EXECUTIVE ORDER NO. 75
CREATION OF REGIONAL COUNCILS AND A COORDINATING COUNCIL TO SUPPORT SOUND ENVIRONMENTAL MANAGEMENT IN THE ALBEMARLE-PAMLICO ESTUARINE STUDY REGION

WHEREAS, the Albemarle-Pamlico Estuarine Study (APES) was a cooperative effort by the State of North Carolina and the U.S. Environmental Protection Agency to preserve water quality, habitats, and fisheries in eastern North Carolina; and

WHEREAS, APES was the first of 21 National Estuary Programs to be started under the Clean Water Act; and

WHEREAS, APES has provided extensive information and scientific research about the environmental issues facing the Albemarle-Pamlico estuary since 1987; and

WHEREAS, that scientific information was combined with extraordinary involvement by citizens to develop a Comprehensive Conservation and Management Plan (CCMP) entitled "A Guide to Environmental and Economic Stewardship in the Albemarle-Pamlico Region"; and

WHEREAS, the CCMP also recognizes that, from an ecological and an economic standpoint, the best way to ensure the general environmental health of the Albemarle-Pamlico watershed is to manage and protect the five river basins of the watershed; and

WHEREAS, the CCMP also recognizes the importance of involving the public in making decisions regarding environmental management; and

WHEREAS, the CCMP recommends the establishment of Regional Councils to foster public input from each of the five river basins in the Albemarle-Pamlico region, and a Coordinating Council to support the implementation process of the CCMP;

NOW, THEREFORE, by the authority vested in me as Governor by the laws and Constitution of the State of North Carolina, **IT IS ORDERED:**

Section 1. Establishment.

Five Regional Councils of citizens ("Councils"), one for each river basin in the Albemarle-Pamlico watershed, are hereby established to advise agencies responsible for environmental management on concerns and issues relative to that basin.

A Coordinating Council consisting or representatives from each Regional Council, citizen commissions, federal resource agencies, and state government is hereby established to evaluate and support implementation of the CCMP.

Section 2. Regional Councils.

A. Composition.

1. Basins to be represented by the Councils. Five separate Regional Councils shall represent each of the following river basins, with the area of the river basin being defined by the hydrologic boundaries ascribed to it by the N.C. Division of Environmental Management (DEM):
   a. Neuse (including areas of the White Oak River basin that drain to Core and Bogue Sounds)
   b. Tar-Pamlico (including areas draining directly into the northern Pamlico Sound)
   c. Roanoke (the portion of the basin below Lake Gaston dam)
   d. Chowan
   e. Pasquotank/Alligator (including smaller rivers and areas that drain directly into the Albemarle, Currituck, Croatan, and Roanoke Sounds)
2. Membership of the Regional Councils.
   a. Each county in the basin shall have at least three representatives on the Council for that basin. In instances where a county lies in more than one basin, that county shall have at least three representatives on each Council that serves a basin of which the county is a part.
   b. Membership from each county shall include:
      (1) one elected or appointed county official selected by the board of county commissioners;
      (2) one elected or appointed municipal official selected by the board of county commissioners in consultation with municipalities in the county (counties without municipalities shall appoint a second county official); and
      (3) one person appointed by the Secretary of the N.C. Department of Environment, Health, and Natural Resources (DEHNR). In making his appointments to each Council, the Secretary shall, to the greatest extent possible, seek to ensure demographic and social balance, as well as balance among the following interests:
         (a) agriculture
         (b) silviculture
         (c) conservation
         (d) environmental science
         (e) commercial fishing
         (f) business/industry
         (g) recreational fishing
         (h) tourism
         (i) Soil and Water Conservation Districts
         (j) at large
   c. Each Regional Council may expand its membership as it deems necessary.
   d. Members shall serve for a five-year term to coincide with the five-year cycle of discharge permit renewals in the river basins. Vacancies shall be filled by the appointing authority.

B. Duties.

1. The Regional Councils shall advise and consult with local, state, and federal governments, as well as the general public and different interest groups within the basin, on the implementation of environmental management programs in the river basins. Because

different basins are likely to face different concerns and problems, the Council for a particular basin shall work to prioritize the problems to be addressed in that basin and to design and build consensus support for the most cost-effective strategies for dealing with those problems. The councils shall also advise the public and local governments of actions and information relevant to environmental management in the basin. The Councils will have no authority other than as advisory bodies.

2. Federal and state agencies with environmental management responsibilities in the basin shall be invited to participate in meetings of the Regional Councils.
3. Each council shall be responsible for determining its own rules of order, chairmanship, attendance regulations, quorums, and other matters of protocol.
4. DEHNR shall assist the councils and serve as a conduit for information between the councils, state and federal agencies, local government, and the public.
5. Each council shall work with DEHNR in preparing an annual public report on the progress of environmental protection and related concerns in the five river basins.

C. Meetings.

Each Regional Council shall meet within three months of its formation by the Secretary of DEHNR and local governments. Each Council shall meet at least two times each year, or more frequently if deemed appropriate.

Section 3. Coordinating Council.

A. Membership.

Membership of the Coordinating Council shall include:

1. Fifteen representatives of the five Regional Councils.

   (Each Regional Council will select two of the elected and/or appointed government officials and one other representative from any background.)
2. Seven representatives of citizen commissions and councils. The Chair of each of the following groups shall select a representative:
   a. Marine Fisheries Commission
   b. Soil and Water Conservation Commission
   c. Environmental Management Commission
   d. Coastal Resources Commission
   e. Wildlife Resources Commission
   f. Forestry Advisory Council
   g. Sedimentation Control Commission
3. Four representatives of federal resource agencies, to be selected by the appropriate federal administrators, are invited to participate:
   a. U.S. Environmental Protection Agency
   b. U.S. Army Corps of Engineers
   c. U.S. Fish and Wildlife Service
   d. National Oceanic and Atmospheric Administration
4. Three representatives of state government:
   a. Secretary of DEHNR, or his designee (Chair of the Coordinating Council)
   b. Secretary of the N.C. Department of Commerce, or his designee
   c. Commissioner of the N.C. Department of Agriculture, or his designee, is invited to participate.

B. Duties.

1. The role of the Coordinating Council shall be to evaluate and support the implementation process to ensure the highest level of cooperation and coordination among agencies, local governments, and public and private interest groups.
2. The Coordinating Council shall consult the Regional Councils for guidance on coordinating implementation strategies at a local level.
3. The Coordinating Council shall set annual priorities for implementing sections of the CCMP and make recommendations based on progress and success, and shall identify and prioritize information needs as descried in the CCMP.
4. The Coordinating Council shall pursue a Memorandum of Agreement between North Carolina and Virginia to ensure continued cooperation and coordination in implementing the CCMP.
5. Each participating agency, institution, and organization of the Coordinating Council shall submit annual reports evaluating the progress made in implementing CCMP recommendations and the success of implementation strategies.

Section 4. Compensation, Per Diems and Expenses.

Members of the Regional Councils and the Coordinating Council shall serve voluntarily and without compensation, per diems or expenses.

Section 5. Effect of Other Executive Orders.

All other Executive Orders or portions of Executive Orders inconsistent herewith are hereby rescinded.

This Order shall become effective immediately.

Done in the Capital City of Raleigh, North Carolina, this the 30th day of March, 1995.

State of North Carolina

JAMES B. HUNT JR.
GOVERNOR

EXECUTIVE ORDER NUMBER 118
AMENDING EXECUTIVE ORDER 75 CONCERNING
IMPLEMENTATION OF THE ALBEMARLE-PAMLICO
ESTUARINE STUDY RECOMMENDATIONS

WHEREAS, Executive Order No. 75 was issued to establish mechanisms to achieve better local stakeholder involvement in environmental programs in the Albemarle-Pamlico Estuarine region by the creation of five regional Councils and one Coordinating Council; and

WHEREAS, one Council, the Neuse River Basin Regional Council (NRBRC), has been established and has been meeting for over a year; and

WHEREAS, the State's environmental management programs have benefited from the experiences of that Council which have demonstrated that certain modifications can be made to the original Executive Order which will lead to more effective and productive local involvement programs.

NOW, THEREFORE, by the power vested in me as Governor by the laws and Constitution of the State of North Carolina, IT IS ORDERED that the following sections of Executive Order No. 75 are amended to read as follows:

Section 2. Regional Councils.

A. Composition.

1. Basins to be represented by the Councils.

Five separate Regional Councils shall represent each of the following five basins, with the area of the river basin being defined by the hydrologic boundaries ascribed to it by the North Carolina Division of Water Quality (DWQ):

A. Composition.

2. Membership of the Regional Councils.

d. Local government representatives shall serve at the pleasure of the appointing authority and any local government vacancies in the Council shall be filled by the appointing authority. In the event of an interest group vacancy, the Secretary of the Department of Environment and Natural Resources shall solicit nominations from current Council members, the Department, and the general public. Interest group representatives serve at the pleasure of the Secretary. The Secretary will select an acting chair of each Council who will serve until the official selection of a chair by the Council membership is accomplished.

B. Duties.

1. A major responsibility of the Regional Councils is to make recommendations to local, state, and federal regulatory authorities on how to maintain and improve water quality and other environmental resources in their individual river basins. Each Regional Council will set their own priorities and develop a plan of work which will address those priorities. The Councils shall also advise the public and affected stakeholders of actions and information relevant to environmental management in the basin. The Councils shall have no authority other than as advisory bodies.

Subject to the amendments provided above, Executive Order No. 75 shall remain in full force and effect.

This order is effective immediately.

Done in the Capital City of Raleigh, North Carolina, this the 15th day of September, 1997.

James B. Hunt Jr.
Governor

ATTEST:

Elaine F. Marshall
Secretary of State

CHOWAN RIVER BASIN REGIONAL COUNCIL
By-Laws

ARTICLE I

Name, Authority, Location, Purpose, Functions

Section 1: NAME

The name of this organization shall be the Chowan River Basin Regional Council (CRBRC). Its area of interest shall include the entire Chowan River watershed.

Section 2: AUTHORITY

The CRBRC has been created by Executive Order #75 (as amended) of the Governor of North Carolina, James Hunt, Jr. The CRBRC is administered through the NC Department of Environment and Natural Resources (NCDENR) - Division of Water Quality (DWQ), Water Quality Section.

Section 3: LOCATION

The principal mailing address of the CRBRC shall be the: NC Division of Water Quality, P.O. Box 29535, Raleigh, NC 27626-0535.

Section 4: PURPOSE & FUNCTION

The primary purpose of the CRBRC shall be to:

A. provide guidance and recommendations to the NCDENR on environmental issues pertaining to the Chowan River watershed;
B. promote public awareness and understanding of the environmental issues concerning the Chowan River watershed;
C. provide input to the various Divisions of the NCDENR, including the Division of Marine Fisheries (DMF), the Wildlife Resources Commission (WRC) and the DWQ in the development (and periodic updating) of the Chowan River Basin wide Management Plan (Chowan Basin Plan) and other environmental management strategies as they concern the Chowan River watershed;
D. provide input to the Environmental Management Commission (EMC), units of local government, and others regarding environmental issues and management strategy recommendations;
E. perform liaison function between the various Divisions of the NCDENR, including the DWQ, DMR, WRC; local governments, and stakeholders/organizations represented by Council members.

To fulfill this purpose, the members of the CRBRC shall be expected to communicate the activities of the CRBRC to their respective organizations, local governments, and the public, and conversely, to communicate the comments and concerns of these organizations to CRBRC membership and others, as appropriate.

Specifically, the CRBRC shall:

A. make recommendations to local, state, and federal regulatory authorities on how to maintain and improve water quality and other environmental resources in their individual river basins. The Council will set its own priorities and develop a plan of work which will address those priorities. The Council shall also advise the public and affected stakeholders of actions and information relevant to environmental management in the basin. The Council shall have no authority other than as an advisory body.

B. disseminate information about the CRBRC, interpret and communicate the goals and strategies of the Albemarle-Pamlico Estuarine Study's Comprehensive Conservation and Management Plan (CCMP), Governor Hunt's Coastal Agenda, and DWQ's Basin wide management plans to the public and to interest groups, and advise the CRBRC of reaction and comments;

C. provide input to the various Divisions of the NCDENR, including the DWQ, DMF, and the WRC; the EMC and others in implementing the goals of the CCMP, Coastal Agenda and Chowan Basin Plan and in defining environmental indicators to help monitor progress in implementing these plans;

D. track and monitor local, state and federal actions to assess their contribution in achieving the goals set forth in the CCMP, Coastal Agenda, and DWQ Chowan Basin Plan(s);

E. identify opportunities and mechanisms to involve the public in implementing the CCMP, Coastal Agenda and DWQ Chowan Basin Plan(s);

F. communicate with decision makers and other authorities about implementation needs and assist in shaping priorities;

G. act as advocates for securing adequate funding for the implementation of plan goals and objectives.

ARTICLE II

Membership and Officers

Section 1: CRBRC Composition

The CRBRC shall be composed of individuals representing a cross section of groups and organizations and local governments (county and municipal) that use or have concerns about the Chowan River. The interests shall include:

* agriculture
* silviculture
* commercial fishing
* recreational fishing
* Soil & Water Conservation Districts
* conservation
* environmental science
* business/industry
* tourism
* at large
* local government

The goal shall be to recruit a fair geographic distribution of members from throughout the Chowan River basin and to achieve a distribution of representation from among the membership categories defined in paragraph one of this section. Membership on the CRBRC may be expanded as determined by a majority of CRBRC members but may not exceed (__) members.

Section 2: Criteria for Membership

Each member shall:

A. be potentially affected by the management recommendations contained in the CCMP, Coastal Agenda, and DWQ Chowan Basin Plan(s);
B. be willing to assume responsibility for communicating with a major user or interest group, and to attend regular meetings;
C. have some knowledge of resource management issues and a commitment to protecting and improving the water quality in the Chowan River.

Section 3: Terms and Methods of Appointment of Members and Replacement Members

According to the Governor's Executive Order #75 (as amended) local government members shall serve at the pleasure of the appointing authority and any **local government agency vacancy** in the Council shall be filled by the appointing authority.

In the event of an **interest group vacancy**, the Secretary of the NCDENR shall solicit nominations from current Council members, the Department and the general public. Interest group representatives shall serve at the pleasure of the Secretary. The Secretary will select an acting chair of each Council who will serve until the official selection of a chair by the Council membership is accomplished.

Section 4: Method of Appointing Additional Members

The process for appointing **additional** members to the CRBRC shall be as follows:

A. nominations for additional members shall be solicited from among current members, the NCDENR, DWQ staff, and by open invitation for nominations from the general public;
B. a membership subcommittee consisting of the CRBRC chair, DWQ staff, and one other CRBRC member, shall review all nominations received for consistency with the provisions of this article concerning CRBRC membership and composition;
C. the membership subcommittee shall submit a list of proposed members to the CRBRC for review, approval and submission to the appropriate appointing body.

Section 5: Compensation

All members shall serve without compensation.

Section 6: Officers

Officers of the CRBRC shall be elected by the members. The officers shall be a Chair, Vice-Chair and Secretary. The term of office shall be one year.

Election of officers shall be held in February of each year. A nominating committee shall be established to identify candidates, and shall notify CRBRC members of those nominated for each position at least 30 days prior to the meeting where voting will take place. Officers shall be elected by a majority vote of the CRBRC members present, provided that a quorum is present.

Section 7: Responsibilities of the Chair

The Chair shall be responsible for:

A. attending the Environmental Management Commission (EMC) meetings as appropriate;
B. communicating recommendations and concerns of the CRBRC to the EMC and vice versa;
C. defining agendas for CRBRC meetings with assistance from DWQ staff;
D. chairing CRBRC meetings;
E. coordinating an annual process to evaluate progress, priorities and next steps for the CRBRC, with assistance from DWQ staff.

Section 8: Responsibilities of the Vice-Chair

A. the Vice-Chair shall serve in absence of the Chair and shall perform as the Chair in all matters of business;

Section 9: Responsibilities of the Secretary

The Secretary shall:

A. assist with defining the agenda;
B. record the minutes of CRBRC meetings;
C. establish whether a quorum is present;
D. handle incoming correspondence;
E. prepare any correspondence from the CRBRC to other individuals or organizations for endorsement by the Chair;
F. ensure that all views on an issue are accurately recorded and reported.

ARTICLE III

Meetings

Section 1: Meetings

According to the Governor's Executive Order, # 75 meetings of the CRBRC shall be held at least two times a year. Subcommittees may meet more frequently. Meetings of the CRBRC shall alternate between locations in the Chowan River Basin and shall be open to the public.

Section 2: Agenda Items

Matters may be placed on the agenda for consideration at meetings of the CRBRC by any of the following:

A. the CRBRC Chair
B. a member of the CRBRC
C. a member of the DWQ staff

Section 3: Parliamentary Procedure

Robert's Rules of Order shall be the parliamentary authority for the conduct of CRBRC meetings.

Section 4: Attendance

Members of the CRBRC shall attend all regular meetings of the CRBRC. If any member of the CRBRC fails to attend two regular meetings per year without sufficient explanation, the Chair may recommend removal and replacement of that member. This attendance requirement also applies to meetings of the various subcommittees.

Section 5: Decision Making and Voting Rights

A. Majority Vote. Decisions/resolutions shall be adopted by a majority vote of the CRBRC members present, provided a quorum is attained. **A quorum shall be defined as at least 5 CRBRC members.** Each member shall have one vote. Proxy votes may be submitted, in writing, to the Chair prior to the meeting where voting will take place.

B. Subcommittees of the CRBRC may operate by consensus to develop recommendations. Those recommendations would ultimately be decided upon by all members of the CRBRC through a majority vote.

ARTICLE IV

Subcommittees

Section 1: Subcommittees

The following shall be established as standing subcommittees to address regular business of the CRBRC:

A. membership subcommittee, composed of the Chair, DWQ staff and one other CRBRC member;
B. issues subcommittee, composed of volunteers from among the CRBRC members;
C. public outreach workgroup, composed of members appointed by the CRBRC in conjunction with DWQ staff;
D. nominating committee for the election of officers, composed of volunteers from among the CRBRC members, but excluding current officers.

As deemed appropriate, the CRBRC may designate additional subcommittees to address concerns and present recommendations to the full committee. A subcommittee may be proposed by the Chair, any CRBRC member, or DWQ staff, and established by a majority vote of the members present, provided that a quorum is present.

All subcommittees shall report to the CRBRC about current activities on a regular basis.

ARTICLE V

Staff

Section 1: Staff Support

Staff support for the CRBRC shall be provided by the Division of Water Quality-WQ Section.

Section 2: Staff Responsibilities

The staff shall be responsible for assisting the Secretary with the transmitting of minutes of all CRBRC meetings, notices/agendas to CRBRC members, and shall transmit a copy of the minutes of each CRBRC meeting to each member prior to the next regular meeting. He/she shall also work with the Secretary to ensure that consensus, majority and dissenting views on all matters and issues shall be recorded and reported.

ARTICLE VI

RC Positions

Section 1: Adopting Official CRBRC Positions

Official positions of the CRBRC on any issue or topic shall be adopted by resolution. Proposed resolutions shall be provided to CRBRC members at least 30 days prior to the meeting where voting will take place. Resolutions may be proposed by the Chair or a member of the CRBRC. Proposed resolutions shall be transmitted to DWQ staff at least 45 days before the meeting at which they will be acted upon in order to allow sufficient time for staff to transmit copies to CRBRC members. Resolutions shall be adopted by: (1) a majority vote of the CRBRC members present, provided that a quorum is present; and (2) by consensus of the subcommittee members with final recommendations decided upon by all CRBRC members through a majority vote (See Article III, Section 5). A record of any resolutions adopted by the CRBRC shall be kept in the DWQ Public Involvement Office, Washington, NC and with the CRBRC Secretary.

Section 2: Representing CRBRC Positions in Public Forums

A member shall not represent, at a public forum, his personal views as being those of the CRBRC.

ARTICLE VII

By-Laws and Amendments

Section 1: Initiation

These by-laws and any amendments thereto shall be effective immediately upon adoption

Section 2: Amendments

Proposed amendments to the by-laws shall be provided to the members at least 30 days prior to the meeting at which they will be acted upon. Any amendments to these by-laws must be approved by a two-thirds majority vote of the members. Members who expect to be absent from the meeting at which the by-laws will be acted upon may provide a written communication of their vote on the proposed amendment to the by-laws. Such notification must be received at least 48 hours before the meeting where the amendments are scheduled to be acted upon.

By-laws amended and adopted
January 8, 1998

RESOLUTION

RECOMMENDATION THAT AN ENVIRONMENTAL IMPACT STATEMENT BE CONDUCTED REGARDING THE PROPOSED NUCOR FACILITY LOCATED ON THE CHOWAN RIVER

WHEREAS, the Chowan River Basin Regional Council was created by Governor Hunt's Executive Order No. 75 to advise agencies responsible for environmental management on concerns and issues relative to the Chowan River Basin; and

WHEREAS, the Chowan River was the first waterbody in North Carolina to be designated as Nutrient Sensitive Waters (NSW) in 1979 because of the occurrence of nuisance algal blooms; and

WHEREAS, the water quality conditions in the Chowan River Basin have improved during the past 20 years due to the enormous effort by industry, municipalities, agriculture, forestry, scientists, environmental groups, government agencies and citizens of the Chowan River Basin; and

WHEREAS, Nucor, a steel industrial company, intends to construct and operate a steel recycling facility on the banks of the Chowan River; and

WHEREAS, it is our belief that review of the environmental impact analysis has been compartmentalized, and that total impact has not been adequately addressed, and a finding of "no significant impact" at this time cannot be justified; and

WHEREAS, it is our opinion that the information and conclusions presented in the Environmental Assessment (EA) and final supplement is not supported with an adequate level of scientific documentation; and

WHEREAS, we believe that the construction and operation of the Nucor facility, as currently proposed, would lead to significant deterioration of the fishery resource and aquatic habitats, would seriously affect the traditional recreational uses of the river, and generally threaten the overall economic sustainability of the resource; and

NOW, THEREFORE, IT IS RESOLVED that based on discussions developed from the review of various documents regarding the status of the Nucor permit applications, members of the Chowan River Basin Regional Council strongly recommend to the Coordinating Council that all requests for final permits for the proposed Nucor facility be held in abeyance and all construction activities cease until an environmental document is completed that adequately discusses and mitigates the potential direct and indirect threats to the Chowan River.

At this time, an Environmental Impact Statement (EIS) is the only document that will address the total current and future impacts of this industry on the Chowan River from an environmental and economical standpoint.

Adopted, this 15th day of June , 1999.

Brewster Brown

Brewster Brown, Vice-Chairman
Chowan River Basin Regional Council

Nan Laughton

Nan Laughton, Secretary
Chowan River Basin Regional Council

CHOWAN RIVER BASIN REGIONAL COUNCIL

Updated 4/8/03

BERTIE

County Representative
VACANT

Municipal Representative
Lee Wynns, III
Mayor of Colerain
P.O. Box 6
Colerain, NC 27924
252-356-4387
Fax – 252-356-2515
lowynns@inteliport.com

Agriculture
G.D. Perry
129 S Perry's Beach
Colerain, NC 27924
252-356-4814

Business/Industry
John Stallings
1001 Stokes Ave.
Windsor, NC 27983

CHOWAN

County Representative
Peter Rascoe
County Attorney
POB 1030
Edenton, NC 27932
(W) 252-482-8431
Fax: 252-482-4925

Municipal Representative
Jerry Parks
Town Council
105 Kimberly Dr.
Edenton, NC 27932
(W) 252-338-4410 (H) 252-482-3276
Fax: 252-338-4486

Silviculture
Roger Spivey
345 Gliden Rd.
Hobbsville, NC 27946
252-221-4333

Tourism
Peter Bogus
632 Soundside Road
Edenton, NC 27932
(W) 252-482-2282

At-large
Alfred Howard
304 Pocahontas Trail
Edenton, NC 27932
252-221-4977

Soil & Water Conservation
Nan Laughton
414 W. Queen St.
Edenton, NC 27932
252-482-7437 x-3 or x-101
nan-laughton@nc.nacdnet.org

GATES

County Representative
Dennis Utt
PO BOX 61
Gatesville, NC 27938-0061
(W) 252-357-1881 (H) 252-357-0708
FAX: 252-357-1242

Municipal Representative
VACANT

Environmental Science
Marjorie Rayburn – Chair
NC Cooperative Ext. Service
Gates County Center
PO BOX 46
112 Court Street
Gatesville, NC 27938 932
252-357-1400 FAX: 252-357-1167
H – 252-426-7167
marjorie_rayburn@ncsu.edu

HERTFORD

County Representative
William Earley
Economic Developer
P.O. Box 429
Winton, NC 27986
252-358-7801

Municipal Representative
VACANT

Conservation
Brewster Brown
PO Box 527
203 Dickerson Street
Winton, NC 27986
(H) 252-358-7741

Business/Industry
Chad Prior
1505 River Road
Cofield, NC 27922
(W) 252-356-3707
(H) 252-332-3319
FAX: 252-356-3930

Business/Industry
Gary Purvis
131 Albemarle Drive
Ahoskie, NC 27910
(W) 252-358-5851
(H) 252-332-7625

NORTHAMPTON

County Representative
Charles Vaughan
County Attorney
P.O. Box 370
Woodland, NC 27897
252-587-5631

Municipal Representative
Robert Carter
Rt. 1 Box 151
Pendleton, NC 27862

Commercial fishing
VACANT

VIRGINIA

John Carlock, Director
Physical & Environmental Planning
Hampton Roads Planning District
723 Woodlake Drive
Chesapeake, Virginia 23320
757-420-8300

Victor Liu, Principal Planner
Crater Planning District Commission
P.O. Box 1808
Petersburg, Virginia 23805
804-861-1666

Noah Hill
VA Dept. Cons. & Rec.
1548-A Holland Road
Suffolk, VA 23434
757-925-2468
nhill@dcr.state.va.us

Michelle Fults
VA DEQ
5636 Southern Blvd.
Virginia Beach, VA 23462
757-518-2160

Ernie Brown
VA Dept. Conservation & Recreation
1548-A Holland Road
Suffolk, VA 23434
757-925-2468
ebrown@dcr.state.va.us

APNEP

Program Office
Bill Crowell
APNEP Director
NC DENR
1601 Mail Service Center
Raleigh, NC 27699-1601
919-715-1327
bill.crowell@ncmail.net

Public Involvement/Outreach
Joan Giordano
Public Involvement Coordinator
NC DENR
943 Washington Square Mall
Washington, NC 27889
252-946-6481
joan.giordano@ncmail.net

5-20-98

CHOWAN RIVER BASIN REGIONAL COUNCIL

Membership Roster

5-20-98

CHOWAN RIVER BASIN REGIONAL COUNCIL

(LOCAL GOVERNMENT APPOINTMENTS)

Membership to the Regional Council includes two local government officials (one county person and one municipal person) from each county in the basin. The following is a confirmed list of appointments submitted by each county's Board of County Commissioners:

COUNTY	COUNTY REP.	MUNICIPAL REP.
Bertie	William Griffin, Jr. Co. Extension Agent P.O. Box 280 Windsor, NC 27983 252-794-5317	Leo Wynns, III Mayor of Colerain P.O. Box 6 Colerain, NC 27924 252-356-4387
Chowan	Emmett Winborne County Commissioner 3443 Rocky Hock Rd. Edenton, NC 27932 252-221-4204	Jerry Parks Town Council ~~405 Kimberly Dr.~~ Edenton, NC 27932 252-297-3300
Gates	James Smith County Commissioner P.O. Box 371 Gates, NC 27937-9651 252-357-1240	Elton Winslow P.O. Box 1 Gatesville, NC 27938 252-357-0720
Hertford	William Earley Economic Developer P.O. Box 429 Winton, NC 27986 252-358-7801	Calvin Hall ~~Town Council~~ ~~P.O. Box 115~~ ~~Winton, NC 27986~~ ~~252-358-3141~~
Northampton	Charles Vaughan County Attorney P.O. Box 370 Woodland, NC 27897 252-587-5631	James Woodard Mayor of Conway P.O. Box 304 Conway, NC 27820 252-585-1667

5-20-98

CHOWAN RIVER BASIN
REGIONAL COUNCIL
(INTEREST GROUP REPRESENTATIVES)

Membership to the Regional Council includes at least one person from each county in the Chowan River Basin representing a specific interest or stakeholder group. The following is a list of representatives by county and interest group:

COUNTY	NAME & ADDRESS	INTEREST GROUP REP.
Bertie	G.D. Perry 129 S. Perry's Beach Colerain, NC 27924 252-356-4814	Agriculture
Bertie	*John Stallings 1001 Stokes Ave. Windsor, NC 27983 (252) 794-2183	Recreational fishing
Chowan	Roger Spivey 345 Gliden Rd. Hobbsville, NC 27946 ~~252-482-4554 or 331-4781~~ (252) 221-4333	Silviculture
	Nancy Nicholls 127 Benbury Drive Edenton, NC 27932 252-482-3400	Tourism
	Alfred Howard 304 Pocahontas Trail Edenton, NC 27932 252-221-4977	At-large
	Nan Laughton 414 W. Queen St. Edenton, NC 27932 252-482-7437 482-4127 482-3280 (H)	Soil & Water Conservation
Gates	*Patricia Piland Rt. 2 Box 93-A Gates, NC 27937 (252) 357-1567	Environmental Science

Hertford	✓	Brewster Brown Roanoke-Chowan Community College Rt. 2 Box 46-A Ahoskie, NC 27910 252-332-5921	Conservation
	✓	Joe Stutts 110 Spring Avenue Murfreesboro, NC 27855 252-398-3525	Business/Industry Vacancy
Northampton		*VACANT*	Need either Rec. fishing, Env. Science and/or Comm. fishing

*Tom Morgan
NC Division of Forest Resources
861 Beria Church Rd.
Elizabeth City, NC 27909
252-331-4781

STATE OF VIRGINIA

John Carlock, Director
Physical & Environmental Planning
✓ Hampton Roads Planning District
723 Woodlake Drive
Chesapeake, Virginia 23320
(757) 420-8300

Victor Liu, Principal Planner
✓ Crater Planning District Commission
P.O. Box 1808
Petersburg, Virginia 23805
(804) 861-1666

*Denotes perspective council member pending formal appointment/approval process.

