MINUTES
ALBEMARLE-PAMLICO ESTUARINE STUDY
DECEMBER 15, 1987

RALEIGH, NC

Technical Committee

At 10:15 a.m., Co-chairman Bruce Barrett called the meeting to order (agenda/Attachment A). He welcomed new members Bobbye Jack Jones (USSCS), Ernie Larkin (Pamlico CAC) and John Stallings (Albemarle CAC). He gave official notice of the replacement of Jim Graham by Tom Ellis (NC Dept. of Agriculture), Bill Austin by David Sides (NC Div. of Soil and Water Conservation), Col. Paul Woodbury by Larry Saunders (USA COE), Charles Fullwood by Dick Hamilton (NC WRC), and Michelle Hiller by Mark Alderson (USEPA-OMEP). In addition, he welcomed a representative from EPA Region III (Philadelphia), Mr. Tom Henry for Al Morris. Dr. Doug Rader, project director, introduced new program staff member Ms. Joan Giordano (public involvement coordinator).

Dr. Ernie Carl reported on the results of the October 20, 1987 Policy Committee meeting. The most significant action at that meeting was the specific charge from the Policy Committee to the Technical Committee to become more active to implement the program within guidelines established by the Policy Committee. Dr. Carl also noted the expansion of the Policy Committee to include Dr. Parker Chesson (chairman, Albemarle CAC) and Mr. Derb Carter, Esquire (chairman, Pamlico CAC). He suggested that if the CAC's are represented on both Policy Committee and Technical Committee, so should the Technical Committee. Dr. Rader read the resolution as passed by the Policy Committee.

> "The Technical Committee is hereby directed to take a stronger role in the day-to-day management and operation of the Albemarle-Pamlico Estuarine Study to fulfill their role as the major, working level committee to implement Policy Committee directives."

Ms. Mike Gantt (Policy Committee representative) stated that the intent was to rejuvenate the Technical Committee.

Dr. Rader than summarized the other actions taken by the Policy Committee:

1) the designation agreement was approved and signed;

2) Virginia is to be more fully included;

3) early milestone of a baseline monitoring plan must be achieved by March (draft as Attachment B);

4) Technical Committee attendance: replacement after three consecutive meetings except for emergencies; and

5) next meeting will be in late winter/early spring.

Copious discussion followed on the significance of the delegation that had occurred. Mr. Paul Wilms stated that day-to-day management of the program was the director's business, it had been conducted appropriately and should continue to be.

He moved that day-to-day management actions be delegated to the project director. Mr. Dick Hamilton seconded.

Dr. Mike Orbach questioned whether the Technical Committee really has final approval power for all expenditures, even within general Policy Committee guidelines. Mr. Barrett asserted that the Technical Committee does, pending Policy Committee guideline changes. Dr. Rader was requested to amend the administrative procedures to reflect this modified Technical Committee/Policy Committee relationship. Dr. Orbach stated that he believes the Policy Committee is still in the loop on all major actions. Mr. Dave Owens suggested that a clear delineation of duties and authorities is required.

Mr. Dave Owens moved that Mr. Wilm's motion be tabled. Mr. Jim Stewart seconded. Motion carried.

Dr. Rader presented a program status report. Major points included:

1. BUDGET

   A) All cooperative agreements were ultimately approved as requested, except for 5% of the total EPA funds withheld from the NRCD-EPA agreement (total EPA commitment of $685,000 instead of $700,000).

   B) Approximately $50-70K of planning year funds remain to be spent; they should be dedicated by July 1, 1988.

2. TECHNICAL

   A) Technical review subcommittee should be formed and the process established for 1988 funding. Technical subcommittee goals would be to revise the work plan and develop methodology and milestones to get 1988-89 funds out effectively.

   B) A Principal Investigators meeting is needed for late winter to clear up confusion.

   C) Supplemental EPA 1987 funds are anticipated, at least $225,000 and possibly more.

   D) Fish & Wildlife Service is bringing in ~$200,000 extra to pay for National Wildlife Inventory completion in North Carolina.

   E) NASA funds have been applied for to pay for land-use database development with the University of North Carolina ($500,000+/3 years).

3. INFORMATION MANAGEMENT

   A) Position will be established by early spring.

B) LRIS is moving forward to develop RFP's and identify data needs.

C) A comprehensive data management plan needs to be formulated from the workplan concept by a new Information Management Subcommittee.

4. PUBLIC INVOLVEMENT

A) Joan Giordano began work in November 1987.

B) About 200+ people attended the November 14 meeting in Elizabeth City.

C) CAC meetings are planned for January 19 (Pamlico CAC) and March 2 (Albemarle CAC).

D) Funded projects are progressing.

E) Newsletter in process; logo being developed.

5. CALENDAR OF EVENTS (Attachment C)

Mr. Owens requested a status report on funded projects routinely at each Technical Committee meeting, to also include a summary of funding sources and upcoming events.

Dr. Carl reported on an exchange of letters with the US Army Corps of Engineers (see Attachment D). The status of Corps participation is uncertain. Dr. Orbach asked if we should leave the COE relationship at that, or whether the Technical Committee should ask Policy Committee members to make contacts to encourage active Corps participation. It was agreed that Corps participation is vital, and Technical Committee members were urged to use their connections to urge an active role for the Corps.

Action Items

Dr. Rader introduced a series of action items, as follows:

1) Startup money for Dr. Stan Riggs (ECU): $6,000

Action: Dr. B. J. Copeland moved approval for immediate action, with the same total cost. Mr. Tom Ellis seconded. Motion passed unanimously.

2) Expansion of Dr. Dave Adams' budget to cover Ms. Judith Gale instead of a research assistant: $15,000

Action: Mr. Dick Hamilton moved approval. Mr. Jim Turner seconded. Dr. Copeland requested additional information about changes in timing or scope of work. Mr. Wilms stated that we should not pay more for the same product--we are paying for Dr. Adams' name, not the specific research assistant. Dr. Rader argued that a known, high-quality researcher would generate a much better product quicker in this important area. Mr. Owens stated that these institutional investigations rarely yielded actionable results that we don't already know, and he was skeptical of the value of increased funding. Mr. Stallings moved to table, but the motion died for

want of a second. Dr. Orbach offered a substitute motion, to approve use of $7,500 as originally proposed, but for staff to get complete justification from Dr. Adams before funding the remainder. Mr. Stallings seconded. Motion failed: 4 in favor/8 opposed. Mr. Wilms offered a substitute motion, to approve the $7,500 immediately, but to require Dr. Adams to submit a detailed justification in writing or in person for consideration at the next meeting. Dr. Copeland seconded. Motion passed unanimously to become the main motion. Main motion passed unanimously.

