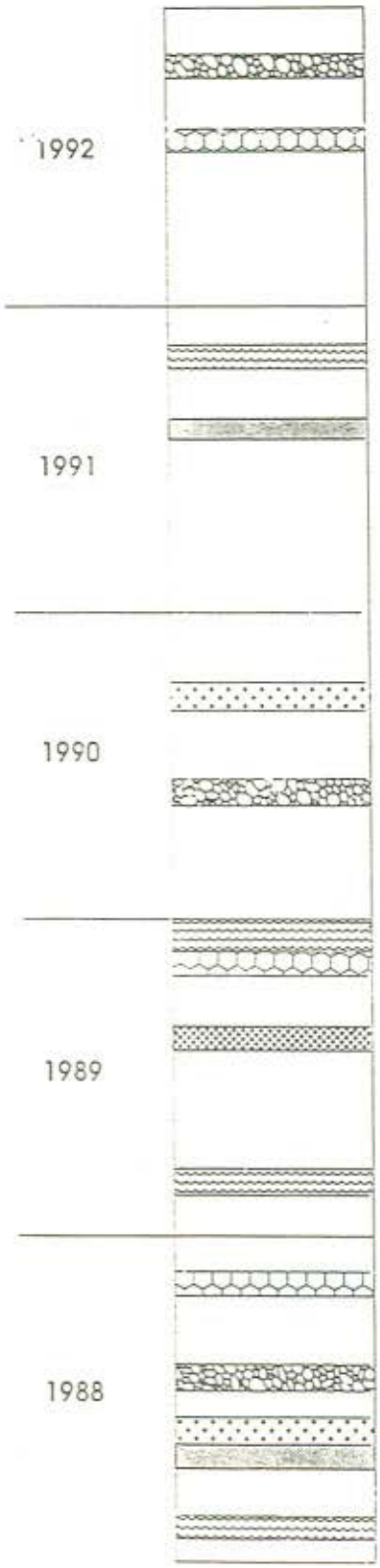
INFORMATION ACQUISITION

Technical information acquisition portion of this study amounts to more than 60 percent of the annual funded effort so far. Many information gaps still remain in what is already known about the estuarine system. By answering questions concerning the four key categories of resource critical area, water quality, fisheries and human environment, a more complete picture of the internal workings of the estuarine system emerge and allow resource managers to make wiser decisions as to the best management strategies to implement. The A/P Study's priority environmental concerns which include decline in fisheries productivity, fish disease/toxicants, anoxia-related fish kills, changes in distribution patterns of aquatic sessile organisms, impairment of nursery area function, eutrophication, habitat loss and shellfish closure all fall within the four key categories.

During FY 1987 there were thirteen projects funded compared to twenty projects funded during FY 1988. However, nine of the twenty second-year projects are continuations from the first year and include projects No. 205, 206, 207, 208, 213, 227, 235, 260, 274 (Table 1). These FY 1988 projects breakdown into critical area (4); fisheries (4); water quality (11); and human environment (2). All A/P Study projects are funded only for a one year period with annual reviews to determine merits of continuance.

Figure 2. A/P Study Milestones

ALBEMARLE-PAMLICO ESTUARINE STUDY MILESTONES



Final CCMP (Nov.)

Institution/Financial Commitment (Aug.)

Draft CCMP (Jan.)
Federal Inconsistencies Alternatives (Jan.)

Compliance Schedule of Action Plan (Nov.)

Final Status/Trends Report (Oct.)

Monitoring Long-Term Management Effectiveness (July)

CCMP Outline Defined (Management Strategies & Cost Evaluation (Jan.)
Federal Consistency Report (Dec.)
Schedule Data Management Activities (Dec.)
Status/Trends Scoping (Probable Causes) (Sept.)
(Loading/Fate)
Inventory of Relevant Federal Programs (Sept.)
Data Base Priorities (Feb.)

Priority Environmental Concerns (Dec.)
Key Data Resources (June)
Federal Agencies Contribution (April)
Design Baseline Monitoring Programs (March)
Existing Monitoring Programs (Jan.)