CAPTAIN ALFRED M. HOWARD, USN, RET.
304 POCAHONTAS TRAIL
EDENTON, NORTH CAROLINA 27932

DECEMBER 5, 1997

MRS JOAN GIORDANO
DENR- DWQ
943 WASHINGTON SQUARE MALL
WASHINGTON, NC 27889

DEAR MRS GIORDANO:

IN REPLY TO YOUR MEMORANDUM OF NOVEMBER 24, 1997, THE FOLLOWING INFORMATION IS PROVIDED:

1. RETIRED FROM THE US NAVY AS A CAPTAIN AFTER 33 YEARS AND 10 MONTHS SERVICE.

2. ESTABLISHED OUR HOME ON THE EAST BANK OF THE CHOWAN RIVER IN THE VICINITY OF MARKER #9.

3. INTEREST IN WATER QUALITY BEGAN WHEN THE CHOWAN RIVER BECAME INFESTED WITH SEVERE ALGAL PROBLEMS SINCE THE MIDDLE 1970s BECAME ACTIVE IN THE FOLLOWING:

a. ESTABLISHED THE ARROWHEAD STREAMS WATCH PROGRAM. THE WATER MONITORING PROGRAM CONTINUES AS A PART OF THE CWQMP. REPORTS OF THE WATER TESTING PROGRAM ARE FILED WITH THE DIVISION OF WATER QUALITY.

b. SERVED AS CHAIRMAN OF THE Chow REGIONAL TASK FORCE FOR THE Chow RESTORATION PROJECT.

c. MEMBER, NORTH CAROLINA/VIRGIN By-STATE WATER CONTROL BOARD

d. MEMBER, APES, ALBEMARLE CITIZENS ADVISORY COMMITTEE.

d. MEMBER, CHOWAN REGIONAL COUNCIL.

JOAN, SHORT & TO THE POINT AS REQUESTED. HAVE A GOOD DAY. THANKS FOR ALL OF YOUR HARD WORK THESE PAST TEN PLUS YEARS.

RESPECTFULLY,

December 2, 1997

Joan Giordano
DENR-DWQ
943 Washington Square Mall
Washington, NC 27889

Dear Joan:

Attached please find my biography. I do not wish to be nominated for any office. My sole concern on this council is the betterment of the Chowan River Basin.

I look forward to working with the Regional Council and please do not hesitate to call me at 919-356-2184 if you have any questions.

Sincerely,

G.D. Perry, Sr.
Regional Council Member
2216 Highway 45
Colerain, N.C. 27924

GEORGE DONALD (G.D.) PERRY
BIOGRAPHY

I was born in Bertie County on July 12, 1922 and I graduated from Colerain High School in 1941. I have lived my entire life in Bertie County on the Chowan River, except when I worked in the Newport News Shipyard for 3 years and served in the Navy during World War II. I have been married to my wife, Lucille, for almost 54 years and we have raised 3 children, 2 girls and 1 boy, and we currently have 5 grandchildren and 1 great-grandchild.

I purchased my first farm and river front property on the Chowan River when I was 20 years old. I have a private beach, Perry's Beach, located on the Chowan River, which has 19 family homes. Since the purchase of my first farm and the river property, I have bought multiple farms, solely, and in conjunction with my son G.D. (Buck) Perry, Jr. Buck currently farms all the property since my retirement in 1987. I have been a Farm Bureau Tobacco Advisory Committee Member for the last 15 years and I have served on the Bertie County Board of Directors for 20 years.

PS. I do not wish to be nominated for any office. My sole concern on this council is the betterment of the Chowan River Basin.

From: **"Brenda Griffin" <NROAR01/TS19P71>**
Organization: **WaRO-DEHNR**
To: **n1ew484**
Date: **Wed, 3 Dec 1997 09:45:08 +1100**
Subject: **(Fwd) Delivery failure**

------- Forwarded Message Follows -------
To: Postmaster
From: Postmaster
Date: Tue, 2 Dec 97 20:49:29 +1100
Subject: Delivery failure

Failed message:
reason - 'User <nlew484@waro.ehnr.state.nc.us> not known at this site.'

$$<lowynns@coastalnet.com>
<nlew484@waro.ehnr.state.nc.us>

Return-path: <lowynns@coastalnet.com>
Received: from abaco.coastalnet.com by waro.ehnr.state.nc.us (Mercury 1.31) with ESMTP;
2 Dec 97 20:49:26 +1100
Received: from lee-wynns (pm-brt1-46.coastalnet.com [205.245.118.46])
□by abaco.coastalnet.com (8.8.8/8.8.8) with SMTP id UAA18749
□for <nlew484@waro.ehnr.state.nc.us>; Tue, 2 Dec 1997 20:42:49 -0500 (EST)
Message-Id: <1.5.4.32.19971203014853.0066c38c@abaco.coastalnet.com>
X-Sender: g3u7b5bt@abaco.coastalnet.com (Unverified)
X-Mailer: Windows Eudora Light Version 1.5.4 (32)
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
Date: Tue, 02 Dec 1997 20:48:53 -0500
To: Joan Giordano <nlew484@waro.ehnr.state.nc.us>
From: Lee Wynns <lowynns@coastalnet.com>
Subject: Biography

Biographical sketch for Lee Wynns
Born 1941 Colerain, NC Bertie County
Graduated Colerain High School 1959
BS Science Teaching, Major Chemistry, UNC Chapel Hill 1964
Masters of Education, UNC Chapel Hill 1971
Teacher Bertie High School 3 Years
Assistant Principal Bertie High School 2 Years
1973 to present worked with Perry-Wynns Fish Co., Inc.
Member Bertie County Board of Education 12 years, Chairman 8 years

Mayor Town of Colerain 4 years, re-elected to a third 2 year term
Member Herring Advisory Panel, Atlantic States Marine Fisheries Comm.
Member Herring Fisheries Management Plan Advisory Panel, NC Div. Marine Fisheries

If you need any other information I can be reached at Perry-Wynns Fish Co., Inc.
Telephone (919)356-4387
Fax (919)356-2515

****

Brenda Griffin
Extension 210

COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY

5636 Southern Boulevard
Virginia Beach, VA 23462
Tel# (757) 518-2000
http://www.deq.state.va.us

Dennis H. Treacy
Director

Francis L. Daniel
Tidewater Regional Director

April 3, 2000

Ms. Joan Giordano
APNEP
943 Washington Square Mall
Washington, NC 27889

RE: **Change of Name**

Dear Ms. Giordano:

This letter is in response to request a change of name of Mr. Kevin Curling from Department of Environmental Quality to Ms. Michelle E. Fults.

Ms. Fults just replaced Mr. Curling who accepted a position with Virginia Marine Resources Commission, recently.

Below is the address, telephone number and the correct information that you might need to update your records.

Michelle E. Fults
Environmental Engineer
Department of Environmental Quality
5636 Southern Blvd.
Virginia Beach, Virginia 23462
(757) 518-2160

If you have any questions, please do not hesitate to contact Michelle at (757) 518-2160. Thank you for your cooperation with this matter.

ILA

Called P. Stanforth + told him to call Chas. Vaughan + Tim Johnson @ Jeff Brown CGIA

From: **<alan@dem.ehnr.state.nc.us>**
Organization: **DWQ Water Quality**
To: **N1EW484@waro.ehnr.state.nc.us**
Date: **Fri, 14 Nov 1997 9:32:42 EST**
Subject: **Re: Chowan River Basin Regional Council**
Cc: **greg@dem.ehnr.state.nc.us**
Priority: **normal**

Hi Joan. Great writeup. Thanks for keeping me posted. I hope the exchange between Joe and Mr. Perry doesn't lead to rifts down the line. Will look to hearing how the Tar-Pam goes.

From: "Joan Giordano" <N1EW484@waro.ehnr.state.nc.us>
Organization: WaRO-DEHNR
To: <alan@dem.ehnr.state.nc.us>
Date: Fri, 14 Nov 1997 09:32:06 +1100
Subject: Chowan River Basin Regional Council
Cc: Guy@dem.ehnr.state.nc.us, suzanne@dem.ehnr.state.nc.us
Priority normal

Good Morning Alan: The Chowan Regional Council meeting held yesterday in Ahoskie went well despite the sparse attendance. There were 6 regular members there, who happen also to be the core group from the Albemarle CAC, in session during the old APES days. Marjorie Rayburn (Coop. Ext.), and Tim Johnson and Jeff Brown (CGIA) also participated.

The group seemed disinterested in adopting the consensus method of decision-making and will query the entire membership for additions/deletions to the strawman by-laws. Those present unaminously supported the majority voting method.

The group added to the "concerns" and "hopes" listings developed at the Plymouth meeting in September and asked that there be a representative from Virginia at the next meeting. I explained my conversations with Bill Browning (Richmond) and John Carlock (Hampton Roads Planning District Commission) and they want to formally invite Carlock for a presentation at the next meeting, to be held in January. There also was inquiry about the Coor. Council.

They endorsed the idea of Johnson and Brown sending a letter out to the full membership to query them about any additional needs/concerns for inclusion in the database CGIA is compiling for the CWMTF grant. The members at the meeting were receptive to Johnson and Brown and they (J&B) felt the meeting

to be helpful to them. They will also be with us in Greenville today.

The group also discussed the vacancies on the council and the fact that more members did not show up for their first meeting. Brewster Brown (who I think wants to be Chairman) indicated to me that he was going to phone the absent folks to remind them of their role. I like his assumption of responsibility for doing this. Hopefully he can muster some participation or at least determine who chooses to remain and who wants to go.

They mentioned the neccessity of complying with the "Open Meetings Law" by noticing several of the papers in the area when subsequent meetings are to be held.

They formed a nominating committee to solicit candidates for the offices of Chair, V. Chair and Secretary and will take that up at the next meeting. At the next meeting also, they are hoping to prioritize their "concerns" listing preparatory to composing their program of work for the year.

Some of their additional concerns were interesting. For example, they are wanting to know where the federal $$ went that were available for "snagging" debris from the Meherrin River. Also, they are concerned about pfisteria in the Chowan and (presumably) want to make sure it doesn't occur there. I'm not quite sure that a plan has been thought through!! The last newly referenced concern had to do with the removal of the dioxin warning signs from the Chowan. They feel there is no threat (vehemently introduced and supported by Joe Stutts' Union Camp {former} affiliation) and were quick to point out that there was excedance only at the Hwy. 17 bridge. Upon G.D. Perry's(Bertie Co.-Ag.) exclamation that the info/data was contributed by Union Camp (and that is presumably like sendig the fox to guard the hen house) Joe Stutts fired back that "the data were credible/honest and that mistrusting those data was mistrusting him." Needless to say Mr. Perry became quiet. All in all, a very interesting meeting.

I hope today in Greenville is somewhat better attended, especially since the Tar-Pam has traditionally been a stronghold of citizens' rights thinkers! Talk/type to you later. Joan

Recd
12-1-97

Joseph H. Stutts
Environmental Communications
110 Spring Avenue
Murfreesboro, North Carolina 23855
November 25, 1997
919-398-3525
FAX 919-398-3525*51

Mr. Guy Stefanski
Department of Environment and Natural Resources
Water Quality Planning
512 North Salisbury Street
Raleigh, North Carolina 27626-0535

Dear Guy:

You will recall that Brewster and I recommended Patricia Piland for membership on the Chowan Council. I received her resume' yesterday and here is a copy. You will note that she has a great deal of expertise germane to our effort, and we again recommend strongly that she be appointed. I have told her of our January meeting and asked her to attend.

A key to the success of the Council system will be the reception the comments and concerns of the councils have in Raleigh. There was a perception among the members of the APES CAC's that their input was neither welcomed nor considered. Recognizing that the CAC's existed in a different time and under a different philosophy of management, I am certain that you and your associates will do a better job. Yet, it will be necessary to overcome a certain amount of skepticism, and I know you and Joan will be working to set the atmosphere to do that.

I have left a message for John Carlock of the Hampton Roads Regional Planning Commission, and I hope he can attend the January meeting. This I will confirm with you.

Before the January meeting I want to poll the members by telephone to remind them to come. It might be a good idea to get a card or letter out now so they can get it on their calendars. Notifications in December sometimes get lost in the welter of holiday mail.

Best wishes for a happy Thanksgiving. The Council is a great opportunity to work with you for the welfare of the Chowan, and I have enjoyed seeing you again.

Sincerely,

P O Box 312
Edenton NC 27932
December 18, 1997

Joan Giordano
NC Department of ENR
943 Washington Square Mall
Washington NC 27889

Dear Joan,

I received the packet of information from you for the Pasquotank Regional Council. I don't know if you recall this or not, but at the kick-off meeting in Plymouth Capt. Al Howard and I spoke with you and Guy about switching me over to the Chowan River Basin Council, since this is the area I live and work in, and I attended the Chowan group's meeting that day. You indicated to us then that you would remove my name from the Pasquotank Council's list; however, I have not received any information on the Chowan Council and am still receiving Pasquotank information.

If possible, would you please switch my name over to the Chowan Council? Also, please correct my mailing address to: P O Box 312, Edenton, NC 27932.

Thanks so much! Hope you and yours have a happy holiday season. I look forward to working with you during 1998!

Sincerely,

Nan

Nan Laughton

1/7/98
Called @ home #- La
message to call me
just to come to Chow
meeting tomorrow (1/8)

- Call me @ 482-4127 (W) or 482-3280 (H) if you have questions - Thanks!

NCDENR
North Carolina Department of Environment and Natural Resources

N.C. Department of Environment and Natural Resources

Release: IMMEDIATE
Date: January 14, 1998

Contact: Don Reuter, 919/715-4112
Distribution: Targeted

SEDIMENTATION AND EROSION CONTROL PLAN ISSUED FOR NUCOR SITE

RALEIGH -- The state's Division of Land Resources on Wednesday approved an erosion and sedimentation plan for land clearing on 126 acres in Hertford County at the 900-acre site of the proposed Nucor Steel Corp. steel recycling plant.

The plan includes slope, buffer maintenance and ground cover requirements to protect adjoining natural resources and properties. No wetlands or areas requiring Coastal Area Management Act permits will be disturbed by the activities allowed under the plan. Failure to comply with any part of the approved plan or with any requirements of the state's Sedimentation Pollution Control Act will result in enforcement action. Nucor still must receive other environmental permits before constructing the proposed facility.

In June 1998, Nucor Steel, based in Charlotte, announced plans to build a $300 million steel recycling facility in eastern Hertford County. In late November 1998, the state called for the completion of an environmental assessment of the project, in accordance with the State Environmental Policy Act (SEPA). The company is in the process of preparing the assessment. Once completed, it will be made available for state agency, federal agency and public review.

Nucor submitted a sedimentation and erosion control plan in November and submitted revisions for three limited land clearings in December. Under the Sedimentation Control Commission's rules and law, the application must be approved or denied within 30 days or it is automatically approved.

The SEPA process continues to apply to the proposed Nucor project. Decisions on additional development and operational permits will not be made until the environmental assessment process is completed.

###

NCDENR

JAMES B. HUNT JR.
GOVERNOR

WAYNE MCDEVITT
SECRETARY

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

January 12, 1999

MEMORANDUM

TO: Charles Gardner, Director, Division of Land Resources
John Morris, Director, Division of Water Resources

FROM: Bill Holman, Assistant Secretary for Environmental Protection

SUBJECT: Nucor/SEPA Process
Land Clearing at Nucor Site

In an opinion letter issued on December 23, 1998, the Attorney General's office advised DENR that the SEPA requirement for the Nucor project was limited under SEPA to the CAMA permit (copy attached). The sole use of public monies and/or public lands in the development of the project is the bed of the Chowan River. The economic incentive package is not public money available for the development of the project, because it is contingent on the satisfaction of numerous conditions that cannot be fulfilled for several years after the plant is manufacturing steel.

The second question raised to the Attorney General's office focused on a DENR rule concerned with SEPA - - 15NCAC 1C.0402(2). The Attorney General's Office advised DENR that the issue was a policy question. The relevant provision reads:

> "(d) While work on an environmental document is in progress, no agency shall undertake in the interim any action which might limit the choice among alternatives or otherwise prejudice the ultimate decision on the issue."

Nucor first submitted a Sedimentation and Erosion Control Plan in November, and Nucor submitted a revised Sedimentation and Erosion Control Plan for three limited land clearings in December. Under the Sedimentation Control Commission's rules and the statute, the application must be processed within 30 days or it's automatically approved. The Commission's rule suspend the processing of the plan for SEPA compliance only when SEPA applies to th project.

P.O. BOX 27687, RALEIGH NC 27611-7687 / 512 NORTH SALISBURY STREET, RALEIGH NC 27
PHONE 919-733-4984 FAX 919-715-3060 WWW.EHNR.STATE.NC.US/EI

I have determined that SEPA does not apply to the Sedimentation and Erosion Control Plan under consideration as a consequence of the application of 15 NCAC 1C .0402(2). Nucor has submitted a letter on January 11 (copy attached) to DENR stating that it will not seek the issuance of additional permits until the SEPA process is completed. In addition, Nucor states in its letter that it will not seek any advantage in SEPA choice among alternatives by the ability to move forward with land clearing at site. Accordingly, DENR will not consider the investment made by Nucor in site preparation as it considers choices among alternatives in making SEPA decisions. For that reason, the rule does not apply to the Sedimentation and Erosion Control Plan now under consideration. When the review of Nucor's Sedimentation and Erosion Control Plan is completed the Division of Land Resources should follow the normal approval process for a non-SEPA project.

Attachments

cc: Edythe McKinney
Dan McLawhorn
Robin Smith
Allen Jernigan
Don Reuter

HAEL F. EASLEY
ATTORNEY GENERAL

State of North Carolina
Department of Justice
P. O. BOX 629
RALEIGH
27602-0629

Reply to: Robin W. Smith
Environmental Division
Tel: (919) 716-6600
Fax: (919) 716-6767

Mell Nevils
return to CHH
DEC 22 '98
12/22/98
DIV LAND RES.

December 21, 1998

Mr. Daniel F. McLawhorn
General Counsel
Dept. Of Environment and
Natural Resources
P.O. Box 27687
Raleigh, N.C. 27602

Re: Application of the Environmental Policy Act, N.C.G.S. § 113A-1, *et seq.*, to Preliminary Nucor Steel Activities

Dear Dan:

By memorandum of December 18, 1998, you raised several questions concerning the application of the North Carolina Environmental Policy Act, N.C.G.S. § 113A-1, et seq. (SEPA) to site preparation activities prior to final approval of the environmental document for the Nucor Steel Plate Mill (Nucor) proposed for Hertford County. I have restated and responded to each of the questions raised in your memorandum below.[1]

1. Because the activities that will be authorized by the erosion and sediment control plan approval do not involve the alteration or disturbance of public lands, is the erosion and sediment control plan approval and agency action subject to SEPA?

No. The NCEPA requires preparation of an environmental document for "any action involving expenditure of public moneys or use of public land for projects and programs significantly affecting the quality of the environment." N.C.G.S. § 113A-4(2).

Rules adopted by the Department of Administration pursuant to the NCEPA define "action" to include "licensing, certification, permitting, the lending of credit, expenditures of public monies, and other similar final agency decisions the absence of which would preclude the proposed activity". T01 NCAC 25.0108(b)(1). While approval of an erosion and sediment control plan could be an

[1] This is an advisory letter; it has not been reviewed and approved in accordance with the procedures for issuing and Attorney General's Opinion.

"action" within the meaning of the rule, the action must also involve either public moneys or use of public lands to trigger the application of SEPA. The background facts stated in your memorandum indicate that no public funds will be involved in the Nucor project. Since your question specifically concerns a situation in which the "action" also does not involve use of public lands, the Act would not apply to require preparation of an environmental document prior to approval of the plan.

2. **If the answer to question 1 is "yes", will DENR's decision, based on an agreement by Nucor to restrict the development as described and to restore the disturbed areas if the SEPA review is not completed, constitute an action which "might limit the choice among alternatives or otherwise prejudice the ultimate decision on the issue" as a matter of law?**

DENR's procedural rules implementing SEPA, T15A NCAC Subchapter 1C, restrict agencies within the Department from taking actions that "might limit the choice among alternatives or otherwise prejudice the ultimate decision on the issue" while work on an environmental document is still in progress. T15A NCAC 1C.0402. Thus, an action that would not in itself trigger SEPA may be barred until an environmental document has been completed if the action could prejudice the outcome of the environmental review. The rule requires the agency contemplating such an action to determine, on a case by case basis, whether its decision would have a prejudicial effect.

Your memorandum does not set out sufficient facts concerning the scope of the preliminary development proposed by Nucor or the nature of the restoration agreement to allow further analysis under Rule 1C.0402. In any case, the application of the rule to the specific facts surrounding Nucor's proposal would initially be within the judgment of the DENR agency. Generally, however, DENR may use agreed-upon restrictions and restoration commitments to ensure that any site preparation activities allowed do not compromise the ultimate decision.

3. **If the answer to 1 is "yes" is the erosion and sediment control plan complete within the meaning of 15A NCAC 4B.0018(5) when the EA/FONSI is published in the Clearing house Bulletin or when DENR completes the SEPA process described in the rules at T15A NCAC 1C.0101(a)(1)?**

As concluded above, the approval of an erosion and sediment control plan for land-disturbing activity that does not involve either public moneys or public lands does not trigger SEPA. Rule 15A NCAC 4B.0018 (5) provides as follows:

> (5) Any plan submitted for a land-disturbing activity for which an environmental document is required by the North Carolina Environmental Policy Act shall be deemed incomplete until a complete environmental document is available for review. The Commission shall promptly notify the person submitting the plan that the 30 day time limit for review of the plan pursuant to Subparagraph (b)(2) of this Rule shall

not begin until a complete environmental document is available for review.

The rule has no direct application where the land-disturbing activity itself does not require an environmental document. If an environmental document is required for the land-disturbing activity, the Court of Appeals has held that it is inappropriate for the agency to take action before having the final document. *See, In Re E.M.C.*, 53 N.C.App. 135, 280 S.E.2d 520 (1981)(final environmental impact statement required prior to Environmental Management Commission certification of eminent domain proceedings for creation of a publicly funded water supply reservoir). The cited rule reflects the reasoning and decision of the Court of Appeals in that case.

Even if the land-disturbing activity does not trigger SEPA review, plan approval may be barred under T15A NCAC 1C.0402 as discussed above. Where DENR determines that approval of an erosion and sediment control plan may "limit the choice among alternatives or otherwise prejudice the ultimate decision" with regard to a larger project that requires an environmental document, plan approval must be delayed until the environmental document is "available for review" pursuant to T15A 1C.0402. The rule does not indicate whether the environmental document "available for review" must be in final form and there is no law directly interpreting the rule. While the rule remains subject to DENR interpretation, you may look to *In re EMC* for guidance. Although that case concerned an action that directly triggered SEPA, it would be reasonable to require the same degree of finality for actions that could otherwise prejudice the outcome of the environmental review.

Please call if you have additional questions.

Very truly yours,

Robin W. Smith
Special Deputy Attorney General

cc: Edwin M. Speas, Jr.
Charles Gardner

ep/

nucor steel

A Division of NUCOR Corporation

216 North Street
Ahoskie, North Carolina 27910

Telephone (252)332-2222
Fax (252)332-2410

January 11, 1999

VIA FACSIMILE

Mr. Dan McLawhorn
General Counsel
North Carolina Department of Environment
and Natural Resources
Archdale Building
512 N. Salisbury Street
Raleigh, North Carolina 27611

RE: Nucor Corporation: Hertford County Plate Mill

Dear Mr. McLawhorn:

This letter confirms that, in connection with activities pursuant to the sedimentation and erosion control plan and stormwater construction permit for the referenced project, Nucor Corporation ("Nucor") will not undertake further activities that would require additional permit approvals and would result in limiting the choices among agency actions or otherwise prejudicing the ultimate decision with respect to state agency review of Nucor's environmental assessment for the project, prior to completion of the North Carolina Environmental Policy Act (N.C. Gen. Stat. 113A-1, *et seq.*) environmental assessment for the project.

Nucor acknowledges that its ability to undertake the land clearing and related activities associated with the sedimentation and erosion control plan and stormwater construction approvals will be entitled to neither positive nor negative weight with respect to any future agency permitting decisions for this project.

Please contact the undersigned if you have any questions.

Very truly yours,

Giffin F. Daughtridge
General Manager

(1)

CHOWAN RIVER BASIN COUNCIL

110 Spring Avenue
Murfreesboro, North Carolina 27855
January 24, 1998

Post-it® Fax Note 7671	Date 1-27-98	# of pages ▶ 2
To Jon Giordano	From Joe Stutts	
Co./Dept. APES	Co. Chow. Bas. Coun.	
Phone #	Phone #	
Fax # 919-975-3716	Fax #	

Arthur L. Collins, Executive Director
Hampton Roads Planing District Commissio
723 Woodlake Drive
Chesapeake, Virginia 23320

Dear Mr. Collins:

The Chowan River Basin Council has been established by executive order of the Governor to provide citizen and local government input for the administration of the Comprehensive Conservation Management Plan (CCMP) that resulted from the Albemarle-Pamlico Estuarine Study (APES). As you know, approximately seventy-five percent of the water entering the Chowan River flows from Virginia. It is therefore important that the Council is familiar with the various aspects of the Virginia side of the watershed, including steps taken to improve stream quality.

Mr. John Carlock served on the APES Citizen Advisory Committee and was a great asset in keeping us informed of the progress in Virginia. He has recently given the Council an appreciation of the overall situation.

The Council asks that Mr. Carlock be appointed to serve with us. His input will be invaluable in achieving mutual understanding between us and groups in Virginia. Additionally, he has great credibility and is much respected by the group, a number of whom served with him on the APES. He is an able representative of your Commission.

You may recall that we met some years ago when you visited Union Camp and on several other occasions. Thank you for working with us.