3) Replacement of funds lost to EPA cuts to Dr. Gary Smith (ECU): $10,000 + $1,500 still intact.

Action: Mr. Wilms moved approval, with the proviso that CAC direction and approval be included. Dr. Orbach seconded. After discussion, Mr. Barrett called the question. Motion carried, with dissent by Dr. Copeland.

4) Rapid Response on Red Tide

Dr. Rader presented a summary of knowledge to date on the red tide dinoflagellate, Ptychodiscus brevis ravaging our coast. He stated that two rapid response projects might be in order. He suggested that procedures for rapid response needed to be developed, but that action in this case was appropriate before such procedures were finalized.

A) Rick Stumpf/Dr. Pat Tester (NOAA/NMFS) had suggested that for $5-6K remotely sensed data could be used to identify and track the high algal density water mass from Florida, and to serve as a sentinel for the future (see Attachment E).

B) Dr. Mary Tyler (Versar) had suggested that the persistence and potential recurrence could be evaluated for about $70K (see Attachment F).

Action: Ms. Sharon Shutler stated that she would work with Drs. Tester and Stumpf to bring a proposal for funding at the next meeting. Dr. Copeland moved that the committee authorize up to $25,000 to be spent with the help of an ad hoc subcommittee to address the question of persistence/recurrence, as soon as possible. Dr. Orbach seconded. Motion passed unanimously. Chairs appointed Dr. Copeland, Ms. Shutler, Dr. Hogarth as committee members, to receive input as well from DEM, EPA, and UNC staff.

Dr. Copeland moved that in rapid response situations the direction could authorize up to $10K to be spent, with the approval of the co-chairmen, to address cause/effect relationships. He withdrew his motion in order to allow rapid response procedure formulation on a programmatic basis.

SUBCOMMITTEE FORMATION

Dr. Carl reviewed the need for standing subcommittees, to include Monitoring, Technical Review, and Information Management. He stated that a Standard Operating Procedures subcommittee was also needed. He stated that before Technical Committee members left, they should leave their requests for

subcommittee assignment. Mr. Owens suggested that a Citizens' Involvement subcommittee was needed and that eventually an implementation committee would be required. Dr. Carl proposed that five subcommittees be appointed: Monitoring, Technical Review, Information Management, Standard Operation Procedures Subcommittee, and Citizens Affairs. Dr. Copeland moved that slate. Mr. Ernie Larkin seconded. Mr. Barrett expressed his confusion about the role of the Citizens Affairs subcommittee, in light of the CAC's existence. Dr. Copeland suggested that his way there was a formal mechanism to allow the CAC's to be heard. Dr. Orbach called the question. Motion passed unanimously.

Dr. Carl asked for suggestions about the next meeting date. He suggested about every three months. He next meeting was scheduled for February 10 in Beaufort.

Chair entertained a motion to adjourn. Motion passed by acclamation. Meeting was declared adjourned at 12:15 p.m.

(Dr. Rader distributed other information, as attached.)

DNR:kn

Attachments

Attachment A

Agenda

ALBEMARLE-PAMLICO ESTUARINE STUDY

Technical Committee

December 15, 1987

Governor's Press Room - Administration Building
116 W. Jones Street, Raleigh, NC

10:00 - 10:05	Welcome New Technical Committee members seated	Ernie Carl/Bruce Barrett
10:05 - 10:15	Report on Policy Committee Meeting of October 20	Staff
10:15 - 10:30	Program Status Report Budget Technical Projects Information Management Public Involvement	Staff
10:30 - 11:00	Fiscal Action on Previously Approved Projects Riggs' startup money Adams' expansion Smith's funding Stumpf's proposal Tyler's proposal	
11:00 - 12:00	Subcommittee Formation and Goals Monitoring Technical Review Information Management	
12:00 - 1:00	Lunch	
1:00 - 4:00	Subcommittee Meetings	
4:00 - 5:00	Reports of Subcommittees	
5:00	Adjournment	

RALEIGH ATTENDANCE 12/15/87 TC

NAME	AFFILIATION	PHONE
DOUG BADER	APES/NRCD	733-0314
Ted Bisterfeld	EPA, Region IV	404/347-2126
Jim Turner	USGS	919-856-4510
Fred White	NRCD DFR	919 733 2162
R. Paul Wilms	NRCD - DEM	919-733-7015
MIKE ORBACH	ECU/MARINE SCIENCE COUNCIL	(919)757-6853
Tom Ellis	NC Dept. of Agriculture	(919) 733-7125
James Stewart	WRRI	(919) 737-2815
David W Sides	NRCD_Soil & water	(919) 733-2302
Bobbye Jack Jones	USDA-Soil Conservation Service	(919) 856-4210
Ernie Larkin	Pamlico Cit Adv Comm	(915) 551-4485
B J Copeland	UNC Sea Grant	(919) 737-2454
Terry Sholar	N.C. Marine Fisheries	(919) 946-6481
RICHARD HAMILTON	WILDLIFE COMM.	3-3391
Ernie Carl	NRCD	733-4984
Bruce Barnett	EPA	404/347-4450
John W. Stallsmith	CAC - Albemarle	919/ 394-2183
Thomas Henry	EPA - Region III	215/597-8243
Joan Giordano	APES	919-946-6481
J.H. Stutts	Albemarle CAC	919-398-3525
Tom Gray	Pamlico CAC	919-828-9874
Dawn M. Parks	E.C.U.	919-752-4286
Mark Cantrell	Pamlico CAC	919-833-4859
Mike Gantt	FWS	919 856-4520
JERAD BALES	USGS	919-856-4791
David Owens	DCM-DNRCD	919 733-2293
Sharon Shuttle	NOAA	

Attachment B

BASELINE MONITORING PROGRAM

ALBEMARLE-PAMLICO ESTUARINE STUDY

As part of the negotiated designation agreement between the U. S. Environmental Protection Agency and the Albemarle-Pamlico Estuarine Study, a milestone of March, 1988, was identified for a final baseline monitoring plan to be completed. This program is anticipated to be ready to be implemented beginning in April, 1988. The following plan resulted from the combined expertise of appropriate state and federal agency staff (US EPA, USGS, US NOAA, NC APES, NC DEM, and NC DMF), and represents probably the most comprehensive baseline program ever implemented in the Southeastern U. S. The component parts are carefully tailored in response to EPA guidance to

- construct a comprehensive baseline dataset to characterize the water quality, sediment and biological resources of the Albemarle-Pamlico system, basinwide;
- evaluate the spatial and temporal heterogeneity inherent in parameters of concern in this system, to allow adequate evaluation of temporal trends in historical and APES-generated datasets;
- evaluate and characterize episodic events of great concern (fish kills, anoxia, etc.) which currently escape systematic review;
- provide ground-truth and calibration to remotely sensed water quality datasets expected to be used to validate land use/land cover-driven watershed models and to understand large-scale hydrologic phenomena; and
- be used to develop by November, 1992, a continuing monitoring program which is intended to evaluate the long-term status of this important estuarine system.