Inventory Federal/State Programs (Dec. 1986)

TABLE 1. FY 1988 INFORMATION ACQUISITION PROJECTS

Topic Area	NO.	Title	Researcher	Institution
Critical Area	203	Regional Inventory & Protection Plan for Critical Natural Areas, Wetland Ecosystems & Endangered Species Habitats	Roe	Parks/NRCD
Critical Area	235	Continuation/Analysis of Pamlico Sound & Albemarle Sound Nursery Area Data	Noble	DMF/NRCD
Critical Area	260	Continuation/Environmental Determination of Oyster Success in the Pamlico Sound	Sutherland	Duke
Critical Area	272	Mitigation for the Losses of NC Bay Scallops to the 1987-88 Red Tide Outbreak	Peterson	UNC
Fisheries	236	Continuation/Scoping Study of Data Requirements for Fisheries Stock Assessment in NC	Phalen	DMF/NRCD
Fisheries	269	Continuation/Abundance & Viability of Striped Bass Eggs Spawned in the Roanoke River/1989	Rulifson	ECU
Fisheries	270	Food & Feeding of Larval Fishes in the Lower Roanoke River & Western Albemarle Sound	Rulifson	ECU
Fisheries/ Water Quality	278	Water Quality as a Function of Discharge from the Roanoke Rapids Reservoir During Hydropower Generation & Abundance & Viability of Striped Bass Eggs	Rulifson	ECU
Water Quality	205	Continuation/Eutrophication & Nuisance Algal Blooms/AP Estuary	Paerl	UNC
Water Quality	206	Continuation/Evaluation of Off-Site Changes in Hydrology & Water Quality Resulting from BMPs in the A/P Region	Bales	USGS
Water Quality	207	Continuation/Compilation & Analysis of Existing Hydrologic & Water Quality Data, APES	Bales	USGS
Water Quality	208	Continuation/Determination of Flow & Flow Patterns in the Pamlico & Neuse River Estuaries	Bales	USGS
Water Quality	213	Continuation/Reduction of Estuarine Nutrient Loadings: N & P Removal in Coastal Swamps	Kuenzler	UNC
Water Quality	227	Continuation/Heavy Metal Pollutants in Organic-Rich Muds of the Neuse River	Riggs	ECU
Water Quality	232	Albemarle-Pamlico Sound Coupling Study	Pietrafesa	NCSU

TABLE 1. FY 1988 INFORMATION ACQUISITION PROJECTS
(continuation)

Topic Area	NO.	Title	Researcher	Institution
Water Quality	250	Shell Disease in Blue Crabs, Callinectes sapidus in the A/P Estuary	Noga/Engel	NCSU/NMFS
Water Quality	256	Effects of Water Management & Land Use Practices on Hydrology & Water Quality in the A/P Region	Skaggs	NCSU
Water Quality	274	Continuation/Hyde County Soil Survey	Pierce	NRCD/SCS
Human Environment	242	NC Estuaries: A Pilot Study for Managing Multiple Use in the State's Public Trust Waters	Clark	NCSU
Human Environment	279	Evaluation of Environmental Management & Resource Protection Programs in the A/P Region	Nichols	RTI

NRCD - NC Dept. of Natural Resources & Community Development
Duke - Duke University
UNC - University of North Carolina
ECU - East Carolina University
USGS - U. S. Geological Survey
NCSU - North Carolina State University
RTI - Research Triangle Institute
NMFS - National Marine Fisheries Service

Any continuation project must submit a new proposal request during the call for proposal period. Continuation and new proposals are evaluated as equals utilizing the established review process and technical merit relevant to the Study needs.

Previous and ongoing projects have yielded significant information. Highlights of this information are presented for each of the four key categories being addressed by the Study.

Critical Resources Areas

High quality aerial photography has been obtained of submerged aquatic vegetation (SAV) from Bogue Inlet north along the Outer Banks to Oregon Inlet. The amount of SAV here is estimated to be 200,000 acres or about equal to the amount of salt marsh statewide. Five percent of the acreage has been precisely mapped.