Sincerely,

Joseph H. Stutts
Interim Chairman

(2)

CHOWAN RIVER BASIN COUNCIL

110 Spring Avenue
Murfreesboro, North Carolina 27855
January 27, 1998

Dennis Morris, Executive Director
Crater Planning District Commission
1964 Wakefield Street
Petersburg, Virginia 23805

Dear Mr. Morris:

The Chowan River Basin Council has been established by executive order of the Governor to provide citizen and local government input for the administration of the Comprehensive Conservation Management Plan (CCMP) that resulted from the Albemarle-Pamlico Estuarine Study (APES). As you know, approximately seventy-five percent of the water entering the Chowan flows from Virginia. It is therefore important that the Council is familiar with various aspects of the Virginia side of the watershed, including the steps taken to improve water quality.

At our last meeting, Mr. John Carlock of the Hampton Roads Planning District Commission staff, who served on the APES, presented an overview of the status of the watershed which was much appreciated. The Council has requested that Mr. Carlock be appointed to join us. He suggested that a representative of the Crater District, representing the western part of the watershed, would be a valuable addition. The Council strongly agrees and asks that you appoint a representative to work with us.

Representatives from Virginia will do much to improve communications between our states and will provide accurate insight into activities that will be mutually beneficial. This vast estuarine system is of huge economic and environmental importance to us and to many Virginians as well.

We look forward to hearing from you and to welcoming your appointee. Our next meeting will be at 4:00 PM on Wednesday, March 11 on the Chowan in Bertie County. We are providing dinner, and I will send you a map and detailed directions.

Thanking you in advance, I am,

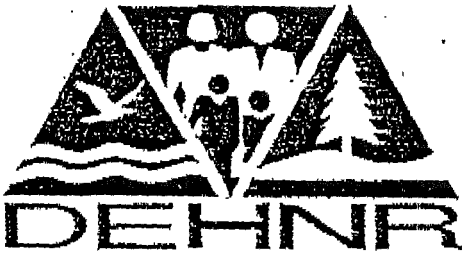
Sincerely,

Joseph. H. Stutts
Interim Chairman

Joan - I'll meet with Mr. Perry and draw you a map.

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Water Quality

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
A. Preston Howard, Jr., P.E., Director



WATER QUALITY SECTION
COMPLIANCE GROUP
PHONE: (919) 733-5083, extension 581
FAX NUMBER: (919) 715-6048

TELECOPY TO: Joan Giordano

FAX NUMBER: WaRO

FROM: SHANNON LANGLEY

NUMBER OF PAGES INCLUDING THIS SHEET: 5

COMMENTS: _____

534-5841 FAX (919) 534-1045

Northampton County Health Department
P. O. Box 635
Jackson, North Carolina 27845

December 2, 1997

Mr. Wayne McDevitt, Secretary
NC Department of Environment and Natural Resources
Archdale Building
512 N. Salisbury Street
Raleigh, North Carolina 27604

Dear Mr. McDevitt,

On Monday, December 1, 1997, it was reported to our office that there was a serious violation of State Water Quality Rules at the Glen Cullifer Hog Farm located on U.S. 258 south of Woodland, North Carolina. The violations involved improper disposal of dead animals and a possible discharge into Urahaw Swamp. This problem was reported by a concerned citizen through our County Attorney and County Manager, who directed us to contact you. The problem has also been reported to Buster Towell and Ken Schuster of the Raleigh Regional Office.

My conversation with Mr. Towell leads me to believe that this violation was recently discovered by him during his regular inspection of the facility, and that a Notice of Violation was issued subsequent to that inspection. Mr. Towell is scheduled to visit the facility this week to investigate this latest complaint.

We would appreciate your assistance in investigating this complaint and correcting any problems found. If our agency can be of any assistance on this or any other matter, please do not hesitate to call.

Thank you for your attention to this matter.

Sincerely,

John L. White, RS
Health Department
Northampton County

JLW/pw

Cc: Sue Gay, Acting Health Director
W. E. Daniels, County Manager
Charles Vaughan, County Attorney
Ken Schuster

PHONE (919) 534-6841

FAX (919) 534-1048

Northampton County Health Department

P.O. Box 655

Jackson, North Carolina 27845

DEC 12

December 10, 1997

Ken Schuster, P.E.
Raleigh Regional Supervisor,
Division of Water Quality
3800 Barrett Drive
Raleigh, North Carolina 27608

Dear Mr. Schuster:

I am writing to request that an in-depth investigation be conducted in response to continuing complaints and concerns surrounding the Glen Cullifer Hog Farm on US 258 near Woodland, NC.

As you may recall, I reported to Buster Towel of your office that we had received a complaint through our County Attorney, on poor management of dead carcasses and a possible illegal discharge from the lagoons. Mr. Towell visited the site on Thursday, December 4, 1997, and did make note of deficiencies in the area of carcass disposal. He also noted only 6" of freeboard on one of the lagoons. No illegal discharge pipe was noted during this visit; however, there is speculation on the part of the complainant that this pipe does exist; as it is reported that they have seen effluent "bubbling" pits. It is because of this continuing question, and the 6" of freeboard that I have been asked to request an in-depth investigation from your office.

Your assistance on this matter would be greatly appreciated. If our office can offer any assistance, please do not hesitate to call.

In closing, may I say that I personally appreciate the promptness of Mr. Towell's visit, and believe that he made an adequate appraisal of the situation as it existed that day; concern from the complainant is that this is an intermittent discharge that there was, and this discharge was not in operation during Towell's visit. Mr. Towell has been of great assistance to our office in the past and his help is always appreciated.

Again, please contact our office if we can be of assistance, and please notify us of your findings.

Sincerely,

John L. White, RS
Environmental Health Coordinator

JLW/jam

Cc: Sue Gay, Acting Health Director
Earl Daniels, County Manager
Charles Vaughan, County Attorney

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

NCDENR

JAMES B. HUNT JR.
GOVERNOR

WAYNE MCDEVITT
SECRETARY

DEC 16 1997

Mr. John L. White, RS
Northampton County Health Department
Post Office Box 635
Jackson, North Carolina 27845

Dear Mr. White:

Thank you for the recent letter and for sharing your concerns about the Glen Cullifer hog farm near Woodland.

The North Carolina Division of Water Quality inspected the farm and found that not enough freeboard was being maintained in the lagoon. The Division issued a Notice of Violation to Mr. Cullifer on December 9, a copy of which the Raleigh Regional Office is sending you. Mr. Cullifer has 30 days to respond to the violation notice and will be required to correct the problem involving his lagoon. The investigation is continuing and enforcement actions are being considered.

Water quality staff have referred the issue of improper animal disposal to the Veterinary Division, North Carolina Department of Agriculture and Consumer Services. The Veterinary Division has jurisdiction in this particular matter.

Thank you again for sharing your concerns and interest. You will be advised of progress on the Division of Water Quality investigation.

Sincerely,

Wayne McDevitt

Wayne McDevitt

WD:aph

cc: A. Preston Howard, Jr.
Ken Schuster

DEC 18 1997

P.O. BOX 27687, RALEIGH NC 27611-7687 / 512 NORTH SALISBURY STREET, RALEIGH NC 27604
PHONE 919-715-4101 FAX 919-715-3060 WWW.ENR.STATE.NC.US/EHNR/

FAX TRANSMITTAL

TO: Joe Stutts FAX # (919) 398 3525 *51

FROM: Joan Giordano Telephone # (919) 946-6481 ext. 269

SUBJ: Ad Hoc Committee Members Identified at 4/23/98 Workshop Meeting

DATE: April 30, 1998

MESSAGE: **Joe, per your request earlier today. Have a good weekend!!**

CHOWAN RIVER BASIN REGIONAL COUNCIL AD HOC COMMITTEES

MONITORING:

Cpt. Al Howard
Patricia Piland
Roger Spivey
Lee Wynns
Tom Morgan
Marjorie Rayburn
VA rep (name coming from Victor Liu)

PARTNERSHIPS:

Jerry Parks
Brewster Brown
Billy Griffin
Nan Laughton
Nancy Nicholls
Charles Vaughan

CHARLES J. VAUGHAN
ATTORNEY AT LAW

TELEPHONE
OFFICE 919-587-5631
HOME 919-587-3821

P. O. BOX 370
WOODLAND, NORTH CAROLINA 27897

May 12, 1998

Mr. Joe Stutts, Chairman
Chowan River Basin Regional Council
110 Spring Avenue
Murfreesboro, NC 27855

Dear Joe:

I received your 11 May 1998 notice that the next meeting of the Chowan River Basin Regional Council will be held on 19 May 1998 at 10:00 a.m. in Edenton.

As you know, I am a self-employed attorney with an office in Woodland. I am also County Attorney for Northampton County. Many of the other members of the Council are either retired or county or state employees. The demands of my law practice will not realistically permit me to attend meetings such far distances in the middle of the work day. I believe that we discussed some of these factors at a previous meeting and I hope that we agreed that meetings would be conducted at the Roanoke Chowan Technical College in the late afternoon or early evening.

Please cause future meeting times and locations to be placed upon the Agenda for discussion at the 19 May meeting. I regret having missed the 19 March meeting as I traveled to Colerain Beach on 18 March for the meeting mistakenly believing it had been postponed one week from 11 March. I have a keen interest in serving on this Council. However, I will not be able to do so unless the meetings are scheduled at a time and location taking into consideration the participation of privately employed persons such as myself.

Very truly yours,

Charles J. Vaughan

CJV/aeh
cc: Ms. Joan Giordano
Mr. Guy Stefanski

North Carolina Cooperative Extension Service

NC STATE UNIVERSITY

College of Agriculture and Life Sciences

Chowan Co. Center
NC Cooperative Extension Service
P.O. Box 1030
Edenton, NC 27932
(252)482-8431

June 18, 1998

Mr. Joe Shutz
Chairman
Chowan Riverbasin Council
110 Spring Avenue
Murfreesboro, NC 27855

Dear Joe,

The Chowan Riverbasin Working Group for EPA 319 Projects met on Friday, June 12th to review the progress of our grant to look at Best Management Practices to improve water quality in the Chowan Riverbasin. Drs. Carl Crozier and David Lindbo, NCSU Soil Science Extension Specialists are assuming leadership of the demonstration projects. They would like the opportunity to address the Chowan Riverbasin Council to inform them about what is involved in the projects, some of the objectives and what BMPs are being studied. If possible, they would like to be put on the agenda for the next Chowan Riverbasin Council meeting.

I think it would be valuable for the Council to know what research and demonstrations are being done in the basin and the information that could be available to the Council as a result of these studies. Feel free to contact Dave and Carl for more details on this project.

Thank you ,

Marjorie Rayburn
Area Specialized Agent, IPM

MR/str

c: Joan Giordano, NCDWQ
Guy Stefanski, NCDWQ
David Lindbo, NCSU Soil Science Specialist
Carl Crozier, NCSU Soil Science Specialist

NORTH CAROLINA GENERAL ASSEMBLY
PRESIDENT PRO TEMPORE
SENATOR MARC BASNIGHT
RALEIGH 27601-2808

June 22, 1998

Mr. Al Howard
304 Pocahontas Trail
Edenton, NC 27932

Dear Mr. Howard:

Thank you for your interest in the proposed Nucor facility and its potential environmental impacts. I appreciate your concern for the environment of your region, and your desire to learn more about this facility which will have such an impact – a positive one we believe – on the Northeast.

The Nucor facility will be a steel *recycling* production facility. It will not smelt raw ore and manufacture steel; it will take existing steel, such as in the form of scrap automobiles, melt it down, and refashion it into steel plates suitable for further processing and refinement at other facilities. This type of *recycling* facility has far less impact on the environment than a steel *manufacturing* facility. Even so, both the state and Nucor are committed to ensuring that all environmental concerns are addressed and all environmental regulations are followed.

Nucor will be required to comply with *all* state and federal environmental regulations, including regulations regarding surface and groundwater discharge, air emissions, and storm water run-off. No exemptions to these permit requirements have been granted, and Nucor has not requested any. The Department of Environment & Natural Resources and the Department of Commerce have formed a team of department staff representing the various permitting divisions to work with Nucor throughout the permitting process. A series of meetings between the Department's staff team and Nucor representatives has already begun, and will continue through the weeks and months ahead as Nucor works through the permitting process.

The staff team includes representatives from the following agencies and areas of expertise: CAMA, the Army Corps of Engineers, DENR Division of Water Quality, Title V permitting, meteorology, federal land management, DENR groundwater section, DENR stormwater section, the DENR regional office in Washington, and PSD and NPDES permitting. The permitting process will address issues including surface and

1ST DISTRICT • STATE LEGISLATIVE BUILDING • RALEIGH, NORTH CAROLINA 27601-2808 • TEL (919) 733-6854 FAX (919)733-87

groundwater discharges, impact on wetlands, water supply and water supply wells, acquifer impact, wildlife habitat, air emissions, and the NSW designation of the Chowan River.

Although the permitting process has just begun, a couple of points about the facility are worth noting. First, all domestic affluent at the plant will be handled by the Town of Winton, so no BOD (nutrient) discharges will go into the Chowan River. Only cooling water and stormwater runoff will be discharged into the river, and these discharges will be cleaned through a retention pond system prior to discharge. This discharge will be at a level which the river can readily absorb.

Second, Nucor has purchased more acreage on the site than is necessary for the facility itself. This extra acreage will allow Nucor to leave in place the trees and other natural vegetation on the unused portions of the property to serve as a natural buffer for air emissions and aesthetics between the plant and adjacent landowners. Nucor has not plans at this time to expand its facility beyond the tract of land which it is currently purchasing, so there is no plan to acquire the land of adjacent property owners.

Third, Nucor has an excellent history of compliance with environmental regulations. At its recycling facility in Berkley South Carolina, (which is similar to the facility to be located in Hertford County), Nucor has been sited with only one signification environmental violation. It was issued one fine of $13,750 for an air emissions violation which resulted from a one-day malfunction of machinery. The South Carolina Department of Health & Environmental Control representative who investigated the violation was quoted as considering the violation "nothing major."

Fourth, the entire permitting and zoning process related to the Nucor facility will be done in full compliance with state and federal law. All permits and permitting applications are a matter of public record, and you are welcome to contact the Department of Environment & Natural Resources if you have any specific questions about any particular environmental or permitting matters. The contact person in DENR is Ms. Edith McKinney, and she may be reached at (919) 733-0823.

Finally, it is important to remember the benefits that Nucor brings to the Northeast. The Nucor plant will employ 350 workers with an average salary of $60,000 per year. Nucor offers a full benefits package and other amenities, including the opportunity for college scholarships for employees' children. Nucor is committed to hiring as many North Carolina residents as is feasible, and the hiring of near-by residents has been a basic component of their operations in other states. The Nucor facility offers

an opportunity for high salary jobs, spin-off economic opportunities for surrounding businesses, and a better quality of life for hundreds of citizens in the Northeast.

I hope the information provided in this letter addresses your concerns. If you have any additional questions, need further information, or would like for me to investigate any additional concerns that you have, please do not hesitate to contact me.

Sincerely yours,

Norma Mills

Norma Mills
General Counsel to the President Pro Tempore

N.C. Department of Environment and Natural Resources

Release: IMMEDIATE
Date: June 30, 1999

Contact: Don Reuter, 919-715-4112
Distribution: Targeted

DENR COMPLETES ENVIRONMENTAL EVALUATION OF PROPOSED NUCOR STEEL MILL

RALEIGH -- The N.C. Department of Environment and Natural Resources (DENR) today announced the completion of the state's environmental analysis of the proposed Nucor Corp. steel plate recycling plant in Hertford County.

The N.C. Department of Administration's State Clearinghouse reviewed comments received on supplemental documents provided as part of the environmental analysis and recommended to DENR that they met the requirements of the N.C. Environmental Policy Act. After a thorough review of the initial environmental analysis, supplemental documents, public comments, and the Department of Administration's recommendations, the state Division of Water Resources, the lead DENR review agency, determined that the environmental assessment and mitigated finding of no significant impact (FONSI) and supplements to the EA meet the N.C. Environmental Policy Act requirements.

As part of the FONSI, the company has agreed to 29 mitigation measures designed to avoid and minimize any potentially significant, adverse environmental impacts. The measures include:

- Connecting to the Town of Winton's wastewater treatment system instead of a wastewater discharge to the Chowan River;
- Increased water recycling to minimize groundwater withdrawals;
- Use of Best Available Technology to minimize air emissions, and
- Loading dock construction designed to minimize fisheries impacts. (a list of significant mitigation measures is attached)

"The Nucor facility has received more public and private environmental review than any other private industrial facility in North Carolina," said John Sutherland, Chief of the Water Projects Section in the Division of Water Resources, who directed DENR's environmental review. "The input received from environmental groups and private citizens during the public review and comment period helped make our review more thorough."

In June 1998, Nucor Corp., based in Charlotte, announced plans to build a $300 million steel recycling facility in eastern Hertford County. In November, the state called for the completion of an environmental assessment of the project, in accordance with the N.C. Environmental Policy Act.

In January, DENR forwarded to the State Clearinghouse the initial environmental assessment (EA). The documents were published in the North Carolina Environmental Bulletin, and the conclusions were made available for review and comment by state and federal agencies, environmental groups and the public

The State Clearinghouse received about 150 letters on the proposed project during the initial public comment period, which closed March 12. In addition, DENR held a public hearing March 1 in Murfreesboro on the proposed facility and the environmental documents.

In late March, DENR directed Nucor Corp. to prepare a supplemental environmental assessment (EA) information requests in comments and to address whether additional measures were needed to avoid or minimize potential environmental damage associated with the proposed plant. DENR called for the additional information after the completion of an inter-agency review and evaluation of public comments on the initial environmental assessment.

Upon completion, the supplemental EA was forwarded to the State Clearinghouse for additional public comment. After review of the comments received, the Department of Administration recommended to DENR that the documents met the requirements of the State Environmental Policy Act.

Nucor must wait, however, until it receives Coastal Area Management Act and Section 404 permits and Section 401 Water Quality Certification before it can begin to do construction on the dock in the Chowan River. The normal agency review process will be required for all remaining permits. Additional mitigation measures can be required in those permits if needed.

# # #

Date: **Tue, 21 Jul 1998 15:50:42 -0500**
From: **"Preston Howard" <preston_howard@h2o.enr.state.nc.us>**
To: **Coleen Sullins <coleen_sullins@h2o.enr.state.nc.us>**
Cc: **Boss Holman <Bill_Holman_at_NRDCS01P@mail.enr.state.nc.us>**
, Tommy Stevens <tommy_stevens@h2o.enr.state.nc.us>
, jim_mulligan@waro.enr.state.nc.us
Subject: **Re: [Fwd: Pasquotank and Chowan Regional Council - NUCOR]**

I concur with your approach. I would suggest that our message to the Council on NUCOR be simply that we would be happy to convey any comments or concerns or questions that the Council has to Edythe, the department's primary contact on NUCOR matters, and to Bill Holman. We should not make any attempt to debate the merits of the NUCOR project.

Coleen Sullins wrote:

> Preston, Tommy - FYI, the Pasquotank and Chowan Regional Council of APES is
> meeting this week (thursday) and the primary subject of the meeting, appears to be
> NUCOR. We have asked Edythe McKinney to attend the meeting, but she is declining
> on the basis of not having enough information to relay at this point in time.
> Unfortunately, that puts us in a rather difficult situation. I will make another
> attempt to get Edythe to participate, at least so that she can hear the issues
> being raised (not to make a presentation). If she still does not want to attend
> the meeting, then, the best position that we can take on the Nucor issue is to
> hear the council's concerns and advise them that we will report them back to the
> department (relay them to Edythe, as she is the point person within the department
> on this particular project). As a resutl of the department specifically
> identifying Edythe as the point person on this issue and wanting everything
> coordinated through her, I do not believe it is appropriate for any of our staff
> who have been involved in parts of this issue to get up before the council. If
> you think otherwise, please advise (not sure that we could get someone to the
> meeting at this late date either). Also, note Joan's note about a group of folks
> planning to get together that same evening to organize an effort to speak out
> against the mill's location. Coleen
>
> Greg Thorpe wrote:
>
> > FYI
> >
> > Joan Giordano wrote:
> >
> > > There is going to be a meeting on Thursday night (same night as the
> > > joint Pasquotank and Chowan RC meeting) between the Wicacon Concerned

> > > Citizens group, Todd Miller, Jim Stephenson, (maybe Environmental Law
> > > Ctr. attorneys) and others, for purposes of futher organizing against
> > > the Nucor siting. I don't know where this is occurring at 7:30pm, but expect
> > > to hear shortly. Later.
> > > Joan
> > >
> > > Date: Tue, 21 Jul 1998 11:55:02 -0400
> > > From: "Greg Thorpe" <greg_thorpe@h2o.enr.state.nc.us>
> > > Reply-to: greg_thorpe@h2o.enr.state.nc.us
> > > To: Coleen Sullins <coleen_sullins@h2o.enr.state.nc.us>
> > > Cc: Guy Stefanski <guy_stefanski@h2o.enr.state.nc.us>
> > > , Alan Clark <alan_clark@h2o.enr.state.nc.us>
> > > , Joan Giordano <Joan_Giordano@waro.enr.state.nc.us>
> > > , Tommy Stevens <tommy_stevens@h2o.enr.state.nc.us>
> > > Subject: Re: NUCOR meeting.
> > >
> > > Alan had talked to Edythe (last week, I believe) and asked her to attend.
> > > Edythe said she didn't have enough info yet to discuss it or answer
> > > questions, and stated that she would not be attending. We would prefer that
> > > Edythe or someone else who knows more about this than we do would attend.
> > > The Councils are going to meet on this topic regardless, so we feel like our
> > > hands are tied. FYI. Guy, Joan, please add to this or correct anything I
> > > said if you have more info. Thanks!!
> > >
> > > Coleen Sullins wrote:
> > >
> > > > Guy - I recommend that you call Edythe McKinney, who is the departmental
> > > > liason on this particular project, and see if she is available to attend
> > > > the meeting. Nucor is an important project that has support at high
> > > > levels, I think it would be beneficial for the departmental representative
> > > > on this issue hear the concerns of the council on this issue. Coleen
> > > >
> > > > Guy Stefanski wrote:
> > > >
> > > > > Coleen,
> > > > >
> > > > > Greg asked that I inform you that NUCOR will be the main topic at
> > > > > Thursday's (7/23) joint meeting of the Chowan and Pasquotank Regional
> > > > > Councils in Winton beginning at 4:00 pm. Concern is mounting among
> > > > > citizens and propery owners about the proposed siting of this steel
> > > > > recycling facility along the Chowan River. No one from DENR or DWQ is
> > > > > scheduled to make a formal statement/presentation. At this point, we
> > > > > hope to listen/record the Councils' concerns and provide them to those

> > > > > more involved in the project. Hopefully, we can get someone (DENR,
> > > > > Commerce, or even Nucor) to speak to them in the near future.
> > > > >
> > > > > Last week, I believe Alan sent you a copy of the agenda and meeting
> > > > > notice sent by the chairman of both Councils. We'll let you know how it
> > > > > turns out.

Date: **Wed, 22 Jul 1998 18:10:39 -0400**
From: **Bill_Holman_at_NRDCS01P@mail.enr.state.nc.us (Bill Holman)**
Subject: **Re[2]: [Fwd: Pasquotank and Chowan Regional Council - NUCOR]**
To: **Coleen Sullins <coleen_sullins@h2o.enr.state.nc.us>**
, "Preston Howard" <preston_howard@h2o.enr.state.nc.us>
Cc: **Tommy Stevens <tommy_stevens@h2o.enr.state.nc.us>**
, jim_mulligan@waro.enr.state.nc.us

We have encouraged Nucor to hold a public info meeting on 7/31 so that local citizens can learn more about the project.

_____ Reply Separator _____

Rolling on the river?

6-21-98 N&O

Governor Hunt boosts a steel recycling plant as an economic blessing for Hertford County and the state's northeast, but Nucor's plans for the facility should prompt a careful environmental impact study.

The North Carolina Coastal Federation raises a pertinent question for Governor Hunt about a steel recycling plant Nucor intends to build near the Chowan River in Hertford County. Why, in light of the state's Environmental Policy Act, has not the administration more clearly conditioned its support for the project upon the results of an environmental impact study?

The 27-year-old state law is specific enough about when an EIS is to be ordered. There are three requirements, the coastal federation reminds the governor: 1) use of public funds, 2) need for actions by the state, and 3) a potential for significant environmental impacts.

Certainly, the proposed $300 million Nucor plant appears to qualify on all counts. The facility would benefit from $155.2 million in state tax credits and exemptions. Further, the Environmental Policy Act plainly states that one of its purposes is "to require agencies of the State to consider and report upon environmental aspects and consequences of their actions involving the expenditure of public moneys or use of public land."

More than that, special care must be taken with any industrial project affecting the Chowan River. It has a troubled environmental history. Discharges of nutrient-laden wastewater, especially from a paper mill in Virginia, have caused heavy growths of algae and numerous fish kills over the years. In a letter to Hunt, the coastal federation says it understands the Nucor wastewater discharge to the Chowan could be as much as 750,000 gallons a day.

The Nucor plant, in addition, reportedly will need a variety of other state and federal permits involving wetlands, air quality, and possible dredging of public trust waters for barge accommodation. Can the state show persuasively that all environmental concerns will be abated as the various state and federal agencies go about issuing permits? That seems highly doubtful.

The Commerce Department and any other state agency involved in plant recruitment and location should make sure of its environmental ground sooner rather than later — in keeping with the intent of state law. For the state's unequivocal policy is to "encourage the wise, productive and beneficial use of the natural resources of the state without damage to the environment. . . ."

Not many North Carolinians would lightly dismiss the $300 million investment and the jobs and other economic benefits Nucor figures to bring to the state's northeast. Even so, nothing less than a full environmental impact study is likely to make sure the steel plant's operations are fully compatible with the Chowan, the wetlands and North Carolina's coastal region.

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

August 13, 1998

IN REPLY REFER TO

Regulatory Division

Action ID: 199811324

Mr. Joseph A. Rutkowski, Vice-President
and General Manager
Nucor Steel
Post Office Box 525
Darlington, South Carolina 29540

Dear Mr. Rutkowski:

This correspondence serves to confirm an August 3, 1998, onsite meeting regarding your proposed development of a steel plate mill which is projected to be located on an approximate 900 acre tract of land which lies off of River and Bazemore Roads, adjacent to the Chowan River and immediately north of Pilands Crossroads, in Hertford County, North Carolina. Attending this meeting were Mr. Chad Prior of your organization, Messrs. Paul Farley and Craig Turner of Land Management Group, Inc. (LMG)(your environmental consultants), Mr. Greg Hughes of the Natural Resources Conservation Service (NRCS), and Messrs. David Lekson and Henry Wicker of my regulatory staff. The purpose of this onsite meeting was to inspect your consultant's efforts to delineate the jurisdictional wetland/high ground intersection located on this property.

My staff's observations revealed that you and your consultants must undertake additional delineation efforts in order to more accurately portray and account for all wetlands subject to the Corps of Engineers regulatory authority that exist on this tract of land. As discussed with Messrs. Farley and Turner, your prompt attention to the following suggestions is requested in order to expedite the delineation and facilitate our regulatory processes:

(a.) Contact the Champion Paper Company (the previous property owner) and request that they provide you with any and all information regarding the history of this property. An emphasis should be placed on existing drainage maps and plans. You should also conduct a more in depth study of the existing drainage system that occurs on the property, analyzing it's effect on surface water movement across the site.

(b.) Undertake a more in depth soil analyses to assist you in clarifying the distinction between hydric and non-hydric soils that exist on the site.

(c.) Initiate the necessary work to obtain topographic cross-sections within those areas underlain by Leaf Loam soils, as indicated in the "Hertford County Soils Survey".

You are advised that, pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, a Department of the Army (DA) permit is required for any work within navigable waters of the Unitd States and for the discharge of dredge or fill material within waters of the United States including wetlands. Mr. Prior informed my representatives that, in addition to the construction of the actual steel mill, the project will also involve the development of a river barge port, the extension of train track to the plant site from existing rail line near the community of Tunis, moving River Road to a new location, as well as the installation of infrastructure facilities (roads, gas, electric, water and waste treatment). Any application that is submitted must include all anticipated construction activities associated with the establishment of this steel mill. Segmenting and/or piecemealing of this project will not be allowed.