This baseline monitoring program is being designed at the specific request of EPA, in response to the Office of Marine and Estuarine Protection's interpretation of Clean Water Bill requirements. We, therefore, request additional supplemental funds to help activate this program at this time. Considerable cost-sharing by program collaborators (especially USGS) has been included to maximize the return from this effort.

PROGRAM COMPONENTS

The comprehensive baseline monitoring plan presented here has six principal components:

- continuous monitors for specific parameters sited at locations of known importance or risk;
- synoptic water quality studies basinwide, with emphasis on open water areas previously poorly known;

- o one-time surveys of sediment and fish tissue toxicants;
- o expansion in time and space of the existing ambient water quality monitoring network, especially into open water areas;
- o emergency response capability to chronicle episodic events;
- o initial implementation of a trained citizen's monitoring program.

Each of these components is critical to the adequate characterization of the dynamic parameters of greatest concern in this system.

Continuous Monitors

Albemarle-Pamlico Estuarine Study has already funded initial flow evaluations in the Pamlico and Neuse River tributaries, being conducted collaboratively with USGS. This work includes twelve continuous tide gauging stations and twelve additional water quality stations (see attached map). These water quality stations originally were intended to measure only temperative and conductivity at various depths, to allow salinity evaluations. However, these stations provide a useful opportunity to add additional instrumentation at relatively low cost and monitor water quality as well.

The rationale behind a system of continuous water quality monitors is linked to the nature of the significant problems in this system. The major parameters of concern at this time are nutrient concentration, dissolved oxygen concentration, algal pigment concentration (chlorophyll a), suspended sediment concentration and salinity. Many of these, but particularly nutrient concentration, dissolved oxygen concentration varies 100%+ over the course of minutes and sometimes tens of meters. All existing systematic monitoring programs completely miss this level of variation, is both time and space. In fact, the diurnal minimum for dissolved oxygen occurs in the early morning when water quality samples are generally sleeping. Similarly, vertical stratification changes are completely missed by single depth or even top and bottom sampling -- changes in the depth of the anoxia zone can go completely undetected (e.g. the Chesapeake anoxia work).

Furthermore, a real-time capability is needed in this system to allow cueing of emergency response and synoptic studies. Punch-tape reading backlogs easily, and long delays in data availability can be avoided by the use of data collection platforms (DCPs) on a portion of the stations. DCPs have the further advantage that data is continually available from the receiving computer in Columbia, S.C., already processed, to any researcher or program person with an interest.

The minimum number of continuous monitoring units needed for such a network in this complex system is forty. This number is composed of 12 existing stations in the Pamlico and Neuse Rivers (USGS), 3 additional in the Pamlico (northshore and farther east of existing station), 2 additional in the Neuse (Street's Ferry Bridge and eastward of existing stations), 12 stations in the Chowan, Albemarle Sound, Alligator River and Currituck Sound), one each in Croatan and Roanoke Sounds, 6 in outer Pamlico Sound and Core Sound, and three in the Pungo River.

Each station will be equipped with two four-channel units, to measure dissolved oxygen at four depths, temperature at two depths and conductivity at two depths. Half of the stations will be equipped with DCPs; the remainder will be read by punch tape at USGS. Because of the extreme vulnerability of the equipment to the elements and vandalism, we will rent all of it from USGS. Rental fees of approximately $80/unit and $80/DCP include all maintenance and replacement costs.

Each of the existing USGS stations will require only an additional unit with four channels to accommodate dissolved oxygen measurements.

The total cost of this equipment rental is as follows:

12 stations with one added unit @ $80/month	= $ 960/month
28 stations with two added units @ $160/month	= $4480/month
20 stations with DCPs @ $80/month	= $1600/month
	$7040/month

$7040/month X 12 months = $84,480/year

The USGS costshare for installation, replacement service, manual reading of half of the stations, data processing, etc. will run approximately $6000 for installation and maintenance for 28 additional stations plus $2000/station for 12 previously funded stations for a total of $192,000.

A problem exists with current technology for long-term success of oxygen electrodes in estuarine situations. Fouling becomes a serious problem, and biased readings can result. Work conducted by Dr. Rick Luettech at the University of North Carolina Institute of Marine Sciences and Dr. Joe Ramus and Dr. Bruce Kenny at Duke University Marine Laboratory demonstrates that reliable data can be attained. In fact, Drs. Ramus and Kenny have developed a new oxygen electrode which is virtually disposable. We believe this represents a major breakthrough in continuous monitoring, and expect to take advantage of their excellent work. A netting and calibrational exercise must be conducted however before standard electrodes can be replaced on the continuous monitors. Drs. Ramus and Kenny have proposed to conduct this work, to devise appropriate dissolved oxygen community metabolism models and to deliver those products as a functional dissolved oxygen system with replaceable electrodes for about $50,000, capable of reporting community oxygen metabolism and its correlates. (The technology development process is complete to date, and no patent rights would accrue to the program.)

The total cost of the development and implementation of the expanded continuous monitoring system then is $326,000, of which the EPA share is $134,400.

Synoptic Water Quality Studies

The amount of water quality data available from the Albemarle-Pamlico system is large, yet relatively little is available from the open water parts of the system. Virtually nothing is known about spatial heterogeneity in water quality parameters throughout the basin. The staff working group strongly recommends conducting at least one synoptic study of all portions of the

system to characterize baseline variability. Forty continuous sampling points is grossly inadequate to address spatial variability. Without adequate information on spatial variability, no time series data (historical or APES generated) can be properly analyzed or understood.

A secondary benefit is the calibration of remotely sensed water quality data, both NOAA AVHRR satellite images (to be obtained from NOAA's Rick Stumpf for approximately $5000 for 1987 images, pending Technical Committee approval) and Landsat TM images which have been proposed to NASA for funding (approximately $540,000 over two and a half years). The NASA work will address land use/land cover from a Geographic Information System perspective, and will calculate watershed and subwatershed loadings of sediment and correlated constituents based on the Universal Soil Loss Equation. It will also allow 30m resolution for certain water quality parameters (temperature, suspended sediment, algal pigments and probably salinity), but must be calibrated by real-time "ground" data. The proposed synoptic study will be scheduled to coincide with the satellite pass in order to accomplish both goals. We expect to use continuous monitor data to cue the synoptic study, to guarantee that representative seasonal conditions exist.