A survey of physical obstructions to spawning anadromous fish stocks revealed 71 obstructions. About half are dams providing zero upstream access but most of the remainder are roadway culverts which are designated as constrictions which may or may not preclude fish movement.

Another project has identified potentially viable new oyster habitat in areas of the estuary and at greater water depths previously believed unsuitable. A pilot demonstration is proposed for funding this coming year to test these areas. Also, a successful method has been shown to accelerate recovery of scallop beds decimated by the 1987 red tide event.

Fisheries Dynamics

Roanoke River striped bass egg viability surveyed in the spring 1988 was the best since 1972. This favorable response was attributed to good water quality and optimal flow regime maintained from the Roanoke Rapids Reservoir. An evaluation of various fish trawl excluder devices concluded that the Florida Fish Excluder is the best of those devices tested for reducing the unwanted juvenile finfish by the Pamlico Sound shrimp fishery.

Water Quality

Eutrophication studies within the mesohaline (medium salinity) reaches of the estuary are finding the limiting nutrient for algal stimulation varies seasonally. The damaging "red tide" dinoflagellate blooms have not reappeared since the invasion of these organisms to the Pamlico Sound from the Gulf Stream in 1987.

A comprehensive inventory of all existing hydrology and water quality studies in the Albemarle-Pamlico Study area has been completed. Sediment maps of the Pamlico Sound estuaries showing the horizontal distribution of heavy metals and phosphorus reveal interesting patterns and can be compared to available historic data.

Human Environment

An ongoing demographic project has categorized the significant population growth since 1980 into recreational housing categories and visitation factors. Another project produced a model to assist resource managers in determining the economic value of recreational fishing from improved water quality.

The examples of research efforts given above are just a sample of the twenty ongoing information acquisition efforts. Many of the projects final reports will be due before the end of 1989.

PUBLIC INVOLVEMENT

The public participation portion of the A/P Study is probably the most important long-term effort to inform and build public/local government support of the program. All public participation projects revolve around the Public Involvement Plan which will be finalized by the Citizens' Advisory Committees during March, 1989. The plan's objectives are to provide timely information about the Sounds and progress being made in the A/P Study; to expand educational programs to inform the public about the values and importance of good management; to ensure that the interested public has ample opportunity to participate in the development of the CCMP; and to initiate a process for involving local elected officials in the Study.

There were eight projects funded in 1987 and seven projects in 1988 (Table 2). However, many other projects are undertaken by the A/P Study staff.

All projects fall under the three headings of education/information (printed material, non-print media and special events), public participation/hands on activities and local government liaisons. All three areas are being addressed with special emphasis on local government liaison in 1989. Extramural funding for these activities will roughly double from 1988 funding.

INFORMATION MANAGEMENT

The Land Resources Information Service (LRIS) is under contract with the A/P Study to carry out the information management aspect of the Study. Progress in specific areas of information management will be described in this section.

The upgrade of the information management computer system to support the initial requirements of the Albemarle-Pamlico Estuarine Study has been completed. This included data ports, memory, disk drive and central processing unit upgrades to the existing LRIS system.

Information management is in the final stages of a comprehensive data needs assessment for the Albemarle-Pamlico Estuarine Study. The purpose of the data

TABLE 2. FY 1988 PUBLIC INVOLVEMENT PROJECTS

Topic Area	NO.	Title	Researcher	Institution
Public Participation	113	State of the Estuary Booklet	Okun/Tursi	UNC/WSJ*
Public Participation	176	Videotape and Slide Show	Smith	ECU*
Public Participation	209	From Sound to Sea: Journey of the Striped Bass	Conoley	Aquarium
Public Participation	224	Guide to Streamwalking: Estuarine Companion	McNaught/Gale	PTRF
Public Participation	225	Community Education Outreach	McNaught/Stroud	PTRF
Public Participation	226	Educational Calendar: 1990	McNaught/Nurnberg	PTRF
Public Participation	240	Teacher Environmental Education Program	Carson	ECSU
Public Participation	266	The State of the Estuary: TV Public Service Announcement Campaign	Willard	Willard
Public Participation	277	Citizen Monitoring: A/P Estuary	McNaught/Perlic	PTRF
Public Participation	---	Freestanding Exhibit/Tour	Staff	A/P Study
Public Participation	---	First Annual Meeting	Staff/CAC	A/P Study
Public Participation	---	Newsletter (three issues)	Staff	A/P Study
Public Participation	---	Fact Sheet/Glossy Brochure	Staff	A/P Study