Based upon the scope and size of this project, it is possible that, pursuant to 40 CFR 1500-1508 of the National Environmental Policy Act of 1969 (NEPA), preparation of a detailed environmental impact statement (EIS) will be required prior to the issuance of a DA permit. This document would include a detailed alternatives analysis of other available construction sites and your justification for choosing the Hertford County site over other available sites. Scoping meetings and a public hearing would also be held to facilitate the preparation of the EIS.

Pursuant to Headquarters, U.S. Army Corps of Engineers guidance, dated December 17, 1997, any Corps district preparing an EIS on a permit action will use a "third party contractor" as the primary method to prepare all or part of a project specific EIS or to obtain required information (40 CFR 1500-1508). A "third party contract" refers to the preparation of an EIS by a contractor paid by the applicant but who is selected and supervised directly by the District Engineer, Wilmington District (Wilmington Regulatory Division).

We have not made a final decision regarding the requirement for an EIS, and will not do so until we can obtain additional information regarding your construction plans. You will be notified immediately once a final decision is made. My staff will be available to assist you with this process.

On February 6, 1990, the Corps of Engineers and the U.S. Environmental Protection Agency signed a Memorandum of Agreement (MOA) establishing procedures to determine the type and level of mitigation necessary to comply with the Clean Water Act Section 404(b)(1) Guidelines.

The MOA provides for first, avoiding impacts to waters and wetlands through the selection of the least damaging, practicable alternative; second, taking appropriate and practicable steps to minimize impacts on waters and wetlands; and finally, compensating for any remaining unavoidable impacts to the extent appropriate and practicable. To enable us to process your application in full compliance with this MOA; we request that you provide the following additional information with any application you may submit (some of this information may be covered in the EIS):

a. Permits for work within wetlands or other special aquatic sites are available only if the proposed work is the least environmentally damaging, practicable alternative. You must furnish information regarding any other alternatives, including upland alternatives, to the work for which you have applied and provide justification that your selected plan is the least damaging to waters or wetland areas.

b. It will be necessary for you to have taken all appropriate and practicable steps to minimize wetland losses. You must indicate all that you have done, especially regarding development and modification of plans and construction techniques, to minimize adverse impacts to wetlands.

c. The MOA then requires that appropriate and practicable compensatory mitigation be provided for all unavoidable adverse impacts remaining after all appropriate and practicable minimization has been employed. You must indicate your plan to compensate for the projected, unavoidable loss of waters or wetlands or provide information as to the absence of any such appropriate and practicable measures.

The information requested above is essential to our expeditious processing of your application. This information must also be sent to the North Carolina Division of Water Quality to enable them to adequately evaluate your application for a Water Quality Certification pursuant to Section 401 of the Clean Water Act.

Please be reminded that we have not made a final decision regarding the location and amount of wetlands that exist on this property. As discussed with Messrs. Farley and Turner, it is likely that this issue will not be settled until further inspections have been conducted throughout the fall and into the early growing season of 1999.

Thank you for your time and cooperation. An interagency meeting will be scheduled in the near future to discuss your plans in more detail.

Any questions regarding this matter may be addressed to Mr. David Lekson at the Washington Regulatory Field Office, telephone (919) 975-1616, extension 22.

Sincerely,

G. Wayne Wright
Chief, Regulatory Division

Copies Furnished:

Mr. Chad Prior, Environmental Engineer
Nucor Steel
Post Office Box 525
Darlington, South Carolina 29540

Mr. William L. Cox, Chief
Wetlands Section - Region IV
Water Management Division
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, Georgia 30303

Mr. John Hefner
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Larry Hardy
National Marine Fisheries, NOAA
Habitat Conservation Division
Pivers Island
Beaufort, North Carolina 28516

Mr. John Parker
Division of Coastal Management
North Carolina Department of Environment, and Natural Resources
Post Office Box 27687
Raleigh, North Carolina 27611-7687

Mr. John Dorney
Division of Water Quality
North Carolina Department of Environment and Natural Resources
Wetlands and Aquatic Plants
4401 Reedy Creek Road
Raleigh, North Carolina 27607

Mr. Terry Moore
Division of Coastal Management
North Carolina Department of Environment and Natural Resources
943 Washington Square Mall
Washington, North Carolina 27889

Mr. Floyd Williams
Division of Land Resources
North Carolina Department of Environment and Natural Resources
943 Washington Square Mall
Washington, North Carolina 27889

January 20, 1999

Ms. Patricia Piland
Rt. 2, Box 93A
Gates, NC 27937

Dear Patricia:

It was good seeing you again last night at the Chowan River Basin Regional Council meeting in Windsor. I hope you found the agenda interesting and informational.

I am enclosing the materials you requested regarding the jointly held meeting between the Chowan and Pasquotank Regional Councils. Upon referencing my files, I have determined that this material was given in person, to Edythe McKinney, who shared it with Preston Howard and Bill Holman. All were present at a meeting held at the Washington Regional Office (occurring shortly after the jointly held Regional Council meeting in question) for the purpose of briefing the WaRO staff on the siting of Nucor.

This information was also transmitted to Raleigh, either by FAX or e-mail, for purposes of apprising DWQ staff (who might not have been present at either of the above referenced meetings) of concerns expressed by the Chowan and Pasquotank RCs and area citizens. As you also requested, I am enclosing the most up-to-date listing of Pasquotank Regional Council participants.

Thank you for your interest in the activities of the Chowan and Pasquotank Regional Councils. If you have questions or need further assistance, please don't hesitate to contact me.

Sincerely,

Joan Giordano,
Public Involvement Coordinator
Albemarle-Pamlico Sounds National Estuary Program

Date sent: **Fri, 12 Mar 1999 20:38:29 -0500**
From: **BETSY SALTER <SALTER.BETSY@epamail.epa.gov>**
Subject: **reply to voice mail**
To: **MCMANUS.FRED@epamail.epa.gov, guy_stefanski@h2o.enr.state.nc.**
Copies to: **Joan_Giordano@waro.enr.state.nc.us**

Guy,
I apologize for not getting back to you today. I have not heard from Suzanne Orenstein with Resolve, so I still don't know if we'll try to pull off a conference call on Mon or Tue.

I will be on travel starting Mon afternoon, so I thought I'd better provide some feedback now on the Chowan proposal given your time constraints. If you want to talk further, call me before 1:00 PM on Mon or send me an email -- I'll have my laptop with me and can check emails while I'm on travel.

With respect to the intended use of demonstration funding for NEPs, it is true that EPA's preferred use of those funds be for demonstration projects or management strategies that will gain measurable environmental results. However, if the Regional Council prefers this project over others that would meet the EPA criteria, I don't want to rule it out because I think the most important thing at this stage is to empower the Regional councils as much as possible.

That said, I do not want to fund monitoring for monitoring's sake. Think creatively about how you can package the proposal to answer the following questions:

1. How will the regional council and the APNEP use the data to make management decisions about how to better protect and restore the Chowan?

2. Are there specific management strategies that will be evaluated in terms of their effectiveness using the data?

3. Is the methodology innovative and transferrable to other parts of the APNEP watershed and to other watersheds in general?

4. If the demonstration project is successful, have long-term/stable sources of funding been identified to maintain the program and store and

manage the data?

Fred and Guy, if these thoughts don't help clarify how to proceed, let's have a conference call on Monday before 1:00 PM.

I'll let you know if I hear from RESOLVE and we can schedule a conference call for scoping out a facilitated session for the coordinating council.

thanks!

NCDENR
North Carolina Department of Environment and Natural Resources

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

WASHINGTON REGIONAL OFFICE
943 WASHINGTON SQUARE MALL
WASHINGTON NC 27889
PHONE (252) 946-6481 FAX (252) 975-3716

TO: Brewster Brown

FAX:

NUMBER: (252) 209-9196

FROM: Joan Giordano

DATE: 4/15/99

NO. PAGES (including cover page) 2

COMMENTS: Brewster –

Per your request this am. This is the mailing label listing I use for RC mailings. I've indicated the slots they fill. Pick up phone numbers (if needed) from the '98 membership roster.

Talk to you soon – call if any questions.

Joan

PS Did you get the Water Resolutions

BREWSTER W BROWN
ROANOKE-CHOWAN COMM COLL
RT 2 BOX 46 A
AHOSKIE NC 27910

CHARLES VAUGHAN
COUNTY ATTORNEY
PO BOX 370
WOODLAND NC 27897

G D PERRY
129 S PERRY'S BEACH
COLERAIN NC 27924

LEO WYNNS III MAYOR
TOWN OF COLERAIN
PO BOX 6
COLERAIN NC 27924

MARJORIE RAYBURN
NC COOP EXT SERV
PO BOX 1030
EDENTON NC 27932

ROGER SPIVEY
345 GLIDEN RD
HOBBSVILLE NC 27946

WILLIAM EARLEY
ECONOMIC DEVELOPER
PO BOX 429
WINTON NC 27986

WILLIAM GRIFFIN JR
CO EXTENSION AGENT
PO BOX 280
WINDSOR NC 27983

ALFRED HOWARD
304 POCAHANTAS TRAIL
EDENTON NC 27932

VICTOR LIU, PLANNER
CRATER PDC
PO BOX 1808
PETERSBURG, VA 23805

JOHN CARLOCK
HAMPTON ROADS PDC
723 WOODLAKE DR.
CHESAPEAKE, VA 23320

GUY STEFANSKI
DWQ - PLANNING
RALEIGH
COURIER #52-01-00

NAN LAUGHTON
414 W. QUEEN ST.
EDENTON, NC 27932

* PATRICIA PILAND
RT. 2, BOX 93-A
GATES, NC 27937

* JOHN STALLINGS
1001 STOKES STREET
WINDSOR, NC 27983

ANDREW COBURN
COBURN & ASSOCIATES
3307 FOREST GROVE CT.
DURHAM, NC 27703

ERNIE BROWN
VA DEPT OF CONS. & REC.
1548 HOLLAND ROAD
SUFFOLK, VA 23434

BETSY SALTER
USEPA
401 M STREET
WASHINGTON, DC 20460

LISA TOLLEY
OFFICE OF ENV. ED.
RALEIGH
COURIER # 52-01-00

LEON DANIELSON
NCSU - POB 8109
RALEIGH, NC 27695

DAMON TATUM, CWMTF
505 COPLEY DRIVE
KILL DEVIL HILLS, NC 27948

JANE STAVELEY
ARCAIDS GERAGHTY & MILLER
2301 REXWOODS DR, SUITE 200
RALEIGH NC 27607

JERRY PARKS
RT. 1 BOX 152-C
BELVIDERE NC 27919

WAYNE GOODWIN
2800 VIRGINIA RD.
TYNER NC 27980

* Pending formal acceptance

MESSAGE CONFIRMATION

JUL-23-1999 09:14AM FRI

FAX NUMBER: 252 975 3716
NAME : NCDENR WARO

NAME/NUMBER	:	12523937508
PAGE	:	002
START TIME	:	JUL-23-1999 09:13AM FRI
ELAPSED TIME	:	01'22"
MODE	:	G3 STD
RESULTS	:	[O.K]

NCDENR
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

WASHINGTON REGIONAL OFFICE
943 WASHINGTON SQUARE MALL
WASHINGTON NC 27889
PHONE (252) 946-6481 FAX (252) 975-3716

TO: Jim P

FAX NUMBER: 353-393-7508

FROM: [signature]

DATE: 7/22/99

NO. PAGES (including cover page) 2

COMMENTS: Per your request.

[signature]

NCDENR
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

WASHINGTON REGIONAL OFFICE
943 WASHINGTON SQUARE MALL
WASHINGTON NC 27889
PHONE (252) 946-6481 FAX (252) 975-3716

TO: John L

FAX:

NUMBER: 253-393-7508

FROM: John L

DATE: 7/22/99

NO. PAGES (including cover page) 2

COMMENTS: Per your request.

RESOLUTION

RECOMMENDATION THAT AN ENVIRONMENTAL IMPACT STATEMENT BE CONDUCTED REGARDING THE PROPOSED NUCOR FACILITY LOCATED ON THE CHOWAN RIVER

WHEREAS, the Chowan River Basin Regional Council was created by Governor Hunt's Executive Order No. 75 to advise agencies responsible for environmental management on concerns and issues relative to the Chowan River Basin; and

WHEREAS, the Chowan River was the first waterbody in North Carolina to be designated as Nutrient Sensitive Waters (NSW) in 1979 because of the occurrence of nuisance algal blooms; and

WHEREAS, the water quality conditions in the Chowan River Basin have improved during the past 20 years due to the enormous effort by industry, municipalities, agriculture, forestry, scientists, environmental groups, government agencies and citizens of the Chowan River Basin; and

WHEREAS, Nucor, a steel industrial company, intends to construct and operate a steel recycling facility on the banks of the Chowan River; and

WHEREAS, it is our belief that review of the environmental impact analysis has been compartmentalized, and that total impact has not been adequately addressed, and a finding of "no significant impact" at this time cannot be justified; and

WHEREAS, it is our opinion that the information and conclusions presented in the Environmental Assessment (EA) and final supplement is not supported with an adequate level of scientific documentation; and

WHEREAS, we believe that the construction and operation of the Nucor facility, as currently proposed, would lead to significant deterioration of the fishery resource and aquatic habitats, would seriously affect the traditional recreational uses of the river, and generally threaten the overall economic sustainability of the resource; and

NOW, THEREFORE, IT IS RESOLVED that based on discussions developed from the review of various documents regarding the status of the Nucor permit applications, members of the Chowan River Basin Regional Council strongly recommend to the Coordinating Council that all requests for final permits for the proposed Nucor facility be held in abeyance and all construction activities cease until an environmental document is completed that adequately discusses and mitigates the potential direct and indirect threats to the Chowan River.

At this time, an Environmental Impact Statement (EIS) is the only document that will address the total current and future impacts of this industry on the Chowan River from an environmental and economical standpoint.

Adopted, this 15th day of June , 1999.

Brewster Brown

Brewster Brown, Vice-Chairman
Chowan River Basin Regional Council

Nan Laughton

Nan Laughton, Secretary
Chowan River Basin Regional Council

North Carolina Cooperative Extension Service

NC STATE UNIVERSITY

College of Agriculture and Life Sciences

Chowan Co. Center
NC Cooperative Extension Service
P.O. Box 1030
Edenton, NC 27932
(252)482-8431

December 8, 1999

Cliff Copeland
County Manager
P.O. Box 1030
Edenton, NC 27932

Dear Cliff,

Enclosed is some information shared by Joan Giordano of NCDENR, Division of Water Quality, at the Chowan Riverbasin Regional Council Meeting in Windsor, December 7, 1999. It gives a summary of the various water quality programs administered by federal and state governments. This information may be useful to see what programs are available for Chowan County to tap into.

It is important to have representation from Chowan County Government in attendance at the Riverbasin meetings to gain knowledge about what is happening in the Chowan basin and provide input from Chowan County's perspective.

Please feel free to contact me or Joan if you have any questions or comments.

Sincerely,

Marjorie L. Rayburn

Marjorie Rayburn
Area Agent
Integrated Pest Management

MR/str

c: Mike Williams
Joan Giordano
Roger Spivey

October 28, 1997

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Acting Chair JHS

SUBJ: Upcoming Regional Council Meeting

The first meeting of the Chowan Regional Council, following the "Kick-Off" meeting in Plymouth on 9/25/97, will be held on **November 13, 1997 at the Roanoke-Chowan Community College (Small Business Center) in Ahoskie** from 1:00 pm until 4:00 pm. The following items are included in this mailing to aid you in preparing for this meeting:

- agenda
- draft by-laws and example charter
- summary listing of your concerns expressed at the "Kick-Off" meeting (9/25)
- membership roster
- copy of the Executive Order establishing your Regional Council
- map of the Roanoke-Chowan Community College campus

As you can see from the agenda, this meeting will be dedicated to organizational tasks which need to be addressed before we can move to developing our Program of Work for the year. Your careful review of the enclosures, especially those pertaining to the by-laws, the Executive Order, and the summary listing of priority concerns, will aid in maximizing the use of our meeting time.

If you have any questions, please call me in Murfreesboro at 919-398-3525 .... or Guy Stefanski (DWQ in Raleigh) at 919-733-5083 extension 585 .... or call Joan Giordano (DWQ in Washington, NC) at 919-946-6481 extension 269.

I look forward to seeing you on November 13th in Ahoskie, and please drive carefully.

MEMORANDUM

TO: Albemarle-Pamlico Sounds NEP Regional Council Members

FROM: Joan Giordano & Guy Stefanski

SUBJ: Meeting Materials

DATE: December 12, 1997

Enclosed are materials which you will find useful as we move into our next round of RC meetings.

-Autobiographical sketches- these are intended to introduce and acquaint all Regional Council members, especially those who were unable to attend the Plymouth kick-off meeting or the first round of council meetings. They are also intended to be used as guidance when electing officers for our Regional Councils.

-Agendas for our next meetings containing date, time, and location

-Minutes from our last meetings

-By-laws (amended draft)- these by-laws have been amended based on discussions held at each of the first round of RC meetings. They are being circulated for comment by those who were not in attendance at those meetings, and also to comply with the policy for adopting them. Please try to be present at the next meeting of your respective river basin council, or make your comments, in writing, to Joan Giordano or Guy Stefanski prior to those meetings.

Joan's address: DENR, 943 Washington Sq. Mall, Washington, NC 27889
Guy's address: DENR, Div. of WQ, P.O. Box 29535, Raleigh, NC 27626-0535

-Priority Concerns/Issues listing- to be expanded upon at our next meetings

As discussed at our last meetings, we are anticipating the use of a professional facilitator to assist us in crafting our Programs of Work. The plans for securing the facilitator are in the formative stages and our best estimation for the occurance of the facilitated meetings is March and April, 1998. Preparatory to this, please refer again to the priority concerns/issues listings you developed in Plymouth. This information will be extremely important to developing our Programs of Work.

As you can imagine, we have much work to do before we can develop our Programs of Work. The first step to accomplishing this is to be present at your basin's next meeting. Please try to

include this on you calendars for the new year and let's begin 1998 with renewed commitment to protecting the water quality, habitats and natural resources of beautiful eastern North Carolina. Have a very happy and safe Holiday Season and we'll see you in '98!

CHOWAN RIVER BASIN REGIONAL COUNCIL

March 3, 1998

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Acting Chairman

SUBJECT: Next meeting on March 19, 1998

Enclosed is the agenda for our upcoming meeting scheduled for March 19, 1998 at Mr. G.D. Perry's river cottage located south of Colerain, NC. The meeting begins at 4:00 pm. You should have received a copy of the minutes from our January 8th meeting, a copy of our final by-laws, as well as directions to Mr. Perry's cottage in a previous mailing. **This meeting will be a "covered dish" dinner meeting. Hamburgers will be provided, but we are asking that each member bring a dish which will be enough to feed 10-12 persons.**

This is a very important meeting as we will officially elect our officers. We will also correlate our list of environmental concerns with the management actions of the APES CCMP. This correlation will have much meaning as we continue to develop our program of work.

I look forward to seeing you at Mr. Perry's Cottage on March 19th. If you have any questions, please call me in Murfreesboro at 919-398-3525 ..... or Guy Stefanski (DWQ in Raleigh) at 919-733-5083 extension 585 .... or Joan Giordano (DWQ in Washington) at 919-946-6481 extension 269.

Please travel safely.

Enclosure.

MEMORANDUM

TO: Chowan River Basin Regional Council members

FROM: Joan Giordano

SUBJ: Herring Report

DATE: May 4, 1998

Enclosed is the report entitled "The Effects of Water Quality on the Hatching Success of Blueback Herring Eggs in the Chowan River Basin" which you requested be sent to you. Due to equipment failure, it was impossible to include this with the last mailing you received. I hope this short delay does not inconvenience you greatly. Please thank Regional Council member Lee Wynns for providing the original when you see him.

Thank you for the fine participation you demonstrated at the workshop in Edenton. I know the effort will produce a great Program of Work.

I look forward to seeing you at our next meeting scheduled for May 19, 1998 at the Edenton campus of the College of the Albemarle located on North Broad Street beginning at 10:00am in the Seminar Room. Please travel safely, and I'll see you then!

The Effect of Water Quality on the Hatching Success of Blueback Herring Eggs in the Chowan River Basin

Final Report

December 1997

Christian T. Waters and Joseph E. Hightower

North Carolina Cooperative Fish and Wildlife Research Unit

North Carolina State University

Box 7617, Raleigh, NC 27695-7617

Blueback herring (*Alosa aestivalis*) is an anadromous species ranging from Cape Brenton, Nova Scotia to the St. Johns River, Florida (Loesch 1987). Each spring, adult blueback herring migrate from the ocean into freshwater systems to spawn (Bozeman and Van Den Avyle 1989). During spawning, individual female blueback herring accompanied by several males typically deposit eggs in shallow, slow moving water over substrate covered with detritus or vegetation (Loesch 1987; Bozeman and Van den Avyle 1989; Rulifson 1994). Fertilized eggs are initially adhesive but lose their adhesiveness after water hardening (<24 hours) (Fay et al. 1983). The fertilized eggs are then essentially pelagic but are negatively buoyant in still water (Jones et al. 1978). Eggs hatch within two to four days depending on water temperature (Bozeman and Van Den Avyle 1989).

Blueback herring are similar in appearance and in life history to alewife (*Alosa pseudoharengus*), and collectively they are referred to and marketed as river herring (Rulifson 1994). Historically, the spawning migration of river herring supported large commercial fisheries, but many of these fisheries have declined substantially since the 1970s. For example, in the Albemarle Sound basin in North Carolina, average landings of river herring from 1880 to 1970 were 5.4 million kg while 1994 landings were only 274,000 kg (Hightower et al. 1996; Sara Winslow, NC Division of Marine Fisheries, personal communication). Commercial pound net catch-per-unit-effort (CPUE) and juvenile abundance also declined within Albemarle Sound (Winslow 1989; Hightower et al. 1996), suggesting that the decline in landings was due to a decline in the population size. Proposed causes of the decline are overfishing, water pollution, and loss of

spawning and nursery habitat (Winslow 1989; Rulifson 1994). Similar to Albemarle Sound, a decline in the river herring population in the Chesapeake Bay region has been attributed to stream acidification, stream blockage, land use changes, and increased sedimentation (Klauda et al. 1991).

Within the Albemarle Sound basin, Winslow (1994) reported a decline in the reproductive success of river herring and noted that a number of tributaries no longer supported spawning runs. It is not known, however, whether the decline in reproductive success is due to overfishing, poor water quality, or loss of habitat. The overall objective of this study was to determine the effect of water quality on the hatching success of blueback herring eggs within the Chowan River basin, which flows into Albemarle Sound. The Chowan River basin, which includes the Chowan, Meherrin, Blackwater, and Nottoway rivers, historically accounted for up to 85% of the total Albemarle Sound landings of river herring (Winslow et al. 1983), which have historically spawned throughout the basin (Odom et al. 1986; Collier and Odom 1989). Since only a few alewifes were collected during this study, we focused on blueback herring. In addition, blueback herring account for about 85% of total Albemarle Sound landings of river herring (Schaaf 1996).

Objectives

The primary objective of this study was to test the null hypothesis that there were no differences in hatching success of blueback herring eggs among sites. The alternative hypothesis was that hatching success would be significantly lower at spawning sites having poor water quality or lacking current spawning runs.

The second objective was to compare water quality with hatching success at each site. Water quality measurements included field parameters (water temperature, dissolved oxygen, pH, and conductivity), nutrients (nitrate, total ammonia, and total phosphorus concentrations), and a suite of polychlorinated biphenyl congeners (PCBs) and pesticides. A correlation between hatching success and water quality would suggest that water quality has been one cause of the decline in the abundance of blueback herring. Results of this study will aid the North Carolina Division of Water Quality (NCDWQ) and the North Carolina Division of Marine Fisheries (NCDMF) in restoring the river herring fishery. If specific water quality parameters affecting hatching success can be identified, spawning areas could be targeted for stricter land use and discharge regulations.

Study Sites

The Chowan River begins at the confluence of the Blackwater and Nottoway rivers near the North Carolina-Virginia border, and flows south into Albemarle Sound (Figure 1). Approximately 76% of the drainage is found in Virginia (9,259 km^2) with the remaining 24% (3,406 km^2) in North Carolina (NCDWQ 1997). The basin has very little urban development and is dominated by forest and agriculture which combine to make up 89% of the land cover (McMahon and Lloyd 1995). Much of the remaining area is designated as wetlands. Many areas within this basin have swamp-like characteristics (such as low dissolved oxygen and low pH); however, they are not classified as swamp waters (NCDWQ 1997).

We selected eleven study sites within the Chowan River basin based on two criteria: available water quality data and the presence or absence of spawning runs. Recent water quality data were provided by the United States Geological Survey, the Union Camp Corporation, and NCDWQ. For information on current and historical spawning runs, we consulted local commercial fishermen and biologists as well as published reports (Winslow et al. 1983; Odom et al. 1986; Collier and Odom 1989; Winslow 1989). The sites, in order from upstream to downstream, were Blackwater River, Nottoway River, Chowan River at Riddicksville, Meherrin River, Deep Creek, Catherine Creek, Wiccacon River, Deep Swamp Creek, Dillard Creek, Chowan River at Whites Landing, and Rockyhock Creek (Figure 1).

We feel that these sites adequately represented the range of spawning habitat present within the Chowan River Basin. Sites at Whites Landing and Riddicksville were located on the mainstem of the Chowan River. Three of the stations were located on major tributaries of the Chowan River: the Blackwater, Nottoway, and Meherrin rivers. The remaining sites, located on smaller streams, were Deep Creek, Catherine Creek, Wiccacon River, Deep Swamp Creek, Dillard Creek, and Rockyhock Creek. At each location, hatching success was measured in a backwater area that would be typical blueback herring spawning habitat (bald cypress swamps out of the main channel flow). Flow at each site (mean=0.02 m/sec) was only a fraction of the flow in the main channel (mean=0.09 m/sec) (Figure 2).

Methods

We used modified Plexiglas incubators to estimate hatching success of blueback herring eggs (Figure 3). These incubators have been used successfully to evaluate hatching success *in situ* for lake trout (*Salvelinus namaycush*) and lake herring (*Coregonus artedi*) (Kennedy 1980; Gunn and Keller 1984; Manny et al. 1989; Mohr et al. 1990; Evans et al. 1994; Savino et al. 1994; Evans et al. 1995).

The incubators consisted of three Plexiglas plates, each containing 50 holes that were 10 mm in diameter. The two outer plates had dimensions of 240 mm x 145 mm x 3 mm. The center plate had dimensions of 300 mm x 145 mm x 9 mm, so it extended beyond the two outer plates by 30 mm at each end. Four holes on each extension of the center plate were used to attach the incubator to 31.75-mm PVC pipe with cable ties. The PVC pipe held the incubator perpendicular to the water's surface about 30 cm off the bottom. A 300-micron mesh screen was inserted between the center plate and each of the outer plates. When assembled, an incubator held one egg in each of the 50 separate 10 mm x 9 mm compartments. The incubator design allowed each egg to be exposed to ambient water conditions but protected it from predation as well as the spreading of fungal infections between cells (Manny et al. 1989).

We obtained eggs and milt by stripping (applying slight pressure to the abdomen to expel either eggs or milt) running-ripe fish collected from pound nets, gill nets, and electrofishing (Tables 1 and 2). We examined catches made by commercial pound net fishermen about twice each week from March 27 through May 8, 1996 and about once each week from March 28 to April 14, 1997. The pound nets were located along the

lower Meherrin and mainstem Chowan rivers. Fish were obtained shortly after dawn when the local fishermen checked their nets. Running-ripe females were removed from the catch and stripped. The eggs were immediately fertilized, water hardened, placed into incubators, and deployed. We obtained additional fish in the late afternoon by drift netting with a 63.5-mm gill net and electrofishing. Drift netting was conducted on most days from April 28 through May 13, 1996 and about three times per week from March 20 through May 21, 1997. In 1997, we collected fish using electrofishing about twice a week from April 1 through May 5. All captured running-ripe females were immediately stripped. The eggs were fertilized, water-hardened, and held overnight in aerated containers. If egg mortality was low on the following morning, incubators were loaded and deployed. This reduced the likelihood of carrying out a trial in which hatching success was low at all sites (e.g., due to widespread fungus), as occurred in trials 1 and 3 in 1996 (Table 1).