Consultation with the Division of Environmental Management personnel who conducted similar limited studies on the Chowan/Albemarle and on the Neuse suggest that the cost for a one-day, systemwide synoptic water quality survey will run approximately $80,000. More than one survey should be scheduled, to demonstrate that the chosen sampling time is not in someway unique, to account for seasonal variability and to provide a safety factor should conditions preclude effective satellite imaging. However, to keep this request to target levels only one study is proposed: other study funds will be used to repeat the process later, as such funds become available.

Total cost, therefore, is $80,000.

Fish Tissue and Sediment Surveys

Sediment contaminant concentration is very poorly known. Preliminary evidence suggests that "hotspots" exist, yet their locations are poorly defined. Furthermore, experienced staff members believe that strong differences in physical composition of the sediment (even across relatively short distances like the north and south shores of the Pamlico River) may be partly or mostly responsible for differences in frequency of anoxia events in those areas. Subsequent work on sediment oxygen demand will probably prove necessary -- siting of proposed discharges could be dramatically affected.

Occasional intensive surveys of fish tissue and sediment contaminants have been conducted in the past, yet no systemwide baseline evaluation has ever been conducted. DEM staff feels very strongly that fish tissues and sediments best reflect this total loadings of toxic substances, integrating variable water concentrations over both time and space. In addition, the potential exists for recreating an unknown past by vertically partitioning sediment cores, especially where industrial markers are present (e.g. Texasgulf and the Pamlico). Preliminary data from upstream in tributaries shows some surprisingly high concentrations of pesticides: a survey is distinctly needed to fill in this blank spot in our knowledge of this system.

This work will couple nicely to current work being conducted in liaison with APES by FWS on a baseline contaminants study of the Albemarle-Pamlico Peninsula and the counties north of Albemarle Sound (fish, reptiles, birds). Biological monitoring staff consulted believe fish tissue work can be done for about $2000/site. Careful scrutiny of water quality station locations and previous tissue programs suggest that 20 sampling locations will be adequate for first-order characterizational work. The total cost of tissue studies, then, is about 20 X $2000/site = $40,000.

Expanded Ambient Water Quality Network

The existing ambient water quality monitoring network maintained by DEM is exceedingly sparse in some areas of the study region, especially the open water. In most cases former ambient stations exist, but the State of North Carolina has been unable to afford to keep them up. The working groups determined that a significant advantage could be gained by reestablishing a portion of the former stations to allow more complete characterization on conditions in the Sounds on an ongoing basis. The existence of historical data from particular stations is a criterion in the selection of stations for reactivation, as is evenness and completeness of coverage. Previous transect-arranged sampling in Albemarle Sound and the Neuse River has been exceedingly valuable. New stations will probably be transect arranged, in the rivers of highest concern, to correspond with continuous monitoring stations. This arrangement would maximize data utility. The recommended expansion is 60 additional sites, mostly concentrated in the Pamlico River, Neuse River and Albemarle Sound. (Approximately five sites would be run on each of four transects in each of the three basins). A two member water quality monitoring team could run those transects and have the samples analyzed for approximately $180,000 per year.

The total cost of an expanded ambient monitoring network is, therefore, $180,000.

Experience with previous sediment sampling in the region suggests that forty sites will be adequate to construct a first-order map of sediment contaminant concentration. Work currently under way by Dr. John Wells at University of North Carolina on physical sediment dynamics will be combined with knowledge of point source locations and nonpoint source concentrations to select specific site. Not all sites will correspond with water quality stations, but proximately to water quality stations will serve as a site selection criterion.

The cost per station for this work is estimated at $1,000. The total cost is 40 X $1000 = $40,000.

Emergency Response and Episodic Event Monitoring

A severe problem exists in the capabilities of NRCD regional staff to respond to episodic events (fish kills, algae blooms, "dead water", spills, etc.) Oftentimes considerable time elapses before any response can be made to citizens' complaints or reports of such events. For that reason (as well as change through time in reporting, recording and responding procedures), virtually all our data on incidences of fish kills and other episodic events is suggestive only. A clear process must be established to monitor and

document these events. Field staff are already badly overloaded, so additional staff is necessary.

We proposed to create a position specifically for emergency response/episodic event monitoring. Not only will this position allow efficient documentation of those events, but it will also expand accountability to the public (as well as provide a replacement for the monitoring team when one member is not present). We estimate the support of such a position would run approximately $50,000 including salary, fringe benefits, travel, telephone, and materials.

Citizens' Monitoring Network

An additional important function of this person will be to coordinate our proposed citizens' monitoring network. Currently, the Pamlico-Tar River Foundation is conducting a scoping study on such networks. We will be ready to implement this program by early spring. We believe the success of the Chesapeake Bay Program Citizens' Monitoring Network speaks for itself: not only can trained citizens using standardized protocols calibrated to state standard techniques (quality assured) provide useful data, they also provide an excellent "streamwatch" capability to fuel the episodic monitoring program described above. The estimated cost of training and equipping about 200 citizen's monitoring groups is about 200 X $200 + $10,000 for other materials = $50,000.