UNC/WSJ - University of North Carolina and Winston-Salem Journal
ECU - East Carolina University
Aquarium - NC Aquarium Society
PTRF - Pamlico-Tar River Foundation
ECSU - Elizabeth City State University
Willard - Lib Willard Productions
A/P Study - Albemarle-Pamlico Estuarine Study

*Projects carried forward from FY 1987 funding

needs assessment is to use a structured methodology to identify the data needs of resource managers and researchers, to document those needs in the form of data base and software specifications, and to supply recommendations for implementation. The data needs assessment team conducted more than 50 interviews with more than 100 people representing federal, state, and local government agencies and university researchers. The resulting data have been compiled and a draft report is due the end of February. A data inventory, including both geographic and tabular data sets, is also being developed through the data needs assessment and will be implemented by the newly hired data manager.

The information management coordinator position was finally filled in March, 1989. After seven long months the five-member search committee was able to hire Charles Nilsson, formerly of Environmental Systems Research Institute, the creators of the ARC/INFO software utilized by LRIS, to fill this vital position. The timeframe of hiring a data manager appears to fit well with the completion of the Data Needs Assessment by LRIS in late February. Mr. Nilsson's first task will be to schedule the data management activities (a milestone due in December, 1989) based on the results of the Data Needs report.

A preliminary list of data items that are generally recognized as required for the Albemarle-Pamlico Estuarine Study has been developed. Considerable progress has been achieved toward incorporating available data into the information management system. Data that are available or in the final stages of development include hydrography (surface water), general soils associations, primary and secondary nursery areas, shellfish growing areas, oyster cultch sites, point source dischargers, ambient and biological monitoring stations, 1980 population census, and water supply intake locations. Data that are currently being developed include NC Division of Environmental Management stream classifications, the U.S. Geological Survey "LUDA" land use, and 1970 population census.