In 1996, fish collected throughout the season from pound nets were placed in tanks at the Edenton National Fish Hatchery for the purpose of tank spawning. It was expected, that as water temperature rose in these tanks, spawning would occur. Fish were held from March 27 through May 14; however, tank spawning never occurred.

Eggs from each female were combined with the milt of several males (Kennedy 1980; Mohr et al. 1990; Evans et al. 1994; Evans et al. 1995). We used the dry method of fertilization, in which eggs and milt were initially combined in the absence of water (Davis 1967; Bromage 1988). Each female was stripped into a 1.9-L plastic tray followed by several males. The eggs and milt were combined in the tray and were stirred by finger for 3 to 5 minutes to promote fertilization. Water was then added to

dilute the mixture, and excess water and milt were decanted from the solution. The dilution process continued until the solution was clear (Davis 1967; Woynarovich and Horvath 1980; Bromage 1988). The solution was then stirred for an additional 15 minutes to prevent the eggs from sticking (Evans et al. 1994; Evans et al. 1995). The fertilized eggs were water-hardened before being loaded into incubators. Due to the experimental nature of the field work in 1996, the water used for fertilization and the water-hardening process varied among trials (Table 1). In 1997, we used distilled water for fertilization and water-hardening (Table 2).

Incubators were loaded by placing one outer plate, mesh insert, and the center plate into a tray of water. Using a micropipette, one live water-hardened egg was placed in each of the 50 compartments. Mortality was determined by egg color: dead eggs had a white, opaque appearance while live eggs were translucent (Davis 1967). The incubators were then completely assembled and stored in aerated water until deployed at the study sites (Evans et al. 1994; Evans et al. 1995). In 1996, we used coolers to transport the incubators, and the source of water used to load and store incubators varied among trials (Table 1). In 1997, we transported the incubators separately in 15cm x 61cm PVC tubes and used water collected from each site to load and store incubators (Table 2).

For each trial, all incubators contained eggs from the same female in order to eliminate maternal differences in hatching success among individuals. Differences in hatching success among individual females have been documented for alewife (Kellogg 1982) and lake trout (Mohr et al. 1990). Also, variation in egg size and weight among

individual females has been reported for both alewife and blueback herring (Jessop 1993).

We deployed one incubator at every site, and two additional incubators were placed in control tanks containing aerated distilled water. The purpose of these controls was to evaluate our methods. One control incubator was placed in distilled water immediately after loading and was not removed until the trial ended. A second control, which was transported in the same manner as other field incubators during deployment and retrieval, was used to determine whether our transport methods had an effect on hatch.

The incubation period for both alewife and blueback herring varies with water temperature (Figure 4). Therefore the length of each field trial was based roughly on the estimated incubation period for the ambient water temperature (Tables 3 and 4). After the incubators were retrieved, the contents of each incubator were emptied into a counting tray using a wash bottle. We used a dissecting microscope to classify the contents of the counting tray using the following categories: dead egg, egg infected by fungus, live egg, dead fry, or live fry. The total count was subtracted from 50, and the difference was classified as missing. Contents of each incubator were preserved in 3-5% formalin.

During each trial, we measured water temperature, dissolved oxygen, pH, and conductivity daily at all sites including the controls. In 1996, we used a portable dissolved oxygen meter, a salinity-conductivity-temperature meter, and a pH meter, while in 1997 a Hydrolab probe was used. We also deployed temperature loggers at each field site during both years to record hourly water temperature measurements.

We collected nutrient samples five times over the two field seasons: 1996 trial one (4/23/96), 1996 trials two and three (5/1/96), 1997 trial one (4/3/97), 1997 trials two and three (4/17/97), and 1997 trials five and six (5/1/97). These samples were refrigerated and delivered to a lab in the NCSU Department of Botany within 48 hours for analysis. If we were unable to deliver the samples within that time, they were preserved and frozen. These samples were analyzed for nitrate, total ammonia, and total phosphorus.

In 1997, we also deployed one low-density polyethylene sampler (LDPS) at each field site. The LDPSs remained at the sites for about two months during which time they assimilated organic contaminants from the water column in a manner similar to fish tissue. After retrieval, the LDPSs were analyzed by the NCSU Department of Toxicology for 20 PCB congeners and 25 pesticides. Maximum PCB and pesticide levels (ng/LDPS) were converted to estimated levels within fish tissue by assuming that lipids comprise 6% of the wet weight of a blueback herring (Crawford et al. 1986). We also estimated the water concentrations that would be expected to produce the levels that we observed in the LDPSs, based on the octanol-water partition coefficient (K_{ow}) (Mackay 1982; Johnson et al. 1987). These estimated levels within fish tissue and in water were compared to published standards, in order to assess the potential impact of the levels we observed.

In 1996, two pilot studies were conducted at a limited number of sites within the lower Chowan River drainage to evaluate methods of collection, methods of fertilization, and incubator design. The first pilot study, using two stations and a control, was conducted with the first available running-ripe males and female of the

season. The second study, using three sites and a control, was conducted at the end of the field season using the last available males and female. Incubators were examined for problems such as impingement of eggs, growth of fungus, and growth of algae.

Our primary focus for this study was to compare sites based upon the hatching success of eggs. In order to calculate percent hatch, we used the formula (live eggs+live larvae+dead larvae)/50, based on the following rationale. We included live eggs in the successful hatch category, under the assumption that those eggs would have hatched if the incubation period had been longer. Water temperature and the rate of egg development varied among sites, particularly for the control tanks which were considerably cooler than the field sites. Since the length of a trial was kept about equal among sites (Tables 3 and 4), the differences in temperature resulted in some sites having large numbers of live eggs while others had large numbers of dead and live larvae. Our second assumption was to include both live and dead larvae, since both indicated successful hatching. Finally, we assumed that missing compartments had contained dead eggs that had decomposed. We consider it unlikely that eggs would have hatched into larvae which then died and decomposed, given the relatively short total exposure time (Tables 3 and 4).

To compare percent hatch among sites, we used a two-way analysis of variance with a block design. The trials were treated as blocks, and sites were analyzed as treatments. Because our hatch values were percentages, we used a arcsin (square-root) transformation of the data (Snedecor and Cochran 1956). We then determined which sites were different using a least significant difference (LSD), the smallest

difference between two means that is statistically significant (Fry 1993). All significance tests were based on a Type I (α) error level of 0.05.

We used correlation analysis (SAS Institute 1994) to test for a linear relationship between percent hatch at each site and the following water quality variables: water temperature, dissolved oxygen, pH, conductivity, and nitrate, total ammonia, and total phosphorus concentrations. Multiple regression analysis was used to examine whether a combination of these water quality variables could be used to reliably predict percent hatch. For 1997, we also estimated the correlations between mean percent hatch by site and levels of PCBs and pesticides.

Results

Estimated Hatch Rates

In 1996, eight running-ripe female blueback herring and alewife were collected from April 15 to May 10 (Table 5). On collection days, daily mean water temperature ranged from 16.0°C to 21.2°C. In 1997, we collected sixteen running-ripe females from March 28 to May 7 when water temperatures ranged from 11.9°C to 17.9°C (Table 5). During 1997, we also either observed spawning or collected naturally spawned eggs at all of our field sites except the Chowan River at Riddicksville (Table 6). Spawning was observed when daily mean water temperature ranged from 14.6°C to 17.2°C.

We conducted all trials using blueback herring due to the low abundance of alewife during both 1996 and 1997 seasons (Table 5). In 1996, two pilot studies and three full trials were conducted from April 15 to May 13 while in 1997, we conducted six full trials from April 1 to May 3. The 1996 pilot studies were successful in evaluating

the methods of collection and fertilization and the design of the incubator. Due to the limited number of sites, however, these studies provided little data about differences in hatching success among sites. For the three full 1996 trials, trial two resulted in a reasonable overall mean hatch rate (66%) whereas in trials one and three, large numbers of dead eggs occurred at all sites including the controls (Table 1). In 1997, we observed mean hatch rates of at least 50% in all six trials (Table 2). However, during trials two and three, water levels dropped by as much as 0.5 m at many sites, exposing incubators for varying periods to the air. Because water levels were still low for the start of trial four, several incubators were deployed on the substrate rather than on stakes that remained exposed (Table 4). Nevertheless, hatch rates for trial four were comparable to those of other trials. Based on these results, we limited our hatch rate analyses to trial two from 1996 and trials one, four, five, and six from 1997.

Because mean daily water temperature varied considerably among trials and between field sites and controls (Figure 5), we observed large differences in the percentage of live eggs in a successful hatch ([live eggs / (live egg + live larvae + dead larvae)] x 100). That percentage had a significant negative correlation with mean water temperature (Figure 6).

Hatch rates varied substantially among stations during all trials, from 100% on the Chowan River at Riddicksville (1997 trial 1) to 0% at Dillard Creek (1997 trial 6) (Figure 7). Across all trials, we observed 70% (SE=17%) mean hatch for field sites and 92% (SE=4%) mean hatch for the controls. There was also considerable variation in hatch rate among trials for some sites, particularly Deep Swamp Creek, Dillard Creek, Catherine Creek, and Rockyhock Creek. Despite the variation among trials, there does

appear to be a consistent pattern in hatch rates among sites. Sites at Dillard Creek, Deep Swamp Creek, Wiccacon River, and Catherine Creek had consistently lower hatch rates, while the Meherrin River, Chowan River at Whites Landing, and Chowan River at Riddicksville tended to have the highest hatch rates (Figure 8).

A two-way analysis of variance using field sites and controls indicated a significant difference among sites as well as trials (Table 7). To test for differences between individual sites, we used the mean squared error (0.022) from a second analysis of variance model (Table 8) that excluded the controls and Dillard Creek to calculate the LSD. In this manner, we were able to better determine significant differences among field sites, assuming Dillard Creek and the controls were different from other sites (Figure 8). The LSD test determined that hatch rates at Dillard Creek were significantly different from all other sites. In addition, despite overlap among some sites, Deep Swamp Creek, Catherine Creek, Wiccacon River and Blackwater River were significantly different from the Meherrin River, Chowan River at Whites Landing, and Chowan River at Riddicksville.

Water Quality

Water temperatures during trial two for 1996 ranged from 16.7°C to 23.9°C (mean=20.7°C) while temperatures for 1997 trials one, five, and six were consistently lower, ranging between 12.1°C to 21.3°C (mean=16.9°C) (Figure 5). In both years, the seasonal pattern was similar among study sites with lower temperatures at upstream sites and the controls. In addition, seasonal warming occurred earlier in 1996 than in 1997 (Figure 9). Presumably due to the lower temperatures during trials, dissolved oxygen values were generally higher in 1997 than in 1996. Values from 1997 regularly

exceeded 5.0 mg/L, while in 1996 we observed values greater than 5.0 mg/L only at the Nottoway River, Meherrin River, Deep Creek, and Chowan River at Whites Landing sites and for the controls (Figure 10). Our pH readings for the field sites ranged from 5.8 to 7.4 for both years with consistently higher values at Deep Creek and Chowan River at Whites Landing (Figure 11). For our controls, we observed a somewhat wider pH range from 5.2 to 7.6. Conductivity measurements typically ranged from 100 to 140 μmhos/cm in both 1996 and 1997 except at the Deep Creek, Rockyhock Creek, and Dillard Creek sites which had consistently higher levels (Figure 12). Conductivity for the distilled water control ranged between 0 and 36 μmhos/cm with one extreme value (125 μmhos/cm) in 1996.

For both 1996 and 1997, total phosphorus measurements were less than 0.26 mg/L at all sites including the controls, and most sites were below 0.15 mg/L (Figure 13). Values were slightly higher at the Wiccacon River and Deep Creek sites. Nitrate levels were less than 0.45 mg/L except for one extreme value of 0.87 mg/L at Dillard Creek in 1997 (Figure 14). Nitrate levels tended to be highest for the Blackwater River, Chowan River at Whites Landing, Rockyhock Creek, and in 1997 for Catherine Creek and Dillard Creek. Total ammonia values were primarily below 0.15 mg/L with a maximum recorded value of 0.30 mg/L at Catherine Creek in 1996 (Figure 15).

To investigate the relationship between water quality and hatching success, we examined correlations among percent hatch, mean temperature, mean dissolved oxygen, mean pH, mean conductivity, nitrate, total ammonia, and total phosphorus concentrations. Because nutrient data were not available for 1997 trial four, the analysis was performed using only 1996 trial two and 1997 trials one, five, and six. For

those trials, percent hatch was positively correlated with dissolved oxygen and was negatively related to conductivity, water temperature, nitrate, total ammonia, and total phosphorus (Figure 16).

Multiple regression analysis based on those trials indicated that percent hatch was best predicted using a simple linear model with dissolved oxygen (R^2=0.39) (Figure 17). Adding the variable nitrate improved the model (R^2=0.48) if the high nitrate value for Dillard Creek 1997 trials five and six was included. If that value was excluded, the R^2 value was 0.40 for dissolved oxygen alone and 0.42 with the addition of nitrate to the model.

Contaminants

The PCBs most often detected in the LDPS analyses were the lower chlorinated congeners. We found the largest number of different PCB congeners at sites on the Blackwater River, Nottoway River, and the Chowan River at Riddicksville (Figures 18 and 19). These sites, as well as the Chowan River at Whites Landing, had the highest concentrations of total PCBs. The most common pesticides were heptachlor, trans-chlordane, cis-chlordane, dieldrin, and DDT compounds (Figure 20 and 21). Levels of these pesticides were similar among sites except for DDT concentrations. DDT levels were highest at Deep Creek, Wiccacon River, Deep Swamp Creek, and Dillard Creek, with 4,4'-DDE the most common of the individual DDT isomers (Figure 21). The maximum contaminant levels that we observed resulted in estimated levels within fish tissue and within water that were generally well below published standards (Table 9).

The correlation between percent hatch and total PCB level was positive and nonsignificant (Figure 22). Correlations for individual PCB congeners (not shown) also

were generally positive and were nonsignificant in all cases. For pesticides, only alpha-BHC was significantly correlated with percent hatch (Figure 22). The correlation between DDT compounds and percent hatch appeared to be relatively strong except for the Dillard Creek site, but none of the correlations were significant (Figure 22).

Discussion

Results from the 1996 and 1997 field seasons demonstrate that differences in hatching success exist among sites. Lower hatch rates were observed at sites located on smaller streams (Dillard Creek, Deep Swamp Creek, Wiccacon River, Catherine Creek) while higher hatch rates were observed at sites on the mainstem of the Chowan River and major tributaries (Nottoway and Meherrin rivers). The stream sites typically had higher conductivity and nutrient levels, and lower dissolved oxygen values than at mainstem river sites, which suggests that there is a connection between hatching success and water quality. Since water quality in the Chowan River basin is affected most by non-point source pollution (McMahon and Lloyd 1995), the smaller streams and creeks may be impacted more directly and immediately by farming or logging practices. Land use within the lower portion of the basin is mainly agriculture while the dominate land cover within the upper portion is forest (McMahon and Lloyd 1995). Our sites with lower hatch rates were located in the lower basin with most of our higher hatch sites upstream (Figure 1), suggesting that agricultural practices may be associated with poorer water quality for blueback herring spawning.

Few water quality studies have been conducted recently on the Chowan River, and most of those considered only a few sites. Therefore, a direct comparison of those studies with our results was difficult. Many of the prior studies were undertaken as a

part of the NCDWQ monitoring programs. These include the monitoring of benthic macroinvertebrates, fish population and tissue analyses, aquatic toxicity, and ambient water quality (NCDWQ 1997). Of these programs, only the monitoring sites of benthic macroinvertebrates and ambient water quality had any overlap with our field sites. The benthic macroinvertebrate studies used taxa richness values and bioclassifications to rate site water quality. Sites used for long-term monitoring of benthic macroinvertebrates (1984-1995) included Chowan River at Riddicksville, Meherrin River, Wiccacon River, and Chowan River at Highway 17 (just downstream from our Whites Landing site). Water quality at the Chowan River at Riddicksville, Meherrin River, and Chowan River at Highway 17 sites was rated as good to fair (NCDWQ 1997), which is consistent with the relatively high hatch rates that we observed. Water quality was rated fair to poor for the Wiccacon River, which was our fourth lowest site in terms of hatch rate. Ambient water quality measurements were only made along the mainstem Chowan River, and those values are also consistent with our results. For all variables except dissolved oxygen, NCDWQ values were within state standards (NCDWQ 1997). Dissolved oxygen values were below the state standard of 4.0 mg/L 17% of the time, but many of those measurements were most likely made during the summer after the blueback herring spawning season.

In addition to the NCDWQ studies, the National Oceanic and Atmospheric Administration (NOAA) included the Chowan River in its South Atlantic Estuarine Eutrophication Survey. Greater than 50% of the Chowan River basin was classified as hypereutrophic, and blooms of toxic and nuisance algae and anoxic events occurred

periodically (NOAA 1996). It should be noted, however, that these conditions occurred from July to September, again after the spawning season of blueback herring.

For both 1996 and 1997, water temperature, dissolved oxygen, and pH levels that we observed during trials were within the reported ranges required for the normal development of river herring eggs at a majority of the sites. Development of blueback herring eggs can occur between 14°C and 26°C while 20°C to 24°C is reportedly optimal (Fay et al. 1983; Bozeman and Van Den Avyle 1989; Klauda et al. 1991). Jones et al. (1978) reported that spawning activity for blueback herring occurs between 14.0°C and 25.5°C. Winslow et al. (1983), Bozeman and Van den Avyle (1989), and Winslow (1989) reported a temperature range of 13.0°C-19.0°C for blueback herring spawning in North Carolina. Our results were generally consistent with those studies. Our water temperature values during 1996 trial two and 1997 trials one, five, and six were between 14°C and 26°C 98% of the time. Over both seasons, we encountered running-ripe individuals when water temperatures ranged from 11.9°C to 21.2°C, with all females except one collected at temperatures above 14.2°C. Observations of spawning in 1997 occurred while water temperatures ranged from 14.6°C to 17.2°C.

For most fish species, a dissolved oxygen concentration between 5.0 mg/L and saturation is required for normal egg development (Piper et al. 1982). Klauda et al. (1991) reported that blueback herring eggs require greater than 5.0 mg/L dissolved oxygen for normal development. Except for sites at Catherine Creek, Deep Swamp Creek, and Dillard Creek, at least 67% of our site measurements were above this 5.0 mg/L threshold (Figure 23).

Klauda et al. (1991) reported that pH values for normal egg development were between 5.7 and 8.5 for blueback herring. Our recorded pH values were within this range for all field sites as well as the controls except for one value (5.2) during 1997 trial one.

At present, specific ranges or tolerances for nutrients such as nitrate, total phosphorus, and total ammonia have not been documented for blueback herring. However, a general guideline for many species is that nitrate levels between 0.0 and 3.0 mg/L and total phosphorus levels between 0.01 and 3.0 mg/L are required for successful egg development (Piper et al. 1982). Our nitrate and total phosphorus levels were within those ranges for all sites. Levels of un-ionized ammonia greater than 0.0125 mg/L are reported to inhibit development of salmonid eggs (Piper et al. 1982). Un-ionized ammonia is the fraction of the total ammonia that is toxic and is determined primarily by water temperature and pH. Increases in either temperature or pH result in the increase in the percentage of un-ionized ammonia. For our maximum values of water temperature and pH, only 2.1% of the total ammonia would be un-ionized. Thus, for our maximum total ammonia measurement (0.300 mg/L), the estimated maximum un-ionized ammonia concentration is 0.006 mg/L, which is only half the documented tolerance level.

Correlation analyses indicated that dissolved oxygen, conductivity, water temperature, nitrate, total ammonia, and total phosphorus were related to percent hatch. The highest simple correlation that we obtained was between hatch success and dissolved oxygen. However, any relationships with percent hatch could be confounded by interactions among water quality variables. For example, percent hatch

is negatively correlated with conductivity and total phosphorus, but there is a significant positive correlation between conductivity and total phosphorus. Thus, multiple regression analysis was used to examine the unique contribution of each variable in accounting for variation in hatch rate.

Stepwise regression analysis indicated that dissolved oxygen and nitrate levels explained a significant amount of variation in hatch rate. However, the importance of nitrate in the model was due to a high level observed for one Dillard Creek value. Otherwise, nitrate concentrations appeared to be uncorrelated with hatch rate. In addition, even this value was within the documented tolerance range of 0.0 to 3.0 mg/L (Piper et al. 1982). Additional observations at higher nitrate levels would help in determining whether there is a direct or indirect link between hatch rate and nitrate concentrations. Thus, the overall indication from our results is that dissolved oxygen is the key variable affecting hatch rate.

A developing fish egg uses dissolved oxygen from the environment, and this uptake increases with the development of the egg. For example, Pacific herring eggs at fertilization require 0.01 μL/hr and at hatching 0.07 μL/hr (Hempel 1979). Diffusion of oxygen across the chorion is also affected by factors such as temperature and pH. An egg can tolerate anoxic external conditions for a short period of time by using oxygen reservoirs in its yolk sac and perivitelline fluid. However, oxygen deficiency over a longer period of time can result in the death of the egg (Hempel 1979). Very little has been documented about the oxygen requirements of blueback herring eggs except for a threshold of 5.0 mg/L (Jones et al. 1978, Jones et al. 1988, Klauda et al. 1991). This threshold appears to be arbitrary and not experimentally derived.

Nevertheless, our lowest hatch values were observed at dissolved oxygen levels below 5.0 mg/L (Figure 17).

The effects of PCBs or pesticides on blueback herring eggs has not been investigated, but high levels of these chemicals would be expected to negatively impact hatch. Of these contaminants, only the pesticide alpha-BHC was significantly correlated with percent hatch. However, this strong negative correlation was due solely to the value for Dillard Creek. Also, levels of alpha-BHC were zero for all but two sites, and the level for Dillard Creek is not considered high enough to be of concern. We observed strong negative correlations between hatch rate and total DDTs, 4,4' DDE, and 2,4' DDD, but these relationships were nonsignificant. Both DDE and DDD are old, highly weathered, degraded forms of DDT. Because of a small sample size (n=10), it is impossible to link these contaminants directly to hatch rate. However, compared with published standards, the levels of these contaminants appear to be too low to have an effect. Also, contaminant levels would need to be quite high to affect egg mortality, given that adults have a short time of exposure to the spawning area and the eggs hatch in only two to three days.

In summary, our overall assessment is that mortality of blueback herring eggs due to poor water quality is not likely to account for the declines in abundance that have been observed. Our hatch rates, excluding Dillard Creek, exceeded 50% (mean=75%). For some sites, hatch rates were not different from that observed for control trials carried out using distilled water. In addition, Dillard Creek, which had the lowest hatch rate, probably represents only a small proportion of total spawning habitat.

The importance of sites similar to Dillard Creek would depend on whether blueback herring prefer small tributary creeks relative to similar habitat along mainstem rivers.

We recommend several areas of future research. Factors resulting in low dissolved oxygen levels within small tributaries need to be investigated. The link between hatch rate and nitrate levels as well as hatch rate and concentrations of DDTs should be examined. Also, because larvae are more sensitive to poor water quality than eggs (Mohr et al. 1990), a study of the effect of water quality on larval growth and survival should be undertaken.

Conclusions

1. Significant differences in the hatch rate of blueback herring eggs among sites were observed. Mean hatch rate among field sites ranged from 89% on the Chowan River at Riddicksville to 26% at Dillard Creek. Lower hatch rates were observed at sites located on smaller streams, when compared to sites on the mainstem of the Chowan River and major tributaries (Nottoway and Meherrin rivers).

2. Differences in water quality among sites were observed. Of the water quality parameters measured, dissolved oxygen was the only parameter with values not within the reported range for normal development of blueback herring eggs.

3. Based on correlation and regression analyses, dissolved oxygen appears to be the primary factor resulting in differences in hatch rate among sites.

4. There was little evidence that PCB or pesticide levels affected hatch rate. We did detect a negative correlation between DDT levels and hatch rate. However, our sample size was small, and the correlation was not statistically significant. Estimated PCB and pesticide levels within fish tissue and water were generally well below published standards.

5. Hatch rates exceeded 50% for all sites except Dillard Creek. Because that site represents only a small proportion of total spawning habitat, we would not expect the decline in blueback herring abundance to be attributable to egg mortality.

Acknowledgments

We thank the following individuals and groups: NCDMF for funding this project through the Fishery Resource Grant Program; Elliott Atstupenas and the Edenton National Fish Hatchery for advice, housing, and assistance with equipment; Matthew Whitman and Vann Stancil for their help as technicians on the project; Sara Winslow, Harrel Johnson, and Steve Trowell of NCDMF, Pete Kornegay and Chad Thomas of the NC Wildlife Resources Commission, Mark Hale of NCDWQ, Dr. Harry Daniels of the NCSU Department of Zoology, Harold Burkett of the Union Camp Corporation, Terry Pratt, Keith Lockwood of Maryland Division of Natural Resources for advice and assistance; Callie Childress and Peter Ruhl of USGS, Norm Bedwell, Trish MacPherson, and Marcia Toller-McCullen of NCDWQ, and Harold Burkett of the Union Camp Corporation for historic water quality data; Dr. JoAnn Burkeholder and Howard Glasgow of the NCSU Department of Botany for nutrient analyses; Dr. Damian Shea and Chris Hofelt of the NCSU Department of Toxicology for organic contaminant analyses and advice on interpreting the results; Ronald Edwards and the Roanoke/Chowan Wildlife Club, Norman and Wayne Bunch, Al Howard, Robert Vogele, and the Arrowhead Beach Property Owners Association, William Nixon, and Billy Gilliam for the use of their property for study sites; and Wilbur Bunch, J.G. Layton Jr., and Tony Stephenson and Tunis Fishery Inc. for their assistance in collecting blueback herring.

Literature Cited

Bozeman, E.L., and M.J. Van Den Avyle. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (S. Atlantic) -- alewife and blueback herring. U.S. Fish and Wildl. Serv. Biol. Rep. 82(11.111): 17p.

Bromage, N.R. 1988. Propagation and stock improvement. Intensive Fish Farming. BSP Professional Books, Oxford. 119-128p.

Collier, R.S., and M.C. Odom. 1989. Obstructions to anadromous fish migration. U.S. Fish and Wildl. Ser. Project No. 88-12. 29p.

Crawford, R.H., R.R. Cusack, and T.R. Parlee. 1986. Lipid content and energy expenditure in the spawning migration of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). Can. J. Zool. 64: 1902-1907.

Davis, H.S. 1967. Culture and diseases of game fishes. Univ. of California Press, Berkeley and Los Angeles. 332p.

Edsall, T.A. 1970. The effect of temperature on the rate of development and survival of alewife eggs and larvae. Trans. Amer. Fish. Soc. 99(2): 376-380.

Evans, M.S., B.A. Manny and T.E. Columbia. 1994. Lake trout eggs: in situ hatching success in Crean Lake, October 1990-May 1991 studies. National Hydrology Research Centre Contribution Number 94012.

Evans, M.S., B.A. Manny and M. Wynn. 1995. In situ hatching success of lake trout eggs in Crean Lake , October 1992-May 1993 studies. National Hydrology Research Centre Contribution Number 95001.

Fay, C.E., R.J. Neves, and G.B. Pardue. 1983. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic) -- alewife and blueback herring. U.S. Fish and Wildl. Serv. Biol. Rep. 82(11.9): 25p.

Fry, J.C. ed. 1993. Biological data analysis a practical approach. Oxford Univ. Press, Oxford and New York. 418p.

Gunn, J.M., and W. Keller. 1984. Spawning site water chemistry and lake trout (*Salvelinus namaycush*) sac fry survival during spring snowmelt. Can. J. Fish. Aquat. Sci. 41: 319-329.