Total Costs

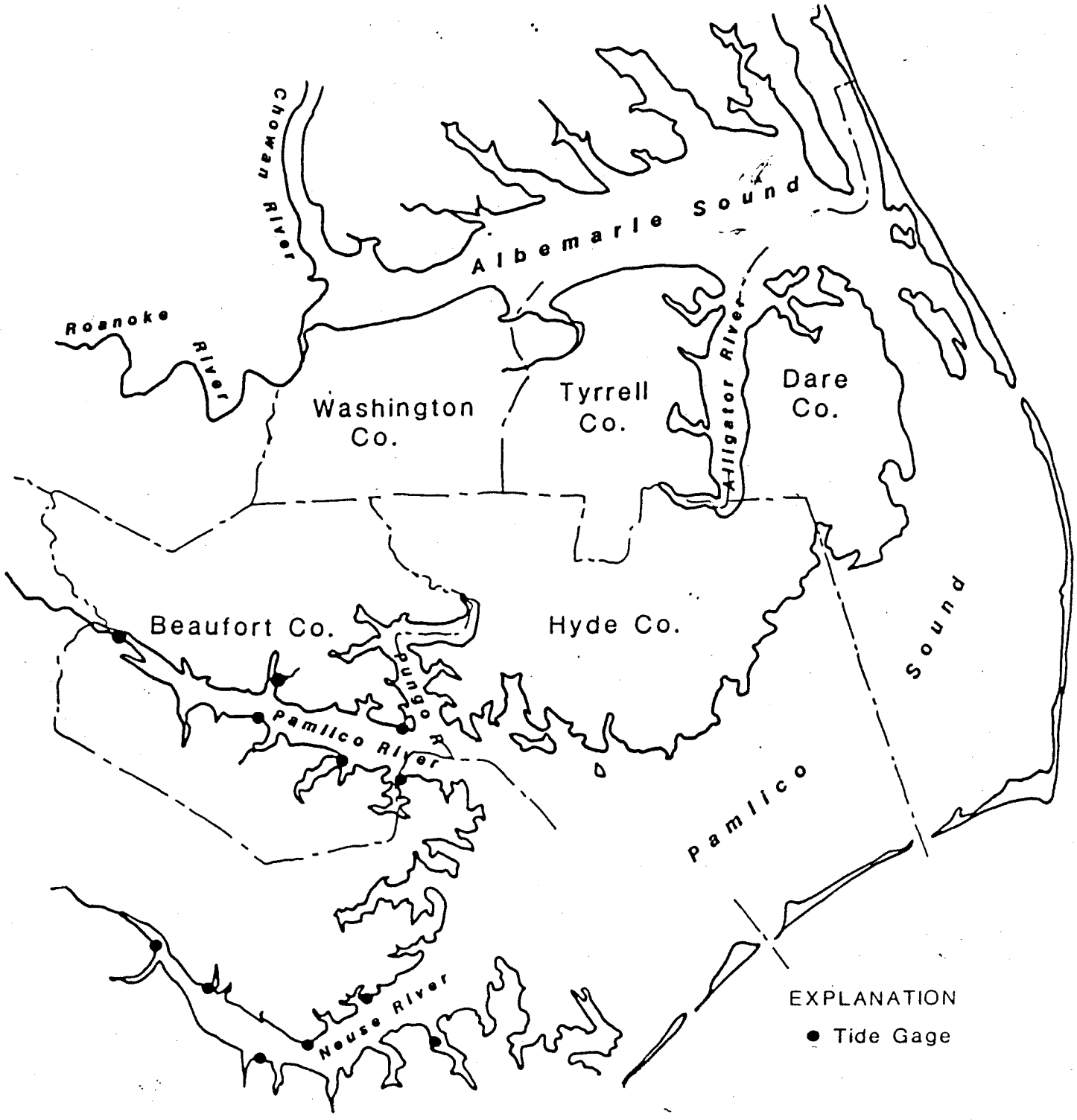
Total funds requested from EPA are shown below:

continuous monitoring network	$ 84,480
dissolved oxygen monitoring development	$ 50,000 *
synoptic water quality study	$ 80,000
fish tissue and sediment surveys	$ 80,000
expanded ambient water quality network	$180,000
episodic event monitoring	$ 50,000 *
citizen's monitoring network initiation	$ 50,000 *
Total Request	$574,480
* candidates for APES program funding	- 150,000
	$424,480
Total program value would be	$574,480
	192,000
	$766,480