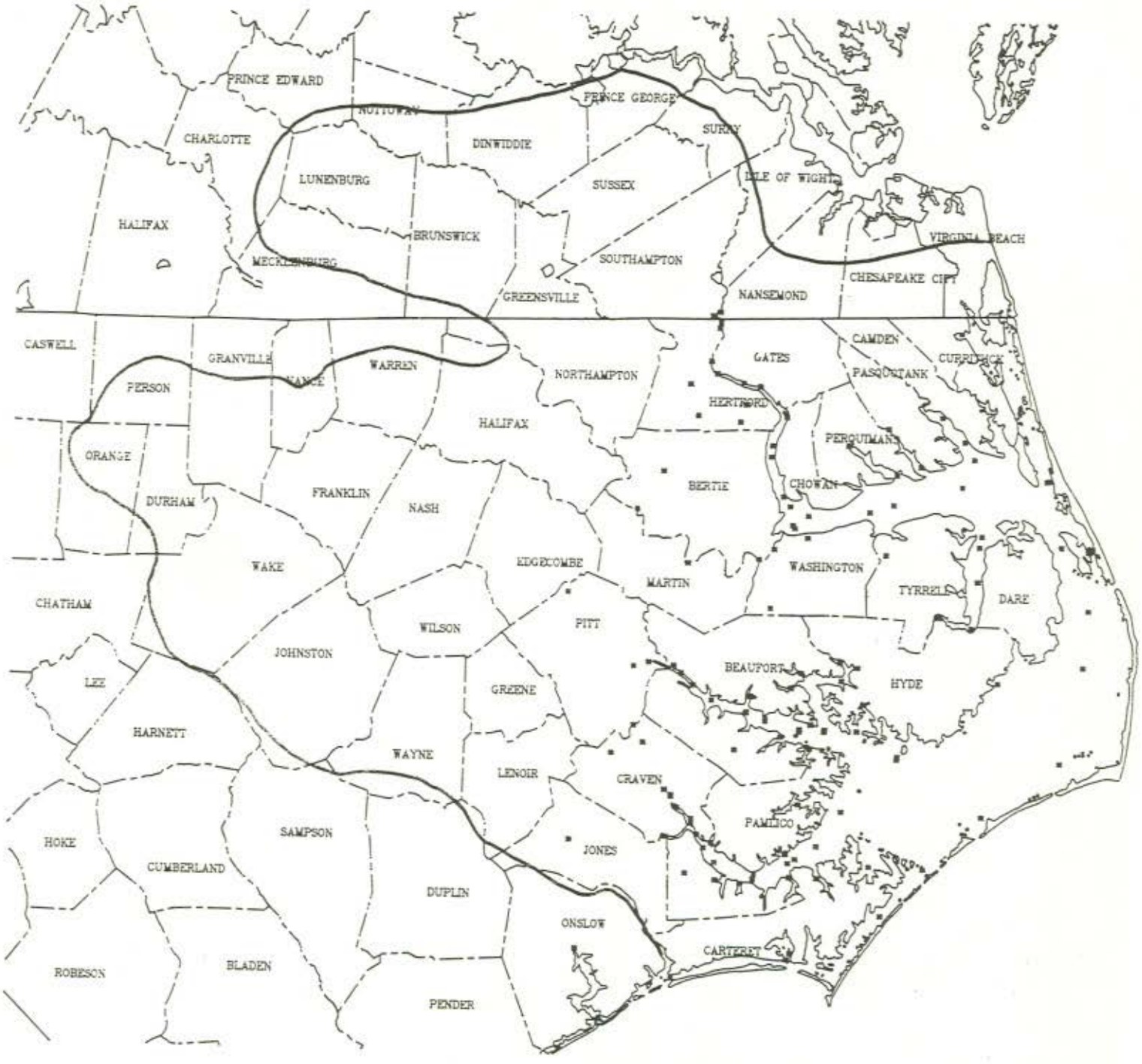
MONITORING

The Albemarle-Pamlico Estuarine Study's monitoring plan was completed in March, 1988, and implemented in October, 1988, to expand the state's baseline monitoring in order to evaluate long-term management effectiveness. This plan has six components to achieve the two stated goals. These components include synoptic water quality evaluation, expansion of existing Division of Environmental Management (DEM) ambient water quality sites in the A/P Study area from 74 monitoring sites to 99 sites, survey of sediment cores, evaluation of fish tissue toxics, determine biological oxygen demand of key marina areas, and establish 40 open water continuous monitoring sites maintained by the U. S. Geological Survey (USGS) (Figure 3).

In addition, funded priority action projects will be monitored in order to determine the effectiveness of the specific management strategy. Please refer to the next section on priority action plans for more information on this subject.

Figure 3

ALBEMARLE-PAMLICO ESTUARINE STUDY



Water Quality
Monitoring Stations

Scale 1:1,800,000

11

March, 1993

N.C. Land Resources Information Servi

PRIORITY ACTION PLANS

Priority action supplemental funds have been provided to the A/P Study in FY 1988 and are available in FY 1989 as supplemental funds and based on individual project merit in competition with projects from the other twelve National Estuary Programs. These funds are provided to estuarine programs to demonstrate management strategies that have the potential to be effective measures for the entire study area, possible national application and can be incorporated into the Comprehensive Conservation Management Plan (CCMP). All priority action projects have a A/P Study requirement of the grant recipient providing 25 percent matching funds toward the project. No other National Estuary Program has been funded to date for demonstration of agricultural best management practices besides the A/P Study.

The FY 1989 priority actions slated for funding include five projects ranging from urban best management practices to shellfish enhancement. Specific projects include an urban stormwater control project in the City of Greenville, agricultural animal waste management, enhancement of oyster cultch planting program, and reestablish depleted scallop grounds.