Hempel, G. 1979. Early life history of marine fish, the egg stage. Washington Sea Grant, Univ. of Washington Press. Seattle, Washington. 70 p.

Hightower, J.E., A.M. Wicker, and K.M. Endres. 1996. Historical trends in abundance of American shad and river herring within Albemarle Sound, North Carolina. N. Amer. J. Fish. Management. 16:257-271.

Jessop, B.M. 1993. Fecundity of anadromous alewives and blueback herring in New Brunswick and Nova Scotia. Trans. Amer. Fish. Soc. 122: 85-98.

Johnson, M.G., J.R.M. Kelso, and S.E. George. 1987. Loadings of organochlorine contaminants and trace elements to two Ontario lake systems and their concentrations in fish. Can. J. Fish. Aquat. Sci. 45(Suppl. 1): 170-178.

Jones P.W., H.J. Speir, N.H. Butowski, R. O'Reilly, L. Gillingham, and E. Smoller. 1988. Chesapeake Bay fisheries: status, trends, priorities and data needs. Maryland Department of Natural Resources and Virginia Marine Resources Commission. 227p.

Jones, P.W., F.D. Martin, and J.D. Hardy, Jr. 1978. Development of Fishes of the Mid-Atlantic Bight: an atlas of egg, larval and juvenile stages. Vol. 1. Acipenseridae Through Icaluridae, Biological Services Program, FWS/OBS-78/12, U.S. Fish and Wildl. Ser., Washington, DC.

Kellogg, R.L. 1982. Temperature requirements for the survival and early development of the anadromous alewife. Prog. Fish-Cult. 44(2): 63-73.

Kennedy, L. 1980. Teratogenesis in lake trout *Salvelinus namaycush* in an experimentally acidified lake. Can. J. Fish. Aquat. Sci. 37: 2355-2358.

Klauda, R.J., S.A. Fischer, L.W. Hall, Jr., and J.A. Sullivan. 1991. Alewife and blueback herring: *Alosa pseudoharengus* and *Alosa aestivalis*. Habitat Requirements for Chesapeake Bay Living Resources. 10-1 - 10-29 p.

Loesch, J.G. 1987. Overview of life history aspects of anadromous alewife and blueback herring in freshwater habitats. Amer. Fish. Soc. Symp. 1:89-103.

Mackay, D. 1982. Correlation of bioconcentration factors. Environ. Sci. Technol. 16:274-278.

Manny, B.A., D.J. Jude and R.L. Eshenroder. 1989. Field test of a bioassay procedure for assessing habitat quality on fish spawning grounds. Trans. Amer. Fish. Soc. 118: 175-182.

Mansueti, A.J. and J.D. Hardy, Jr. 1967. Development of fishes of the Chesapeake Bay region: An atlas of egg, larval and juvenile stages. Nat. Resources Inst., Univ. of Maryland, College Park, Maryland. 202p.

McMahon, G. and O.B. Orville, Jr. 1995. Water-quality assessment of the Albemarle-Pamlico drainage basin, North Carolina and Virginia -- environmental setting and water-quality issues. U.S. Geological Survey Open-File Report 95-136. 72p.

Mohr, L.C., K.H. Mills and J.F. Klaverkamp. 1990. Survival and development of lake trout *(Salvelinus namaycush)* embryos in an acidified lake in northwestern Ontario. Can. J. Fish. Aquat. Sci. 47: 236-243.

National Oceanic and Atmospheric Administration (NOAA). 1996. NOAA's Estuarine Eutrophication Survey. Vol 1: South Atlantic Region. Silver Spring, Maryland. Office of Ocean Resources Conservation Assessment. 50p.

North Carolina Division of Water Quality (NCDWQ). 1985. Water quality criteria for primary nursery areas in North Carolina. NCDWQ, Raleigh, North Carolina. Report No. 84-10, 53p.

NCDWQ. 1997. Chowan River basinwide water quality management plan. NCDWQ, Raleigh, North Carolina. 163p.

Odom. M.C., R.J. Neves, and J.J. Ney. 1986. An assessment of anadromous fish migrations in the Chowan River Drainage, Virginia. final report. U.S. Fish and Wildl. Ser. 33p.

Piper, R.G., I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler, and J.R. Leonard. 1982. Fish hatchery management. U.S. Fish and Wildl. Ser., Washington, D.C. 517p.

Rulifson, R.A. 1994. Status of anadromous *Alosa* along the east coast of North America. Pages 134-159 *in* Anadromous *Alosa* Symposium, Tidewater Chapter, Amer. Fish. Soc.

SAS Institute. 1995. JMP® Statistics and Graphics Guide, Version 3.1. SAS Institute Inc., Cary, North Carolina. 593p.

Savino, J.F., M.A. Blouin, B.M. Davis, P.L. Hudson, T.N. Todd and G.W. Fleischer. 1994. Effects of pulsed turbidity and vessel traffic on lake herring eggs and larvae. J. Great Lakes Res. 20(2): 366-376.

Schaaf, W.E. 1996. Status of the blueback herring (*Alosa aestivalis*) in the Chowan River, North Carolina (Draft). NC Div. Mar. Fish., Morehead City, North Carolina. 39p.

Snedecor G.W. and W.G. Cochran. 1956. Statistical methods applied to experiments in agriculture and biology. 5thed. Iowa State University Press. Ames, Iowa. 534p.

Wang, J.C.S., and R.J. Kernehan. 1979. Fishes of the Delaware estuaries. A guide to the early life histories. Ecological Analysts, Inc. Towson, Maryland. 410p.

Winslow, S.E. 1989. North Carolina Alosid fisheries management program. Completion Report for Project AFC-27. NC Div. Mar. Fish. 120p.

Winslow, S.E. 1994. Albemarle Sound area alosid management. Annual Rep., Proj. AFC-47, NC Div. Mar. Fish., 11p.

Winslow, S.E., N.S. Sanderlin, G.W. Judy, J.H. Hawkins, B.F. Holland, Jr., C.A. Fischer, and R.A. Rulifson. 1983. North Carolina anadromous fisheries management program. Completion Report for Project AFCS-16. NC Div. Mar. Fish. 402p.

Woynarovich E. and L. Horvath. 1980. The artificial propagation of warm-water finfishes - a manual for extension. FAO Fisheries Technical Paper No. 201. 183p.

Table 1. Summary of methods used during the 1996 field season to estimate hatching success for blueback herring eggs.

	Pilot Study #1	Trial #1	Trial #2	Trial #3	Pilot Study #2
Collection site of fish	Meherrin River	Chowan River below Tunis	Chowan River at Winton	Chowan River at Dillard Creek	Meherrin River at Murfreesboro
Type of gear used for collection	Pound net	Pound net	Drift gill net	Pound net	Drift gill net
Time of fertilization	4/15/96 7:45	4/21/96 9:00	4/29/96 20:30	5/1/96 8:30	5/10/96 18:30
Number of fish used in fertilization	1 female 4 males	2 females 5 males / female	1 female 4 males	1 female 4 males	1 female 4 males
Water used during fertilization	Meherrin River	Chowan River below Tunis	Chowan River at Winton	Distilled water	Distilled water
Water used during water hardening process	Meherrin River	Chowan River below Tunis	Distilled water	Distilled water	Distilled water
Length of time to load incubators	Approx. 1.5 hours	Approx. 4 hours	Approx. 2.5 hours	Approx. 2 hours	Approx. 2 hours
Number of incubators loaded	batch #1 4 incubators batch #2 4 incubators	13 incubators / female	14 incubators	14 incubators	4 incubators
Water used loading incubators	Chowan River at Winton	Chowan River at Winton	Hatchery freshwater	Hatchery freshwater	Hatchery freshwater
Time of first incubator deployment	4/15/96 10:30	4/21/96 14:19	4/30/96 12:06	5/1/96 12:48	5/11/96 12:55
Length of time between fertilization and deployment	2.75 hours	5.3 hours	15.6 hours	4.3 hours	18.4 hours
Water used to transport incubators before deployment	Chowan River at Winton	Chowan River at Winton	Hatchery freshwater	Hatchery freshwater	Hatchery freshwater
Mean Incubation Length	batch #1 50.6 hours batch #2 100.1 hours	67.9 hours	49.2 hours	46.1 hours	47.0 hours
Water used to transport incubators after removal	Dillard Creek	Mouth of the Chowan River	Hatchery freshwater	Hatchery freshwater	Hatchery freshwater
Mean Hatch	batch #1 74.5% batch #2 37.3%	1.2%	66.3%	7.9%	31%

Table 2. Summary of methods used during the 1997 field season to estimate hatching success for blueback herring eggs.

	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6
Collection site of fish	Dillard Creek	Catherine Creek	Catherine Creek	Wiccacon River	Catherine Creek	Catherine Creek
Type of gear used for collection	Electrofishing	Electrofishing	Electrofishing	Electrofishing	Gill net	Gill net
Time of fertilization	4/1/97 16:30	4/15/97 18:30	4/15/97 18:30	4/17/97 21:06	4/29/97 19:55	4/29/97 20:04
Number of fish used in fertilization	1 female 4 males	1 female 4 males	1 female 4 males	1 female 4 males	1 female 2 males	1 female 3 males
Water used during fertilization	Distilled water	Distilled water	Distilled water	Distilled water	Distilled water	Distilled water
Water used during water hardening process	Distilled water	Distilled water	Distilled water	Distilled water	Distilled water	Distilled water
Length of time to load incubators	2.8 hours	6.4 hours		3.5 hours	4.4 hours	4.4 hours
Number of incubators loaded	13 incubators	13 incubators	13 incubators	13 incubators	13 incubators	13 incubators
Water used loading incubators	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water
Time of first incubator deployment	4/2/97 10:42	4/16/97 14:20	4/16/97 14:20	4/18/97 13:40	4/30/97 11:40	4/30/97 11:40
Length of time between fertilization and deployment	18.2 hours	19.8 hours	19.8 hours	16.6 hours	15.75 hours	15.6 hours
Water used to transport incubators before deployment	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water
Mean Incubation Length	48.1 hours	61.5 hours	61.5 hours	84.7 hours	48.0 hours	48.0 hours
Water used to transport incubators after removal	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water	Site specific water
Mean Hatch	88.9%	51.1%	63.1%	64.9%	70.0%	80.8%

Table 3. Deployment time, retrieval time, and length of deployment for 1996 pilot studies and trials by site.

	Pilot Study #1a			Pilot Study #1b			Trial #1			Trial #2			Trial #3			Pilot Study #2		
	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)
Control							4/21 22:06	4/24 18:10	68.1	4/30 12:06	5/2 19:15	55.2	5/1 12:48	5/3 17:08	52.3	5/11 14:24	5/13 13:05	46.7
Transport Control										4/30 18:25	5/2 13:01	42.6	5/1 19:53	5/3 10:57	39.1			
Blackwater River							4/21 15:30	4/24 13:09	69.7	4/30 14:52	5/2 15:42	48.8	5/1 15:50	5/3 13:45	45.9			
Nottoway River							4/21 16:31	4/24 13:24	68.9	4/30 15:37	5/2 16:15	48.6	5/1 16:36	5/3 14:15	45.7			
Riddicksville							4/21 15:58	4/24 13:46	69.8	4/30 15:10	5/2 15:57	48.8	5/1 16:07	5/3 13:58	45.9			
Meherrin River							4/21 14:19	4/24 14:20	72.0	4/30 16:03	5/2 16:49	48.8	5/1 17:16	5/3 14:47	45.5			
Deep Creek							4/21 18:00	4/24 12:04	66.1	4/30 16:30	5/2 14:39	46.2	5/1 17:47	5/3 12:46	43.0			
Catherine Creek							4/21 18:25	4/24 11:44	65.3	4/30 16:50	5/2 14:23	45.6	5/1 18:08	5/3 12:30	42.4			
Wiccacon River							4/21 18:23	4/24 10:56	64.6	4/30 17:15	5/2 13:58	44.7	5/1 18:44	5/3 12:02	41.3			
Deep Swamp Creek							4/21 19:15	4/24 10:35	63.3	4/30 17:40	5/2 13:39	44.0	5/1 19:08	5/3 11:44	40.5			
Dillard Creek	4/15 10:30	4/17 10:30	48.0	4/15 10:30	4/19 14:57	100.5	4/21 20:30	4/24 16:54	68.4	4/30 13:10	5/2 17:50	52.7	5/1 13:59	5/3 15:45	49.8	5/11 13:49	5/13 12:10	46.4
Whites Landing	4/15 11:00	4/17 9:30	46.5	4/15 11:00	4/19 15:26	100.4	4/21 20:15	4/24 17:17	69.0	4/30 12:51	5/2 18:10	53.3	5/1 13:33	5/3 16:06	50.6	5/11 13:23	5/13 12:30	47.1
Rockyhock Creek							4/21 20:00	4/24 17:37	69.6	4/30 12:30	5/2 18:29	54.0	5/1 13:11	5/3 16:23	51.2	5/11 12:55	5/13 12:50	47.9
Mean Length of Deployment			47.3			100.5			67.9			48.7			45.6			47.1

Table 4. Deployment time, retrieval time, and length of deployment for 1997 trials by site.

	Trial #1			Trial #2			Trial #3			Trial #4			Trial #5			Trial #6		
	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)	Deployed	Retrieved	Length of Deployment (hrs)
Control	4/2 10:42	4/4 19:30	56.8	4/16 14:20	4/21 18:00	123.7	4/16 14:20	4/21 17:53	123.6	4/18 13:40	4/22 16:54	99.2	4/30 11:40	5/2 19:48	56.1	4/30 11:40	5/2 19:48	56.1
Transport Control	4/2 20:36	4/4 10:06	37.5	4/16 22:48	4/19 14:56	64.1	4/16 22:48	4/19 14:56	64.1	4/19 14:56	4/22 8:00	65.1	4/30 20:38	5/2 11:42	39.1	4/30 20:38	5/2 11:42	39.1
Blackwater River	4/2 16:34	4/4 12:18	43.7	4/16 17:06	4/18 17:06	48.0[a]	4/16 17:06	4/18 17:06	48.0[a]	4/18 17:06	4/22 9:56	88.8[c]	4/30 14:18	5/2 14:26	48.1	4/30 14:18	5/2 14:26	48.1
Nottoway River	4/2 17:10	4/4 12:50	43.7	4/16 17:40	4/18 17:44	48.1[a]	4/16 17:40	4/18 17:44	48.1[a]	4/18 17:44	4/22 10:32	88.8[c]	4/30 14:58	5/2 15:14	48.3	4/30 14:58	5/2 15:14	48.3
Riddicksville	4/2 16:48	4/4 12:32	43.7	4/16 17:20	4/18 17:22	48.0	4/16 17:20	4/18 17:22	48.0	4/18 17:22	4/22 10:12	88.8	4/30 14:36	5/2 14:42	48.1	4/30 14:36	5/2 14:42	48.1
Meherrin River	4/2 15:40	4/4 13:26	45.8	4/16 16:14	4/18 16:06	47.9[a]	4/16 16:14	4/18 16:06	47.9[a]	4/18 16:06	4/22 11:08	91.0[d]	4/30 13:28	5/2 13:36	48.1	4/30 13:28	5/2 13:36	48.1
Deep Creek	4/2 14:48	4/4 14:16	47.5	4/16 18:32	4/18 18:38	48.1	4/16 18:32	4/18 18:38	48.1	4/18 18:38	4/22 11:54	89.3[c]	4/30 16:06	5/2 16:18	48.2	4/30 16:06	5/2 16:18	48.2
Catherine Creek	4/2 14:18	4/4 14:34	48.3	4/16 18:56	4/18 19:02	48.1[a]	4/16 18:56	4/18 19:02	48.1[a]	4/18 19:02	4/22 12:10	89.1[c]	4/30 16:32	5/2 16:38	48.1	4/30 16:32	5/2 16:38	48.1
Wiccacon River	4/2 13:32	4/4 15:10	49.6	4/16 19:32	4/20 10:50	87.3[b]	4/16 19:32	4/20 10:50	87.3[b]	4/18 19:52	4/22 12:48	88.9[e]	4/30 17:08	5/2 17:12	48.1	4/30 17:08	5/2 17:12	48.1
Deep Swamp Creek	4/2 13:02	4/4 15:32	50.5	4/16 20:04	4/18 20:08	48.1[a]	4/16 20:04	4/18 20:08	48.1[a]	4/18 20:08	4/22 13:06	89.0[c]	4/30 17:36	5/2 17:34	48.0	4/30 17:36	5/2 17:34	48.0
Dillard Creek	4/2 11:22	4/4 17:00	53.6	4/16 22:08	4/19 13:00	62.9[b]	4/16 22:08	4/19 13:00	62.9[b]	4/19 13:00	4/22 15:08	74.1	4/30 19:30	5/2 19:12	47.7	4/30 19:30	5/2 19:12	47.7
Whites Landing	4/2 11:50	4/4 16:40	52.8	4/16 21:42	4/19 12:28	62.8[b]	4/16 21:42	4/19 12:28	62.8[b]	4/19 12:28	4/22 14:38	74.2	4/30 19:00	5/2 18:46	47.8	4/30 19:00	5/2 18:46	47.8
Rockyhock Creek	4/2 12:10	4/4 16:20	52.2	4/16 21:16	4/19 11:50	62.6[b]	4/16 21:16	4/19 11:50	62.6[b]	4/19 11:50	4/22 14:10	74.3	4/30 18:32	5/2 18:24	47.9	4/30 18:32	5/2 18:24	47.9
Mean Length of Deployment			48.1			61.5			61.5			84.7			48.0			48.0

[a] Incubators were exposed by low water levels.
[b] Incubators may have been exposed by low water levels.
[c] Incubators were deployed on the substrate.
[d] Stakes were repositioned in order to deploy incubator.
[e] Incubator was deployed on the substrate upriver of our study site.

Table 5. Summary of ripe female blueback herring and alewife collected during 1996 and 1997.

Date	Number of Females	Species	Collection Location	Collection Gear	Mean Water Temperature (°C)	Eggs used in a study trial
4/15/96	1	blueback herring	Meherrin River	Pound net	16.0	1996 Pilot Study 1
4/15/96	1	alewife	Meherrin River	Pound net	16.0	Not used [a]
4/21/96	2	blueback herring	Chowan River below Tunis	Pound net	18.9	1996 Trial 1
4/21/96	1	blueback herring	Meherrin River	Pound net	18.9	Not used [a]
4/29/96	1	blueback herring	Chowan River at Winton	Drift gill net	20.1	1996 Trial 2
5/1/96	1	blueback herring	Chowan River at mouth of Dillard Creek	Pound net	19.6	1996 Trial 3
5/10/96	1	blueback herring	Meherrin River at Murfreesboro	Drift gill net	21.2	1996 Pilot Study 2
3/28/97	1	alewife	Meherrin River	Pound net	14.2	Not used [a]
4/1/97	1	blueback herring	Dillard Creek	Electrofishing	11.9	1997 Trial 1
4/8/97	1	blueback herring	Meherrin River	Pound net	17.9	Not used [a]
4/11/97	1	blueback herring	Chowan River at Tunis	Pound net	16.0	Not used [a]
4/15/97	4	blueback herring	Catherine Creek	Electrofishing	16.3	1997 Trials 2&3
4/17/97	4	blueback herring	Wiccacon River	Electrofishing	16.1	1997 Trial 4
4/29/97	2	blueback herring	Catherine Creek	Gill net	14.9	1997 Trials 5&6
5/7/97	2	blueback herring	Chowan River at Winton	Drift gill net	17.8	Not used [a]

[a] Egg mortality was judged to be excessive (>90%).

Table 6. Summary of spawning observations and collection of naturally spawned eggs for 1997.

Date	Locations	Mean Water Temperature (°C)	
4/16/97	Catherine Creek Wiccacon River Deep Swamp Creek	16.2	spawning observed
4/17/97	Deep Creek Catherine Creek Wiccacon River Deep Swamp Creek Dillard Creek	16.1	spawning observed
4/18/97	Meherrin River Catherine Creek	14.6	spawning observed
4/18/97	Deep Creek Catherine Creek Wiccacon River Deep Swamp Creek Rockyhock Creek Dillard Creek	14.6	eggs collected on incubator
4/22/97	Blackwater River Nottoway River Deep Creek Catherine Creek	15.1	eggs collected on incubator
4/29/97	Catherine Creek	14.9	spawning observed
4/30/97	Catherine Creek Chowan River @ Whites Landing	15.2	spawning observed
5/1/97	Meherrin River Deep Creek Catherine Creek Deep Swamp Creek Chowan River @ Whites Landing	16.3	spawning observed
5/2/97	Meherrin River	17.2	spawning observed
5/2/97	Meherrin River Nottoway River Chowan River @ Whites Landing	17.2	eggs collected on incubator

Table 7. Summary of two-way analysis of variance using field sites and controls for 1996 trial 2 and 1997 trials 1,4,5, and 6.

Source of Variation	SS	df	MS	F	P-value	F crit
Sites	2.825	11	0.257	8.053	<0.0001	2.014
Trials	1.056	4	0.264	8.279	<0.0001	2.584
Error	1.403	44	0.032			
Total	5.284	59				

Table 8. Summary of two-way analysis of variance using field sites excluding Dillard Creek for 1996 trial 2 and 1997 trials 1,4,5, and 6.

Source of Variation	SS	df	MS	F	P-value	F crit
Sites	0.885	9	0.098	4.376	0.0007	2.153
Trials	1.198	4	0.300	13.327	<0.0001	2.634
Error	0.809	36	0.022			
Total	2.893	49				

Table 9. Comparison of 1997 maximum values for PCB and pesticides within the LDPSs to reported toxic levels.

Contaminant	Maximum level observed for our field sites ng/LDPS	Estimated level in fish tissue assuming 6% lipid content ng/g wet wt.	Food and Drug Administration Action Levels for fish tissue (DWQ 1997) ng/g wet wt.	Environmental Protection Agency Screening Values for fish tissue (DWQ 1997) ng/g wet wt.	Back-calculated water concentration based on octanol-water partition coefficient (K_{ow}) (Mackay 1982; Johnson et al. 1987) ng/L	Criteria for primary nursery areas in North Carolina (DWQ 1985) ng/L	North Carolina water quality standards for aquatic life (DWQ 1997) ng/L
Sum of PCBs	133.06	7.98	--	10	0.045[a]	0.1	1.0
alpha-BHC	5.20	0.31	--	--	0.824	--	--
Hexachlorobenzene	8.87	0.53	--	70	0.052	--	--
Heptachlor	45.82	2.75	--	--	0.166	4.0	4.0
trans-Chlordane	61.57	3.69	300	--	0.062	--	--
cis-Chlordane	49.38	2.96	300	--	0.049	--	--
trans-Nonachlor	41.83	2.51	--	--	--	--	--
Total Chlordane[b]	198.60	11.92	--	80	0.199	4.0	4.0
Dieldrin	26.63	1.60	300	7	0.088	2.0	2.0
Endosulfan II	12.62	0.76	--	--	3.028	--	--
Total Endosulfan[c]	12.62	0.76	--	20,000	3.028	9.0	50.0
Endosulfan Sulfate	13.46	0.81	--	--	--	--	--
Methoxychlor	21.82	1.31	--	--	1.094	30.0	30.0
4,4'-DDD	30.21	1.81	5,000	--	--	--	--
4,4'-DDE	160.47	9.63	5,000	--	--	--	--
2,4'-DDT	11.05	0.66	5,000	--	--	--	--
2,4'-DDD	36.72	2.20	5,000	--	--	--	--
Total DDTs	238.45	14.31	--	300	0.238	1.00	1.00

[a] Based on K_{ow} for Aroclor.
[b] Sum of Heptachlor, Heptachlor epoxide, trans-Chlordane, cis-Chlordane, and trans-Nonachlor.
[c] Sum of Endosulfan I and Endosulfan II.

List of Figures

were constructed using the least significant difference (LSD) from the analysis of variance. Sites connected by the same line are not significantly different from each other.

Figure 9. Mean daily water temperature versus date for 1996 and 1997. Means were calculated from data collected by temperature loggers (readings every 1.2 hours) and Hydrolab probes (readings every hour).

Figure 10. Daily dissolved oxygen measurements by site for trial two in 1996 and trials one, five, and six in 1997. Dashes represent 1996 and 1997 mean dissolved oxygen values.

Figure 11. Daily pH measurements by site for trial two in 1996 and trials one, five, and six in 1997. Dashes represent 1996 and 1997 mean pH values.

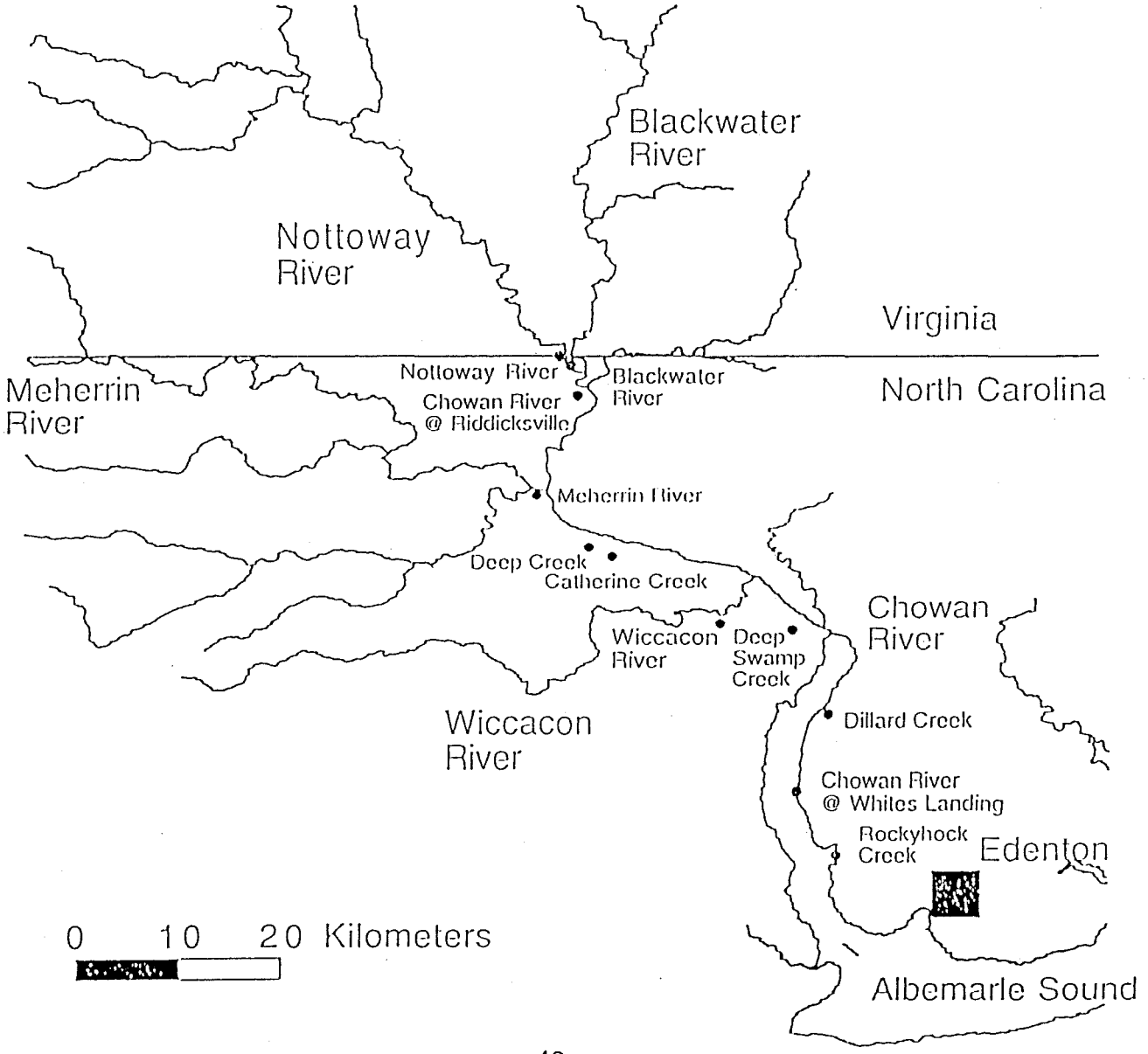
Figure 12. Daily conductivity measurements by site for trial two in 1996 and trials one, five, and six in 1997. Dashes represent 1996 and 1997 mean conductivity values.