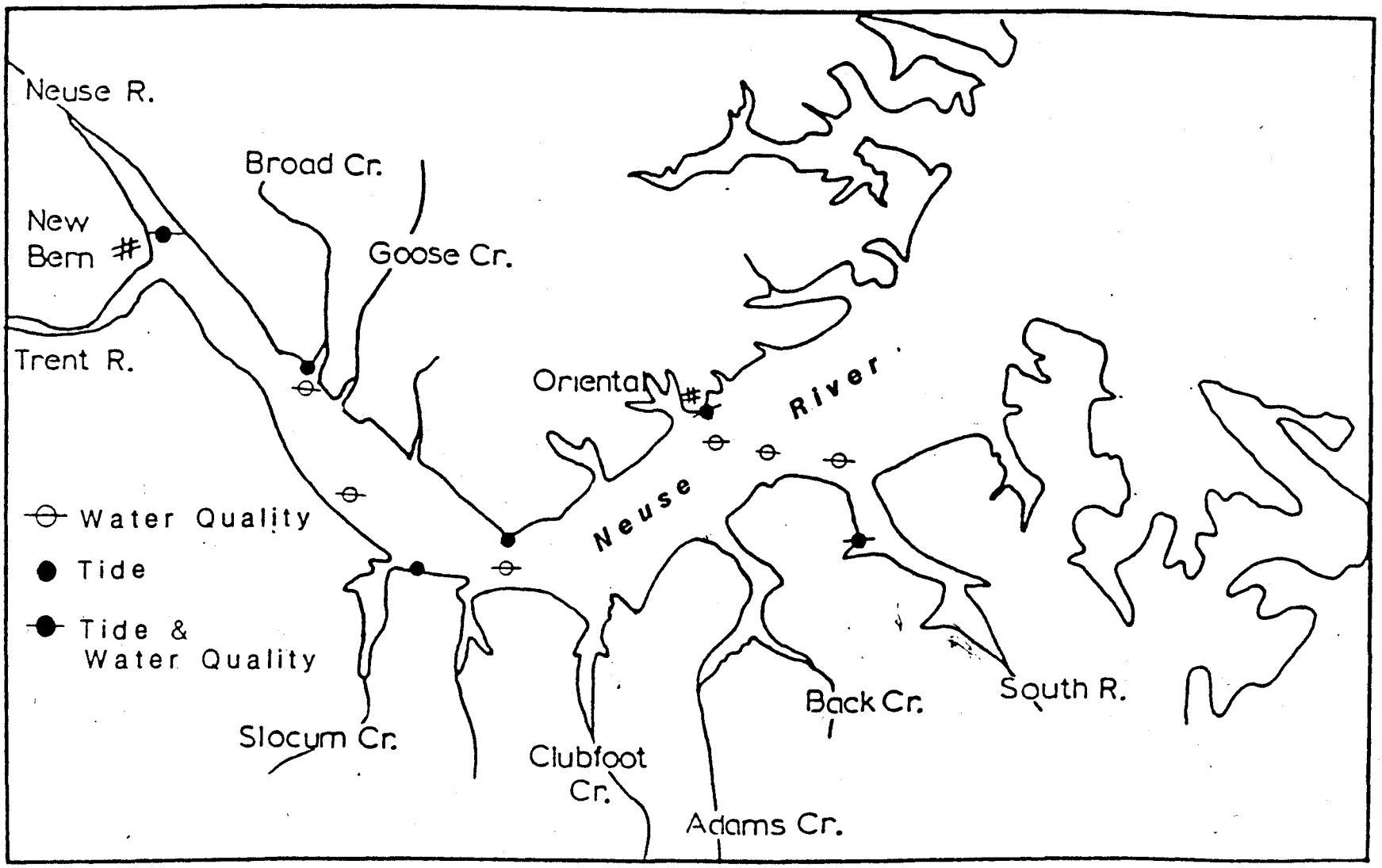
Albemarle-Pamlico Peninsula

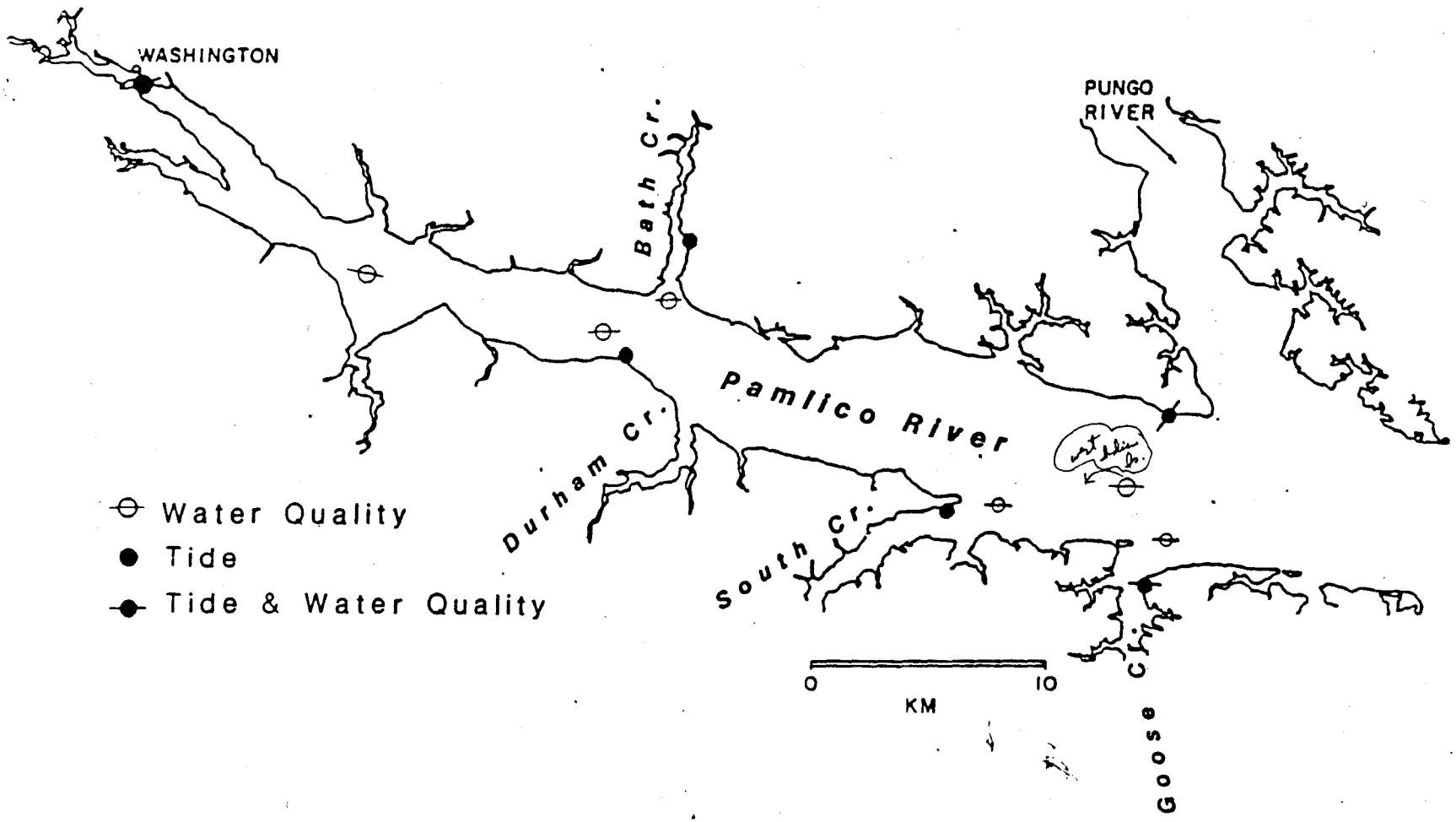
Pamlico and Neuse River Tide Gage Locations

Agricultural-Drainage Study Sites



Neuse River Estuary Tide and Water Quality Stations





Pamlico River Estuary Tide and Water Quality Stations

Calendar

December 14-15	Chesapeake Bay Program Agreement Signing Gala (Baltimore, MD)
December 15	APES Technical Committee meeting (Raleigh)
December 15	Elizabeth City/Pasquotank River Conference Planning Session
January 12-14	Governor's Coastal Initiative Public Hearings (Morehead City, Washington, Manteo)
January 19	Pamlico Citizens' Advisory Committee meeting (Manteo?)
January 19	Elizabeth City/Pasquotank River Conference
January 20-22	Governor's Coastal Initiative Public Hearings
February 9	Albemarle Citizens' Advisory Committee meeting (Currituck County?)

Attachment D

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

December 3, 1987

IN REPLY REFER TO

Planning Division

Mr. S. Thomas Rhodes, Secretary
North Carolina Department of Natural
Resources and Community Development
Post Office Box 27687
Raleigh, North Carolina 27611-7687

Dear Secretary Rhodes:

This is to inform you that I am withdrawing from formal participation in the Albemarle-Pamlico Estuarine Study and am relinquishing my position on the Technical Committee. I do this with regret and am taking this action to allow the committee to select a more active participant in the study. I have tried unsuccessfully to secure support and funding for our participation in the study. I felt we could make a real contribution in development of a regional hydrodynamic estuarine model and a land use data base. However, current policy limits Corps of Engineers study efforts to studies that would lead to high priority outputs in the areas of flood control and/or navigation. My headquarters advised that this limitation applies specifically to Corps participation in your joint estuarine study with the Environmental Protection Agency.

I want to stress that I am taking this action because I don't feel we can participate in a meaningful and professional manner given the policy under which we must currently operate. I personally endorse the estuarine study effort, however, and have high hopes that it may lead to statutory or regulatory guidance that will make the task of water resources management easier for all of us. I also am prepared to share with you any data we may develop as part of our ongoing study of Eastern North Carolina Above Cape Lookout. Please let me know if I may assist you in any way.

Regretfully,

Paul W. Woodbury
Colonel, Corps of Engineers
District Engineer

Copy Furnished:

Commander, South Atlantic Division
U.S. Army Corps of Engineers
510 Title Building
30 Pryor Street, S.W.
Atlanta, Georgia 30335-6801

U.S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

BC: Doug Rader

State of North Carolina
Department of Natural Resources and Community Development
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor

S. Thomas Rhodes, Secretary

December 11, 1987

Colonel Paul W. Woodbury
District Engineer
Wilmington District
Corps of Engineers
Post Office Box 1890
Wilmington, North Carolina 28402-1890

Dear Colonel Woodbury:

I am doubly distressed by your letter of December 3, advising me of your inability to participate in the Albemarle-Pamlico Estuarine Study. This study is a high priority of Governor Martin and Congressman Walter Jones. It is our best hope for rational management of the North Carolina Coast, an effort in which the Corps of Engineers has a large statutory role.