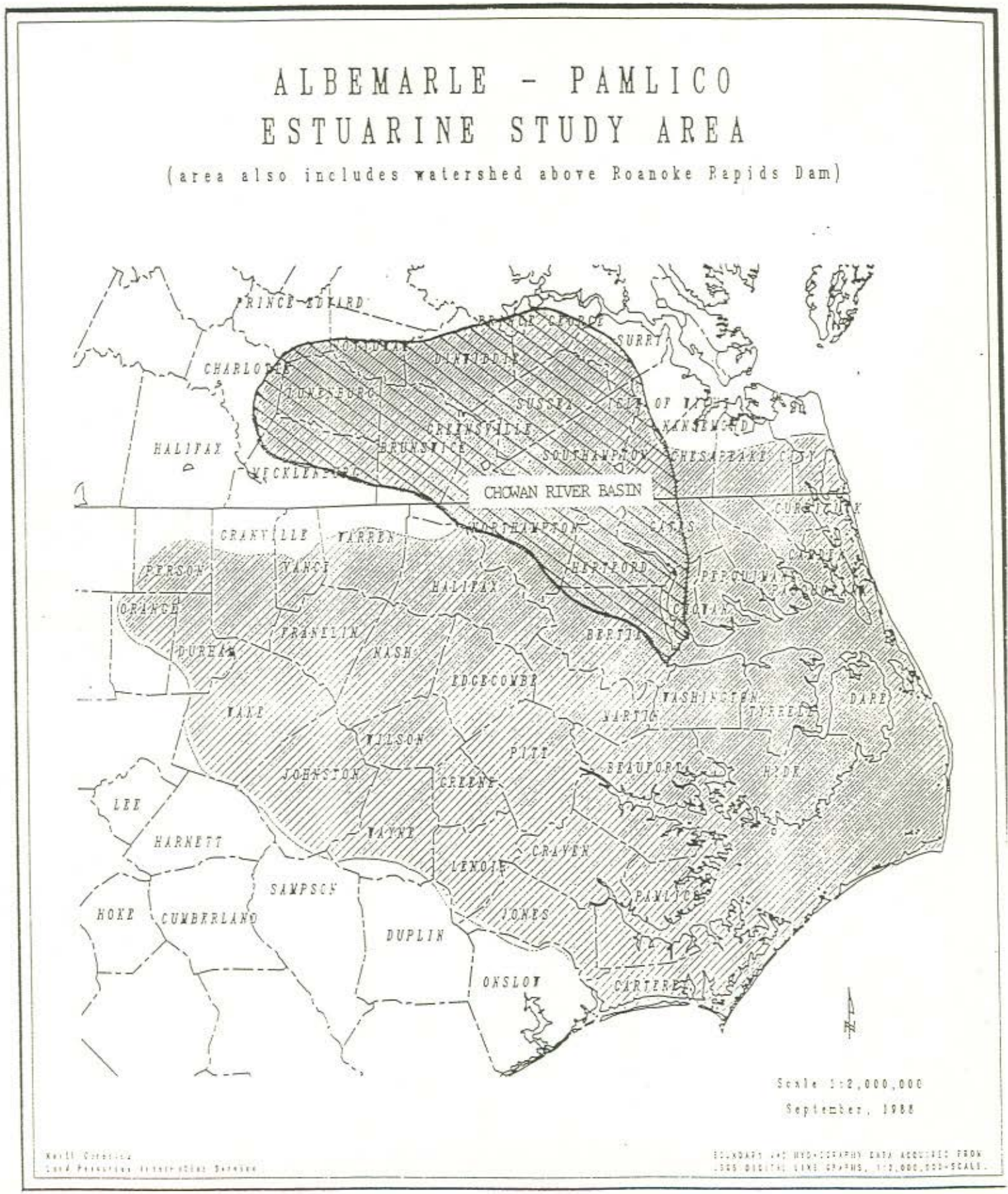
Funds provided in FY 1988 are being utilized to implement agricultural best management practices with waste management in the Bennett's Creek watershed of Gates County. This watershed has experienced waste management problems in dealing with animal feed lots. The second project is an alternative to one previously proposed because many basic logistical questions could not be answered in the earlier proposal. This alternative project is a joint effort between the Virginia and North Carolina Division's of Soil and Water Conservation to establish best waste management practices in the Chowan River Basin which includes both states (Figure 4). Agricultural waste management problems have been identified in the Chowan Basin by both state's environmental agencies.