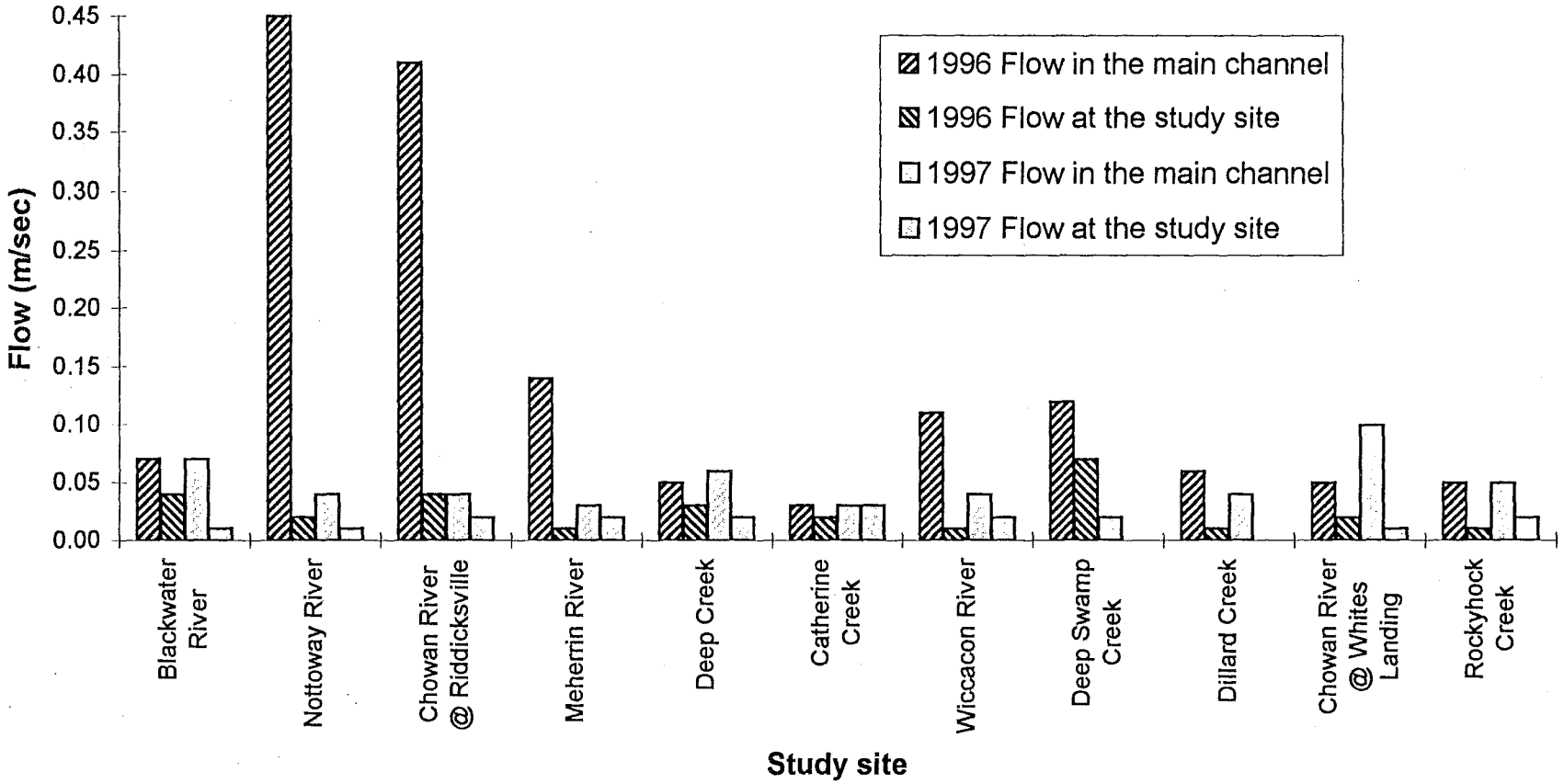
Figure 13. Total phosphorus measurements by site for the 1996 and 1997 field seasons. Dashes represent 1996 and 1997 mean total phosphorus concentrations

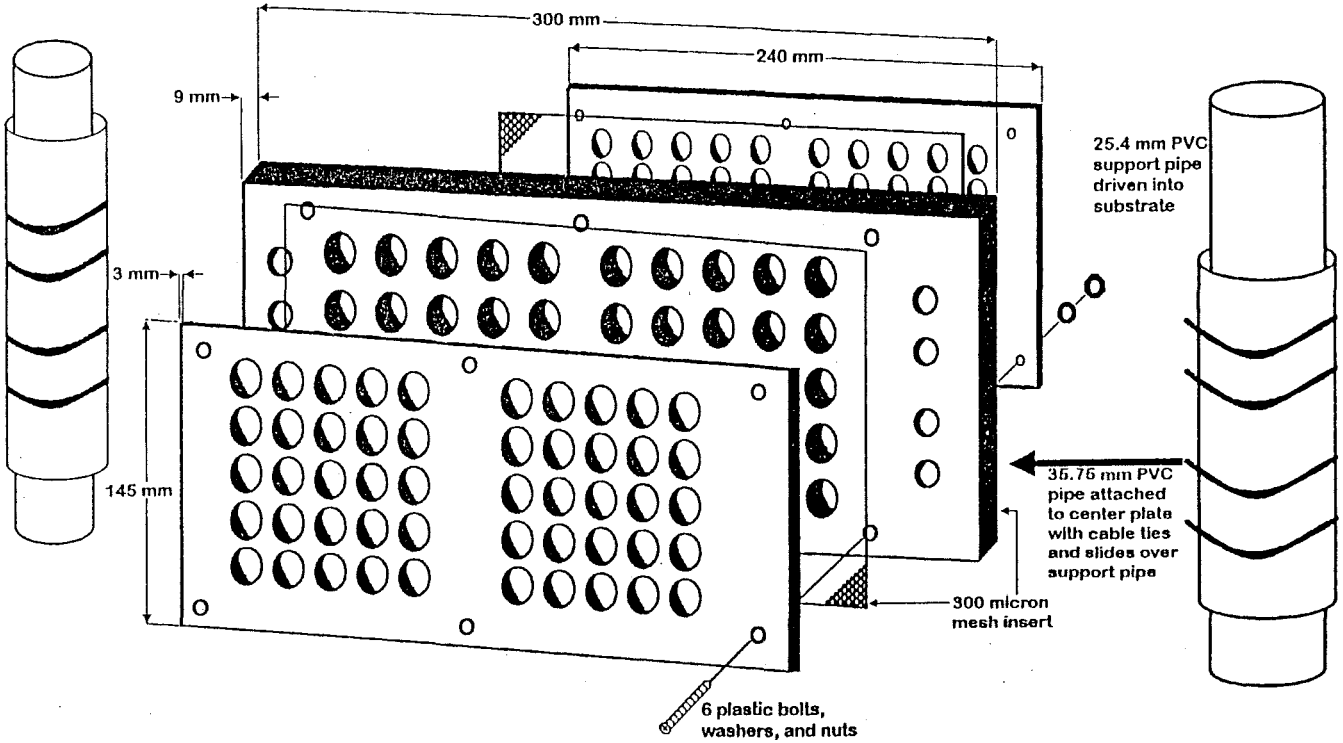
Figure 14. Nitrate measurements by site for the 1996 and 1997 field seasons. Dashes represent 1996 and 1997 mean nitrate concentrations.

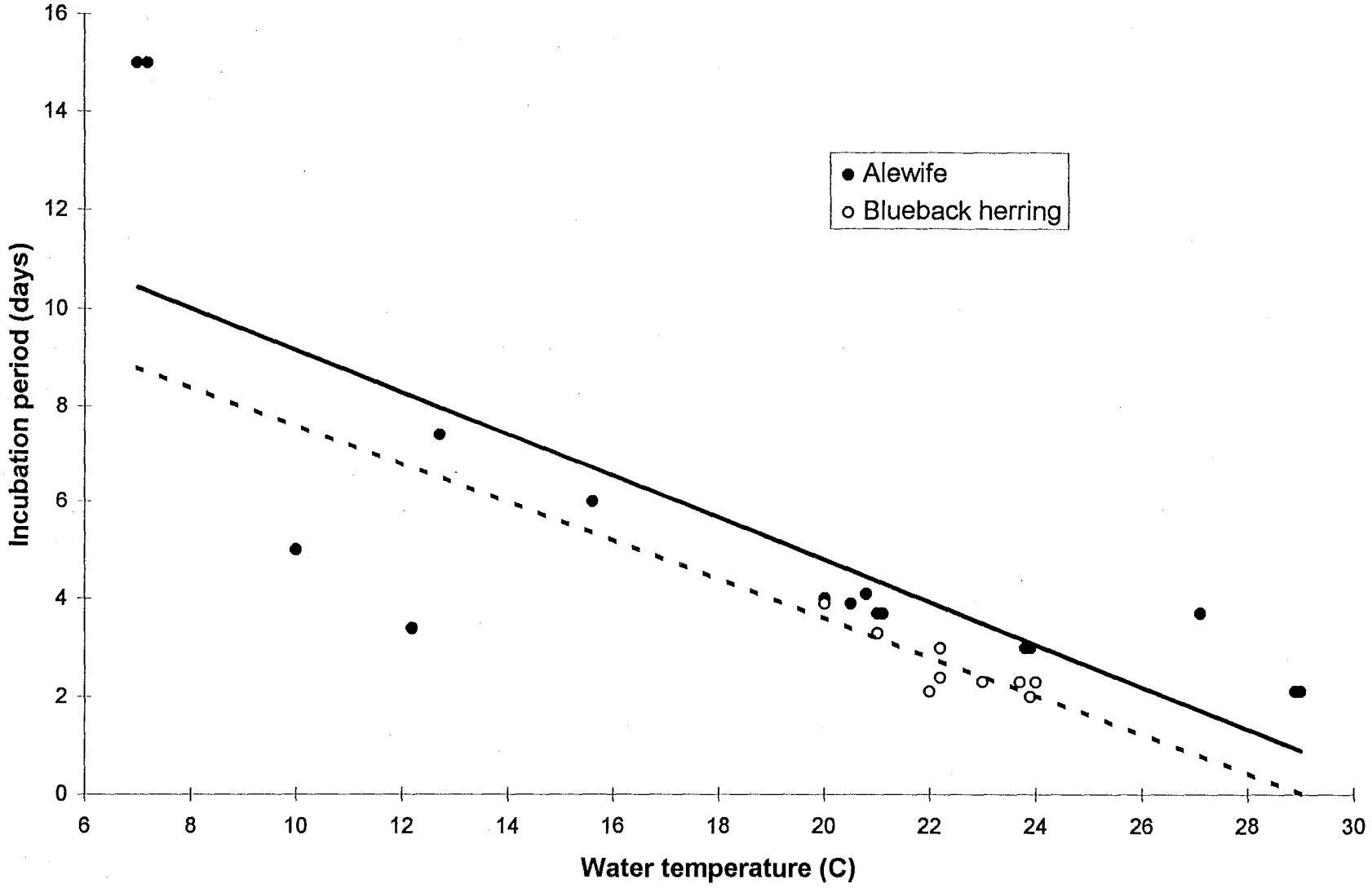
Figure 15. Total ammonia measurements by site for the 1996 and 1997 field seasons. Dashes represent 1996 and 1997 mean total ammonia concentrations.

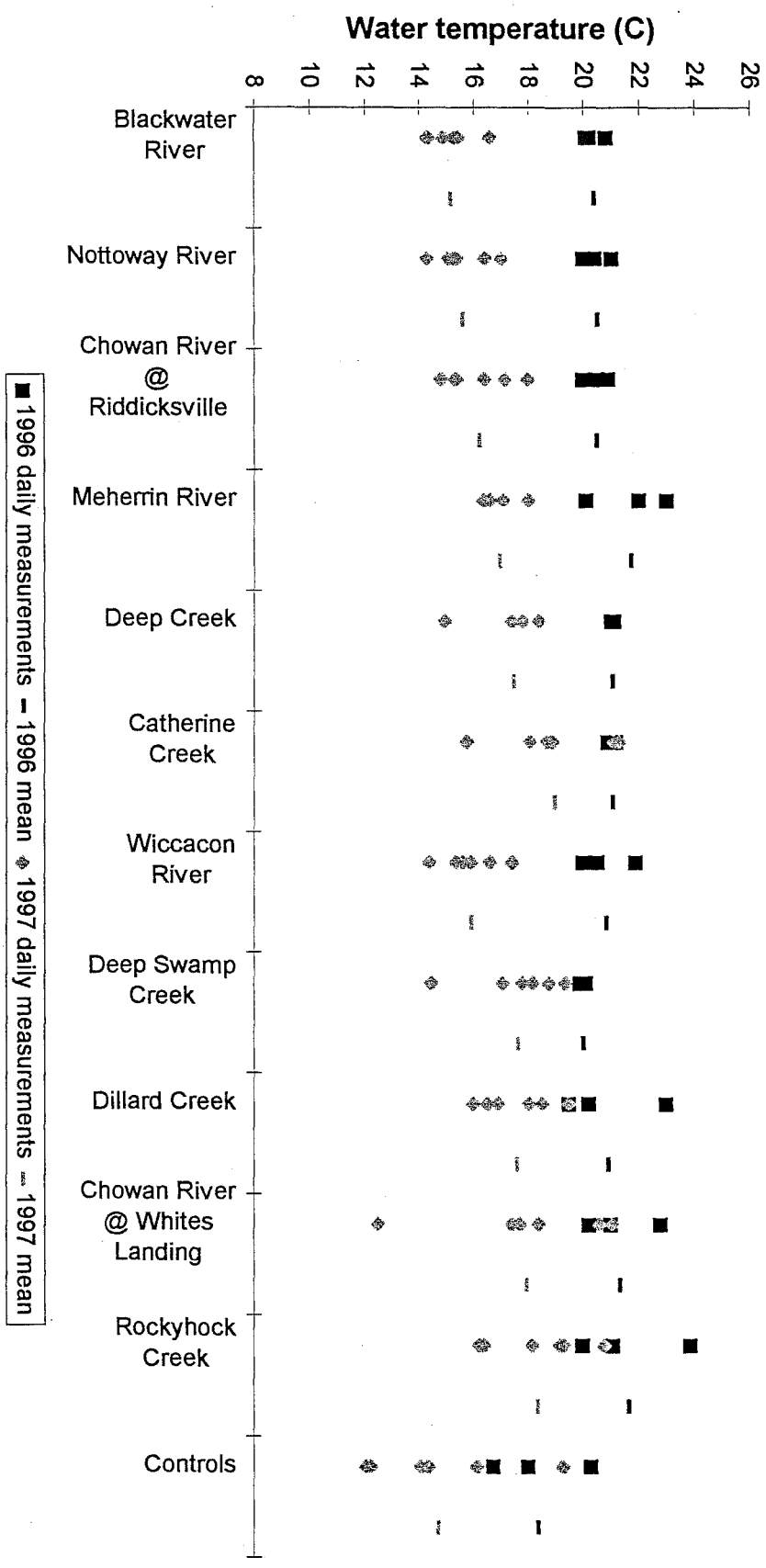
Figure 16. Correlations of percent hatch and mean water temperature, dissolved oxygen, pH, conductivity, and total ammonia, nitrate, and total phosphorus

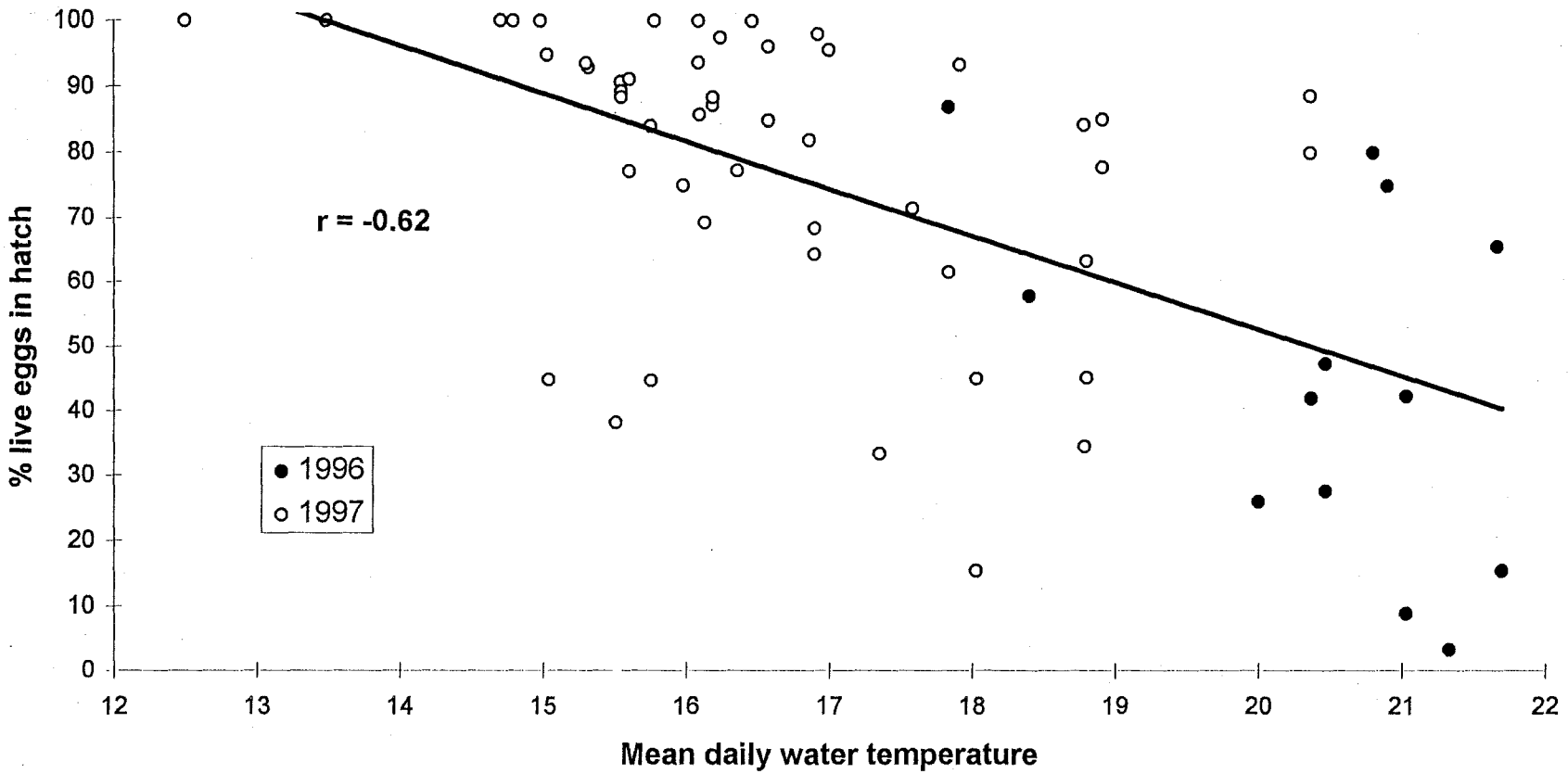

Blackwater
River
Nottoway
River
Virginia
North Carolina
Nottoway River
Blackwater
River
Chowan River
@ Riddicksville
Meherrin
River
Meherrin River
Deep Creek
Catherine Creek
Wiccacon
River
Deep
Swamp
Creek
Chowan
River
Wiccacon
River
Dillard Creek
Chowan River
@ Whites Landing
Rockyhock
Creek
Edenton
0 10 20 Kilometers
Albemarle Sound

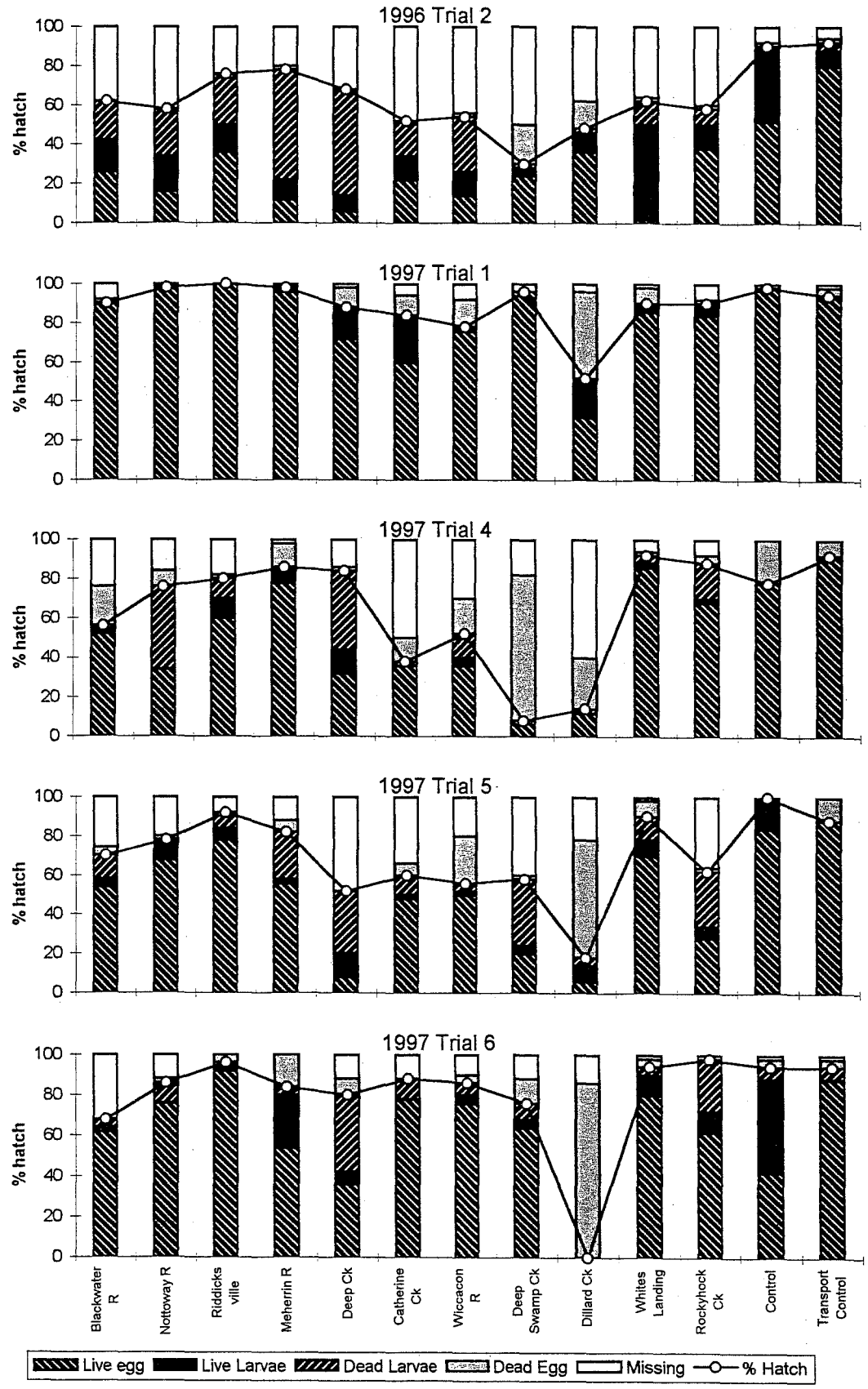

0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow (m/sec)
1996 Flow in the main channel
1996 Flow at the study site
1997 Flow in the main channel
1997 Flow at the study site
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Study site

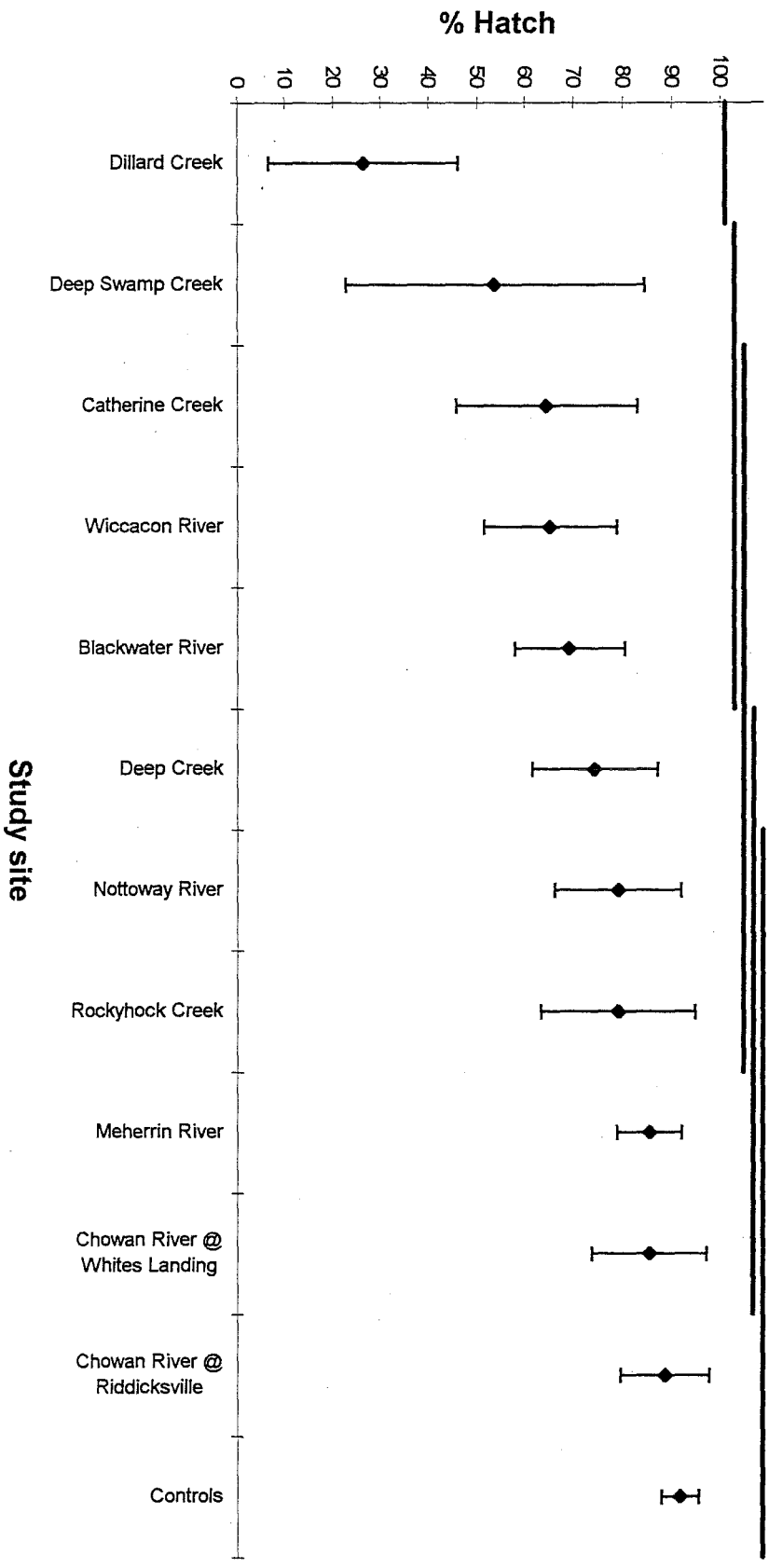

300 mm
240 mm
9 mm
3 mm
145 mm
25.4 mm PVC support pipe driven into substrate
35.76 mm PVC pipe attached to center plate with cable ties and slides over support pipe
300 micron mesh insert
6 plastic bolts, washers, and nuts