While lack of Corps participation in the regional hydrodynamic estuarine model and the land use data base will cripple our efforts, it is perhaps more damaging that you and your staff will not be able to participate in study management through the Technical Committee.

If there is anything that Governor Martin or I could do to obtain a reversal of this decision, please advise me. If not please let me thank you for your post service on the Committee and assure you we will endeavor to coordinate the study with your office by any means which still remain.

Sincerely,

Tommy Rhodes

S. Thomas Rhodes

STR:su
copy to: Commander, South Atlantic Division
U. S. Army Corps of Engineers
510 Title Building
30 Pryor Street, S. W.
Atlanta, Georgia 30335-6801

U. S. Environmental Protection Agency
Region IV
345 Courtland Street
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Governor James G. Martin
State Capitol
Capitol Square
Raleigh, North Carolina 27611

Senator Jesse Helms
403 Senate Dirksen Office Building
Washington, D. C. 20510

Representative Walter B. Jones
241 Cannon House Office Building
Washington, D. C. 20515

Attachment E

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL ENVIRONMENTAL SATELLITE, DATA,
AND INFORMATION SERVICE
Washington, D.C. 20233

Assessment and Information Services Center
1825 Connecticut Ave. NW rm 517
Washington, DC 20235
(202) 673-5400

25 November 1987

Dr. Jerad D. Bales
U.S. Geological Survey
P.O. Box 2857
Century Postal Station
300 Fayetteville St. Mall
Raleigh, NC 27602

Dear Jerad:

Enclosed are two slides showing reflectance (which can be converted to attenuation or suspended solids). The closeup of the sounds on March 14, was processed the same way as the scenes for April 1 and 10, although they have a different display scheme. Particularly note the variation across Bluff Shoal in Pamlico Sound and between upper and lower Albemarle Sound. These variations have appeared in several of the scenes I've looked at indicating the need for data to compare these areas. The scenes also show a substantial decrease in reflectance (i.e. in sediment load) in both sounds from March 14 to April 10.

A list of partially processed imagery that has minimal cloud cover for 1987 is attached. We may have other cloud free images of the Sounds for 1987, but the data is unprocessed. In general, the quality of the images is good for SST and reflectance, and erratic for water color (relatable to pigments) owing to varying amounts of haze (SST and reflectance are more responsive to haze correction routines). From this data set I could produce images showing mean and variance of reflectance for different months using the images I have available from March to August. These images have already been acquired and partially processed, thereby reducing the effort and cost. The results, namely monthly or bimonthly means and variances could be delivered by March 1. The costs for the work would be on the order of about $5000 for such processing.

Please call if you have additional questions.

Sincerely,

Rick

Richard P. Stumpf, Ph.D.

Partially Processed 1987 images containing minimal clouds over Albemarle and Pamlico Sounds.

Date	Time (EST)
March 06	1430
13	1500
14	1450
22	1505
23	1455
April 01	1500
02	0800
10	1500
13	1430
30	0750
May 09	0755
09	1450
10	1440
18	1455
28	1445
29	1435

Date	Time (EST)
June 01	0800
05	1500
25	1445
July 01	1525
12	0810
18	0740
20	1520
21	0815
22	0755
Aug 09	1505
17	2530
23	0800

Versar INC.
ESM Operations

11 December 1987

Mr. Doug Rader, Project Director
Albemarle-Pamlico Estuarine Study
North Carolina Department of Resources
and Community Development
P.O. Box 27687
Raleigh, NC 27611-7687

Dear Doug:

Following our conversation, I have put together the following work plan. I have been tracking the inoculation of Ptychodiscus brevis into the Pamlico-Albemarle region for the past month, and I am most concerned that this intrusion has most likely established Ptychodiscus in this area as a permanent toxic resident. As you know, my expertise is in the hydrographic mechanisms which introduce red tides into new locations and the mechanisms of encystment of the dinoflagellates which lead to their establishment in new areas. Attached are my recent reprints which demonstrate my capability for field investigations on the physiology, behavior, and transport of dinoflagellate species and their cyst forms in estuaries. I have developed methods for coring and enumerating vertical distributions of cysts in the sediment such that seed bed locations can be defined. I have also studied the triggers which cause the cells to encyst and excyst as well as enumerating some potential controls on the excystment process. I don't have to impress upon you the seriousness of the establishment of Ptchodiscus in the Sound, but it must be determined immediately the extent and location of the seed beds.

Their physiological tolerance to the Sound's waters must be ascertained in order to predict their permanance. I realize NOAA is sampling the water column and collecting specimens now. I believe that my expertise in the physiological tolerances of these cells as well as in sampling cysts (a very difficult procedure) and determining seed bed locations can greatly enhance the present effort. Also the surface blooms cannot be adequately followed by in situ efforts alone such that our capability of following the blooms in real time via satellite will be most necessary. I have contacted Bill Hogarth as to collaboration

and he assured me that my group could utilize the Marine Fisheries vessels. Time is of the essence, we must collect samples for physiological tolerances while the cells are in the water column, which is now. We must also follow the gamete production and encystment in situ which again is now such that we can predict if viable seed beds are being established to reinoculate the water column next year. I can have a sampling team ready with approximately a week's notice depending upon the availability of vessels. I would suggest the following scenario:

1. Mapping of bloom migration using NMF ground truth as well as NOAA NESDIS satellite data

2. Field water column mapping and collecting of samples for:

   a) vegetative and sexual stage enumeration
   b) diurnal migration
   c) photosynthetic capacity (health)

3. Field and coring operations for establishment of seed bed locations

4. Laboratory experiments for:

   a) analysis of physiological tolerances of cells and cysts to Sound waters
   b) analysis of viability of vegetative, sexual, and cyst forms
   c) assays for toxicity to fish and humans of various stages

5. Analysis of data as a base for prediction of location and magnitude of reoccurrence of blooms and potential impact on fisheries and local economy.

We realize this effort is broad, but it is doable and reliable. We are probably talking in the 60-70 k range initially, but it is critical that we begin as soon as possible. Pamlico/Albemarle may be just the tip of the iceberg, for if Ptchodiscus becomes established here, it may easily seed nearby Chesapeake due to wind driven circulation reversals. Please provide me with feedback as quickly as possible. I will be happy to include any experimental investigations you may with to add.

Sincerely,

Mary Tyler
Senior Scientist

PR-209

FISCAL ACTION ON PREVIOUSLY APPROVED PROJECTS

Three projects which were approved previously by Policy Committee action for funding last August or this December require additional action.