BUDGET

The A/P Study budget is funded each year primarily from funds provided by the Environmental Protection Agency's (EPA) Office of Marine and Estuarine Protection to the Department of Natural Resources and Community Development and the State of North Carolina through an appropriation. There is a required 25 percent match of all EPA funds made available to the Study. NRCD will provide the 25 percent match with the state appropriation except in the case of early implementation projects in which the grant recipient will provide the 25 percent matching funds. Additional funds are provided by various federal agencies that directly participate in the Program. Funds obtained from the two main sources are listed below for the last three years.

Year	North Carolina	EPA
1986	$ 16,000	$ 350,000
1987	500,000	685,000
1988	500,000	1,625,000

Figure 4. Priority Action Project



The base budget for 1988 (Table 3) was $1,425,000; however, there were two supplemental funds of $350,000 for baseline monitoring and $350,000 for priority action projects. These additional supplemental funds made available by EPA exhausted our 25 percent cash match and other sources of "in-kind" match were required.

The projected base budget for 1989 (Table 4) is $1,700,000; however, there is only one supplemental fund for priority action projects and none available for monitoring this year. Implementation projects submitted by the twelve National Estuary Programs to EPA will be judged on a competitive basis. Therefore, the amount of supplemental funds provided by EPA for 1989 is unknown at the present time.

PUBLICATIONS

The publications list (Table 5) includes completed information acquisition reports, public participation activities, program documents and has more than doubled from last year (8 to 20). Most of these documents are available except for a few information acquisition reports that are due in final form from the author(s). There are quite a few projects from the first year's funding that will be due in the next few months. These additional reports should number between five and eight. Please contact the program office to obtain a current publications list.

EVENT SCHEDULE

The Albemarle-Pamlico Estuarine Study has established the administrative boards' annual meeting schedule, one year in advance to promote better attendance, coordination and communication among the four committees (Table 6). This 1989 schedule revolves around the funding year selection process and EPA's deadline for submission of a proposed budget package.

Table 3
ALBEMARLE-PAMLICO ESTUARINE STUDY
Budget: FY 1988
Review and General Breakdown

I. Existing Funding Sources

$ 700,000	EPA FY 1988 Funds
225,000	EPA FY 1987 Supplemental Funds
500,000	State of North Carolina Funds
$1,425,000	Total

II. Possible Supplemental Funding Sources

$ 350,000	EPA FY 1988 Possible Supplemental Funds (Monitoring Effort)
350,000	EPA FY 1988 Possible Early Implementation Funds
$ 700,000	Total

III. Base Budget Breakdown

Item	Cost	Percent	Guideline
A. Administration	$ 250,000	15.9	(15)
B. Information Management	164,000	10.5	(15)
C. Public Participation	168,698	10.7	(10)
D. Technical Info. Acquisition	986,065	62.9	(60)
Total	$1,568,763	100.0	

Table 4
ALBEMARLE-PAMLICO ESTUARINE STUDY
Proposed Budget: FY 1989
Review and General Breakdown

I. Existing Funding Sources

$1,200,000	EPA FY 19890 Funds
500,000	State of North Carolina Funds
$1,700,000	Total (Base Budget)

II. Possible Supplemental Funding Sources

~$ 500,000	EPA FY 1989 Priority Action Plan Funding [Clean Water Act Section 205(1)]*
~$ 500,000	Total

III. Base Budget Breakdown

Item	Cost	Percent	Guideline
A. Administration	$ 287,317	16.9	(15)
B. Information Management	165,000	9.7	(15)
C. Public Participation	234,527	13.8	(10-20)
D. Technical Info. Acquisition	1,013,156	59.6	(60)
Total	$1,700,000	100.0	

*Further details of the five Priority Action Plans proposed are in a separate supplemental budget package.

TABLE 5. ALBEMARLE-PAMLICO ESTUARINE STUDY PUBLICATIONS LIST
March 1989

No.	Abbreviated Title	Author/Editor	Status
86-01(I)	Existing Management Programs	Brower (UNC)	Available
87-01(P)	Source Document	Rader et al. (A/P Study)	Available
87-02(P)	Work Plan I	Rader et al. (A/P Study)	Available
87-03(I)	Proceedings: Modeling Workshop	Stewart/Duffy (WRRI/SCI)	Available
87-04(I)	Proceedings: Remote Sensing Workshop	Stewart (WRRI)	Available
87-05(I)	Proceedings: Fish Disease Workshop	Stewart (WRRI)	Available
87-06(P)	Citizens' Monitoring Pilot	Lekson (PTRF)	Available
88-01/02(P)	Baseline Monitoring Network	Rader et al. (A/P Study)	Available
88-03(P)	Citizens' Guidebook	Kennedy (NC Coastal Federation)	Available
88-04(P)	Status Report: March 1988	Rader (A/P Study)	Available
88-05(P)	Beaufort County Magazine	Rader (A/P Study)	Available
88-06(I)	Water Quality/Hydrology Bibliography	Bales (USGS)	Available
88-07(I)	Red Tide Persistence	Tyler (Versar)	Draft Stage
88-08(P)	Project Abstracts for the Period 1987-89	Holman (A/P Study)	Available

(I) Information Acquisition Documents
(P) Public Participation/Program Documents

TABLE 5. ALBEMARLE-PAMLICO ESTUARINE STUDY PUBLICATIONS LIST
March 1989
(continuation)

No.	Abbreviated Title	Author/Editor	Status
88-09(I)	Turtle Excluder Device	Pearce/Street (Mariners' Marine/DMF)	Gone to Print
88-10(I)	Submerged Aquatic Vegetation (Eastern)	Ferguson (NOAA)	Draft Stage
88-11(P)	Can Albemarle and Pamlico Be Saved?	Taylor (Wildlife of NC)	Available
88-12(I)	Obstructions to Anadromous Fish Migration	Collier (US F&WS)	Draft Stage
88-13(I)	Value of Recreational Fishing in A/P Estuaries	K. Smith (NCSU)	Draft Stage
88-14(I)	Analysis of Fringe Wetlands in A/P Sounds	Brinson (ECU)	Draft Stage

(I) Information Acquisition Documents
(P) Public Participation/Program Documents

Table 6

ALBEMARLE-PAMLICO ESTUARINE STUDY SCHEDULE - 1989

Date	Event
January 13, 1989	Review of Proposals (submittal due date)
February 7-9, 1989	CAC Meetings to Evaluate Specific Proposals
February 21, 1989	Technical Committee Meeting to Consider Subcommittees' Proposal Recommendations
February 27, 1989	Roundtable Meeting of All Committees
February 28, 1989	Policy Meeting to Consider Technical Committee's Proposals and Annual Budget Recommendations
March 3, 1989	Return Selected Proposals to Authors for Revisions
March 17, 1989	Revised Proposals to Director/Subcommittees
April 7, 1989	Final Proposals to EPA for Approval
April 24-26, 1989	CAC Meetings
May 10, 1989	Technical Committee Meeting
July 1, 1989	Projected EPA Award of Funding
August 7-9, 1989	CAC Meetings
August 22, 1989	Technical Committee Meeting
August 30, 1989	Roundtable Meeting of All Committees
August 31, 1989	Policy Committee Meeting
September 14, 1989	Annual Researchers Review Workshop
September 19, 1989	Technical Review Subcommittee Meeting
October 6, 1989	Annual Public Meeting
November 6, 1989	Technical Committee Meeting
November 21, 1989	Policy Committee Meeting