1. Stan Riggs (ECU, Mud Pollutants)

   HISTORY: Approved by Policy Committee for December or ASAP. Principal Investigator has requested startup money so he won't lose this entire sampling year and his staff dedicated to this project. Probably can be funded as part of baseline monitoring work to be done under supplemental funds.

   RECOMMENDATION: Contaminant work in river/sound sediments is badly needed. Recommend authorization of $6,000 as per request (attached).

2. Dave Adams (NCSU, Wetland Protection Strategies)

   HISTORY: Approved by Policy Committee for December or ASAP. Principal Investigator has requested expansion from ~$7500 to $15,500 to cover upgrade in staffing.

   RECOMMENDATION: Recommend approval to generate best possible material on this vital subject.

3. Gary Smith (ECU, Videotape/Slide Show)

   HISTORY: Approved by Policy Committee for August initiation. Administrative problem at ECU caused us to include in "Contractual Services" in NRCD cooperative agreement request. Five percent cut from $700,000 to $685,000 total APES grant was taken from NRCD "contractual services", leaving only $1200.

   RECOMMENDATION: Recommend authorization to spend $10,000 of planning year contractual services funds to execute the videotape portion of this project.

National Estuary Program Designation

Proposed Schedule, Albemarle-Pamlico Estuarine Study

TIME	MILESTONE
01/88	Inventory of existing monitoring programs completed
03/88	Baseline monitoring program designed
04/88	Identification of potential contributions by other federal agencies
06/88	Key data resources identified (draft)
08/88	Final list of data sets prepared and reviewed
12/88	Priority environmental concerns reviewed and reaccessed by the Policy Committee/Technical Committee/EPA
06/89	1. Databases prioritized (which useful for what purposes) 2. Probable causes of significant environmental changes identified
09/89	1. Inventory of relevant federal programs completed 2. Plan for addressing load/transport/fate relationships
11/89	"Probable cause" document reviewed by scientists/managers
12/89	1. Schedule for data management activities established 2. Federal consistency report completed
04/90	Key sections of Comprehensive Conservation and Management Plan identified
07/90	Draft monitoring plan (management effectiveness)
08/90	Draft report on status and trends and probable causes
10/90	Final combined report distributed to public
04/91	Potential management strategies defined and costs evaluated
08/91	Priority action plan to maintain/attain potential uses drafted (with authority needed, etc.)
11/91	Compliance schedule for action plans developed
01/92	1. Draft Comprehensive Conservation and Management Plan 2. Recommended alternatives to resolve federal inconsistencies
08/92	Institutional and financial commitments for action plans secured
11/92	Final Comprehensive Conservation and Management Plan

Also requires biennial reports on management action effectiveness to public

...es G. Martin
Governor

Karen Hayes Rotterman
Director of Communications

State of North Carolina
Office of the Governor

Release: IMMEDIATE
Contact: NRCD Public Affairs (919) 733-4984
Release No: NR-47

Date: Dec. 9, 1987
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GOVERNOR ANNOUNCES ALBEMARLE-PAMLICO GRANTS

RALEIGH - Governor Jim Martin has announced that 12 coastal governments will receive $223,860 in federal grants to improve water quality in the Albemarle-Pamlico Sounds area.

The towns and counties involved will provide some matching funds and services for planning, capital construction, and land acquisition and to develop demonstration projects to improve water quality in the area.

The federal funds will be administered by the Division of Coastal Management in the North Carolina Department of Natural Resources and Community Development.

Local governments involved are in the 20 counties covered by the Coastal Area Management Act and the Albemarle-Pamlico Estuarine Study area, which extends from Carteret County to the Virginia state border.

The projects range from revision of subdivision regulations to buying waterfront easement to improving stormwater control. The grants range from $6,600 to the City of New Bern to buy waterfront easement to $28,000 to Beaufort County for a demonstration project on alternative wastewater control methods.

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NOTE: A list of grant recipients and grant projects is attached.

Governor's Office, Communications
116 W. Jones St., Raleigh, N. C. 27611
(919) 733-5612

Tim Pittman
Press Secretary

ALBEMARLE-PAMLICO WATERSHED IMPROVEMENT GRANTS

Local Government	Grant
Chowan County (revise subdivision regulations)	$ 6,930
City of New Bern (waterfront easement)	6,630
Beaufort County (shore map/land management)	21,000
(alternative wastewater control)	28,000
Town of Murfreesboro (stormwater improvement)	17,220
Hyde County (Hyde Canal runoff control)	28,000
(water monitoring project)	7,000
City of Elizabeth City (land buffer acquisition)	27,000
Pamlico County (revise subdivision regulations)	6,760
City of Washington (revise subdivision regulations)	8,400
Craven County (revise subdivision regulations)	7,420
Town of Kill Devil Hills (update stormwater plan)	17,500
Town of Oriental (stormwater management)	21,000
Town of Kitty Hawk (stormwater management)	21,000
TOTAL	$223,860

James G. Martin, Governor

S. Thomas Rhodes, Secretary

North Carolina
Department of Natural Resources and Community Development

Release: IMMEDIATE

Date: December 9, 1987

Contact: NRCD Public Affairs (919) 733-4984

GOVERNOR APPLIES FOR FEDERAL RELIEF FUNDS

RALEIGH--A $275,000 red tide disaster project proposal was sent to the National Marine Fisheries Service December 4th by S. Thomas Rhodes, Secretary, N.C. Department of Natural Resources and Community Development (NRCD), at the direction of Governor Jim Martin.

"The Governor is greatly concerned about the red tide's effect on shellfishermen in North Carolina," Rhodes said. "He has urged us to explore every avenue of relief.

"While this grant money would not provide any immediate assistance, it would enable shellfishermen to rebound more quickly in the future. The Governor intends to follow every single approach available to help this stricken area. This is just one of many shots in our gun."

The monies would be used to increase future stocks of oysters and clams, consequently providing additional future harvests to mitigate the red tide kill of an estimated $1 million worth of bay scallops this season. Nothing can be done to restore the lost bay scallops, N.C. Marine Fisheries officials said.

By November 18, the red tide closure covered 170 miles of coastline and 300,000 acres of shellfish waters. Projected losses to shellfishermen in the affected area during November and December 1987 are $1.5 million.

The N.C. Division of Marine Fisheries, NRCD, proposes to plant 100,000 bushels of shell cultch annually for two years in Core Sound, Bogue Sound, and their tributaries to provide substrate for oysters and clams.

Total projected benefits from the project would be $3.9 to $4.4 million.

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Public Affairs Office
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Don Follmer
Director, Office of Public Affairs