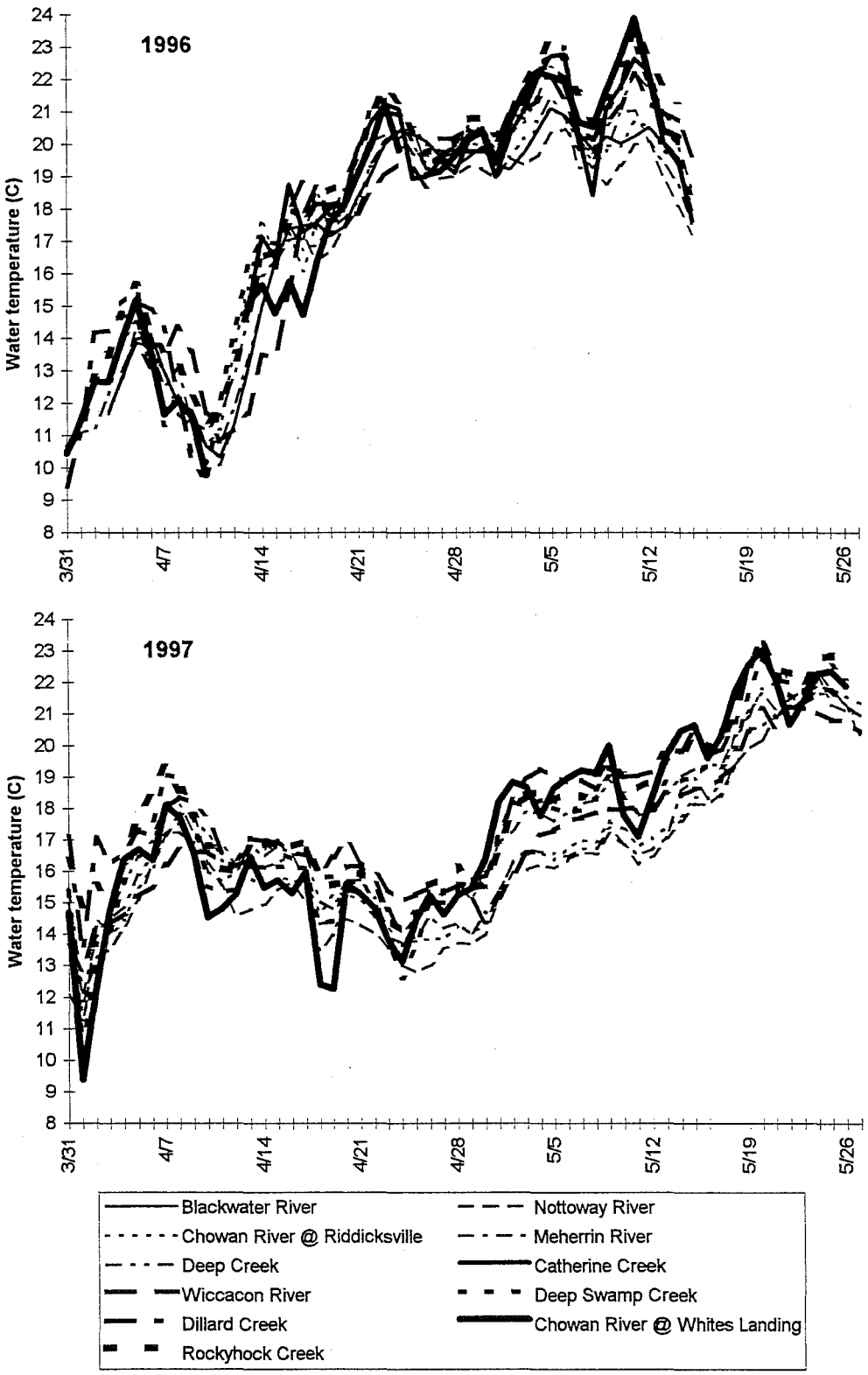

Incubation period (days)
Water temperature (C)
Alewife
Blueback herring
0
2
4
6
8
10
12
14
16
6
8
10
12
14
16
18
20
22
24
26
28
30

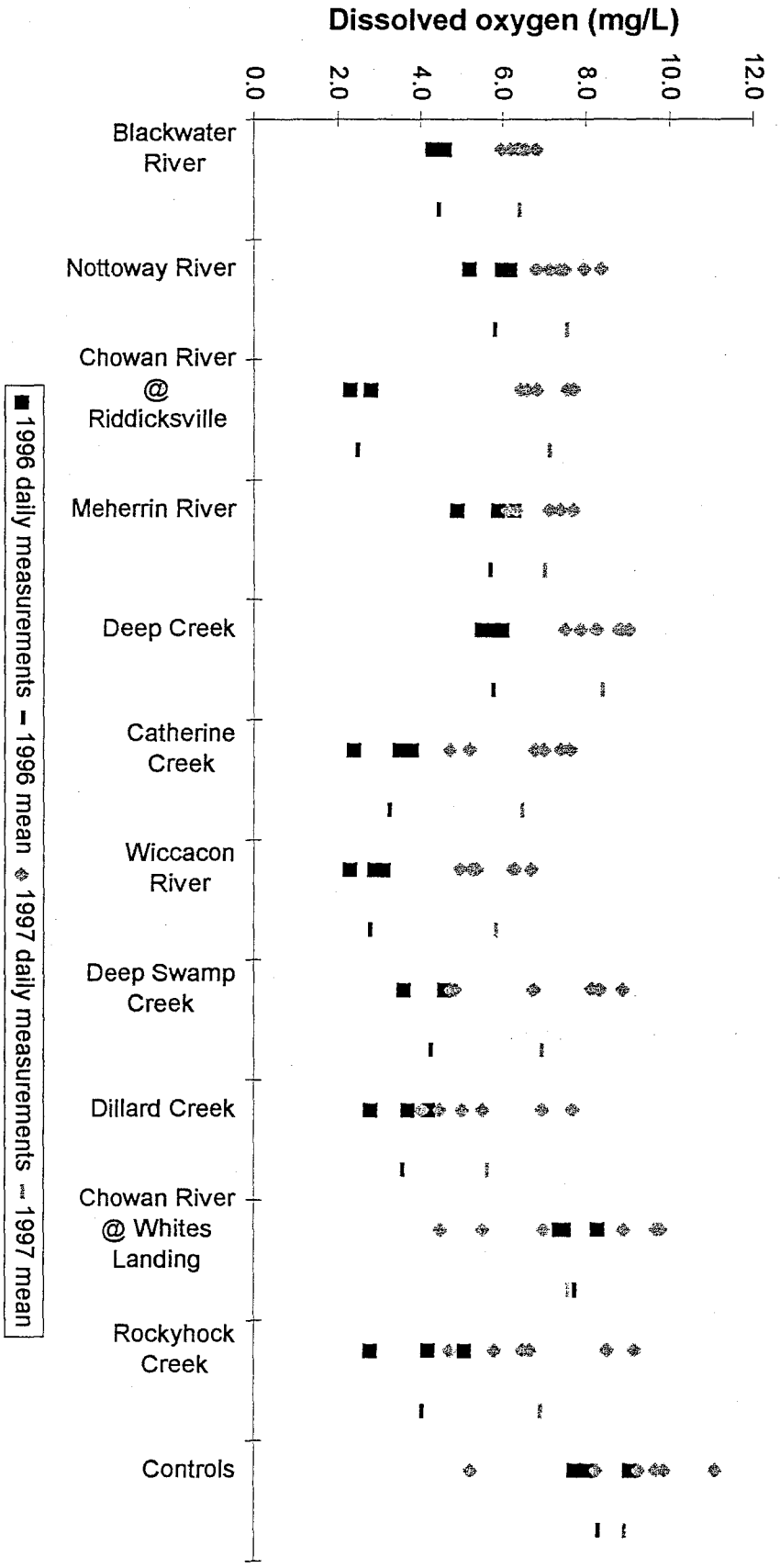

Water temperature (C)
8
10
12
14
16
18
20
22
24
26
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 daily measurements
1996 mean
1997 daily measurements
1997 mean

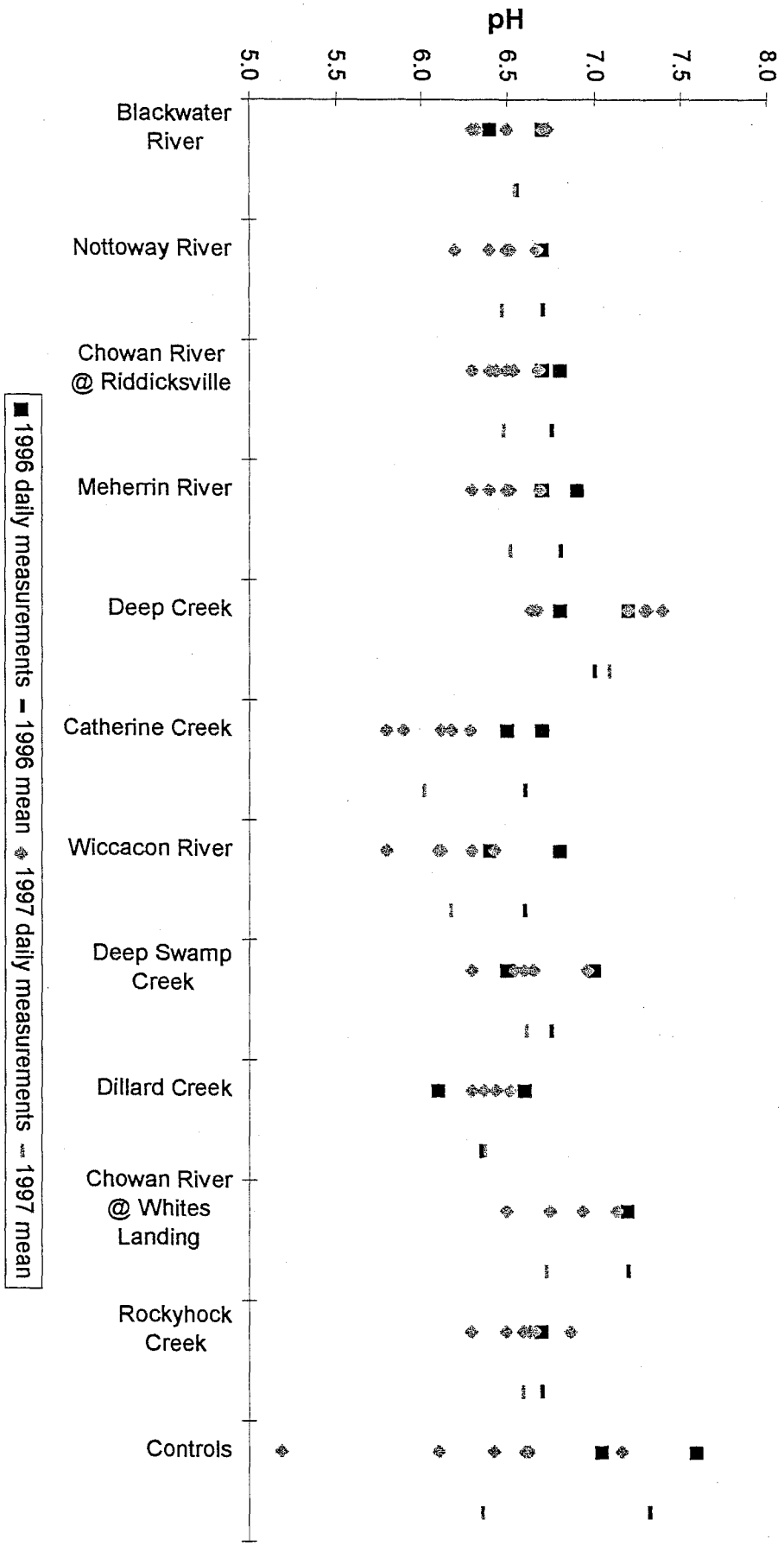

% live eggs in hatch
100
90
80
70
60
50
40
30
20
10
0
r = -0.62
1996
1997
12
13
14
15
16
17
18
19
20
21
22
Mean daily water temperature

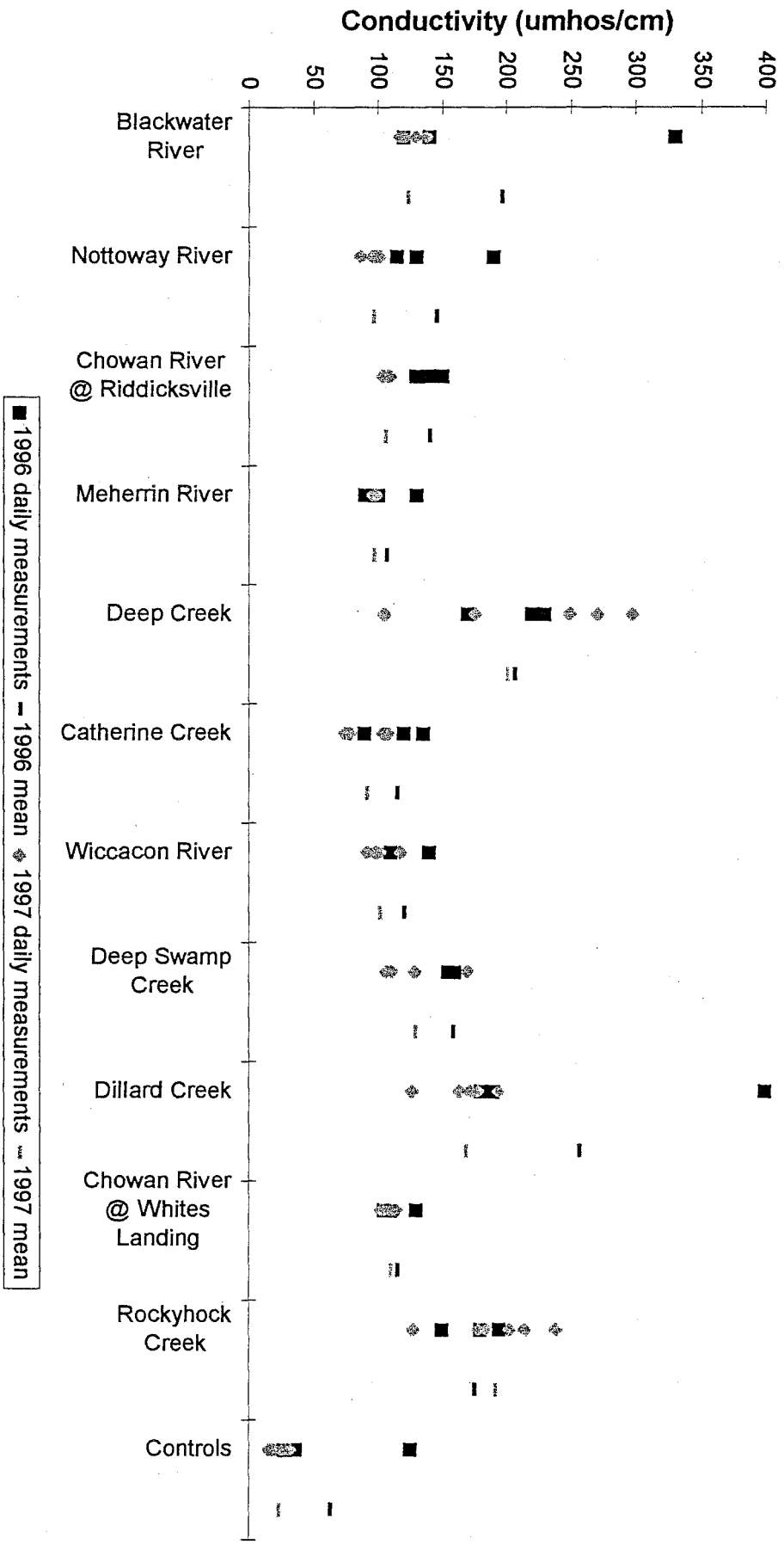

1996 Trial 2
1997 Trial 1
1997 Trial 4
1997 Trial 5
1997 Trial 6
% hatch
0
20
40
60
80
100
Blackwater R
Nottoway R
Riddicksville
Meherrin R
Deep Ck
Catherine Ck
Wiccacon R
Deep Swamp Ck
Dillard Ck
Whites Landing
Rockyhock Ck
Control
Transport Control
Live egg
Live Larvae
Dead Larvae
Dead Egg
Missing
% Hatch

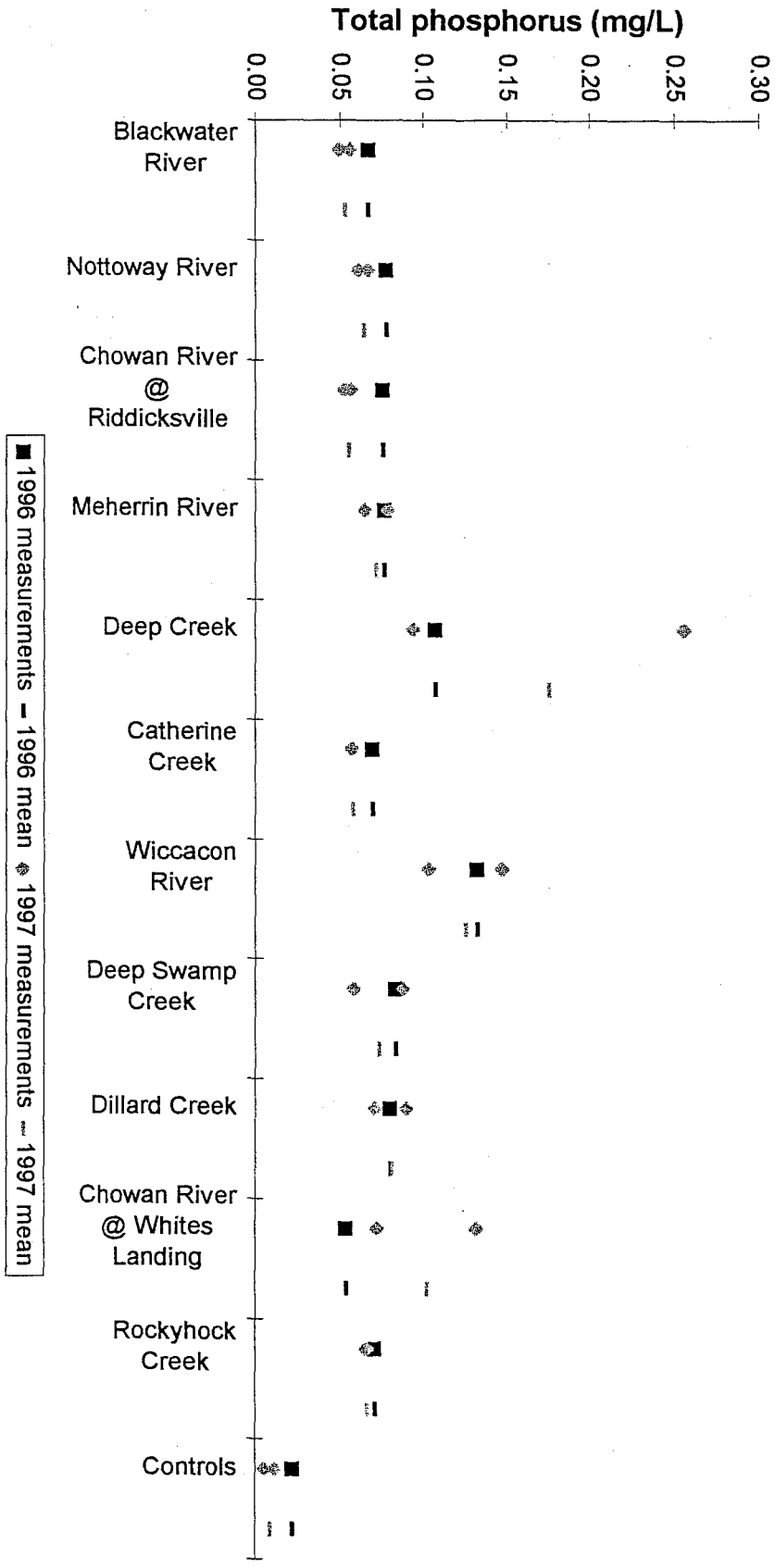

% Hatch
0
10
20
30
40
50
60
70
80
90
100
Study site
Dillard Creek
Deep Swamp Creek
Catherine Creek
Wiccacon River
Blackwater River
Deep Creek
Nottoway River
Rockyhock Creek
Meherrin River
Chowan River @ Whites Landing
Chowan River @ Riddicksville
Controls

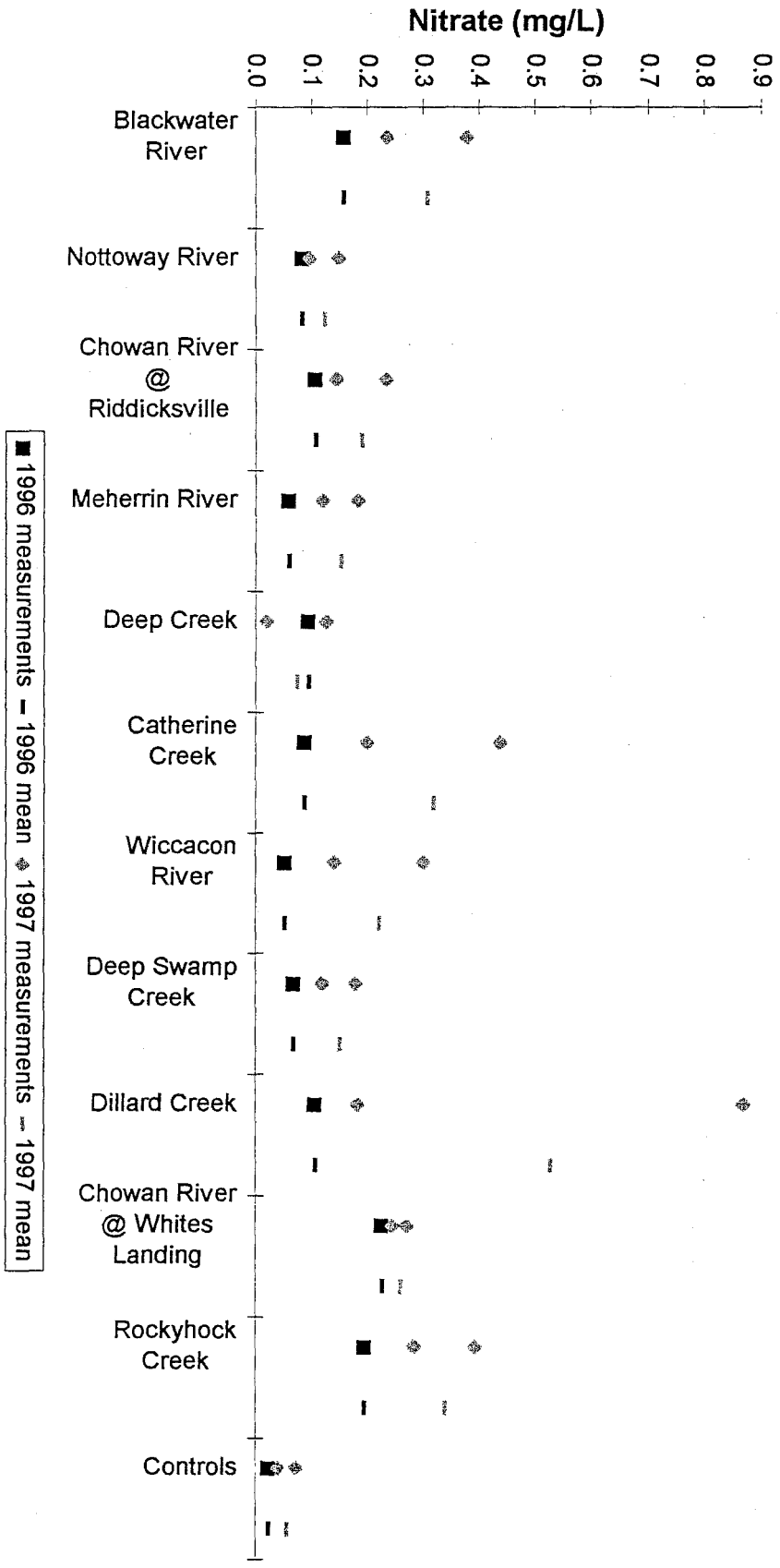

1996
Water temperature (C)
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
3/31
4/7
4/14
4/21
4/28
5/5
5/12
5/19
5/26
1997
Water temperature (C)
Blackwater River
Chowan River @ Riddicksville
Deep Creek
Wiccacon River
Dillard Creek
Rockyhock Creek
Nottoway River
Meherrin River
Catherine Creek
Deep Swamp Creek
Chowan River @ Whites Landing

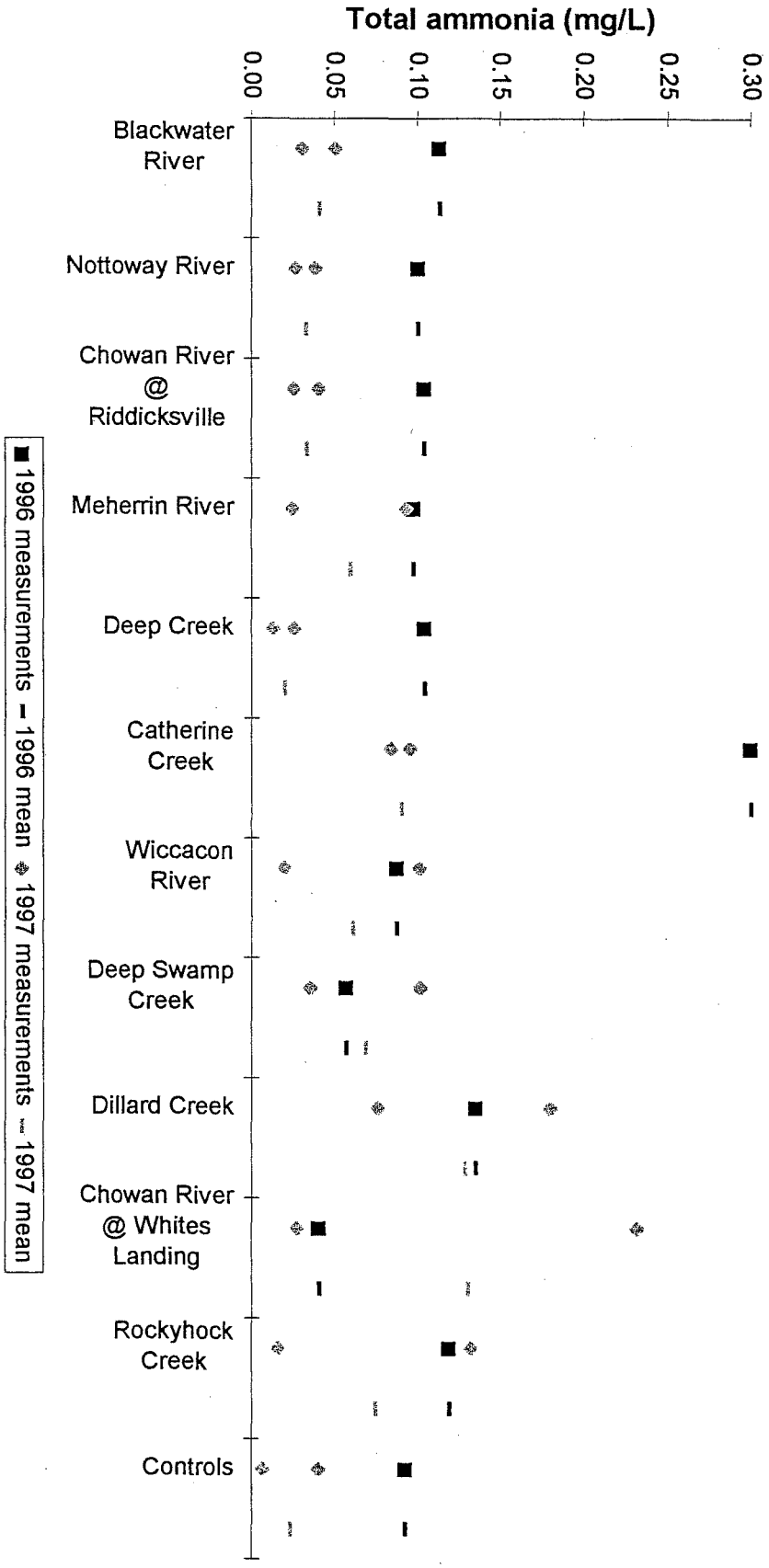

Dissolved oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 daily measurements
1996 mean
1997 daily measurements
1997 mean

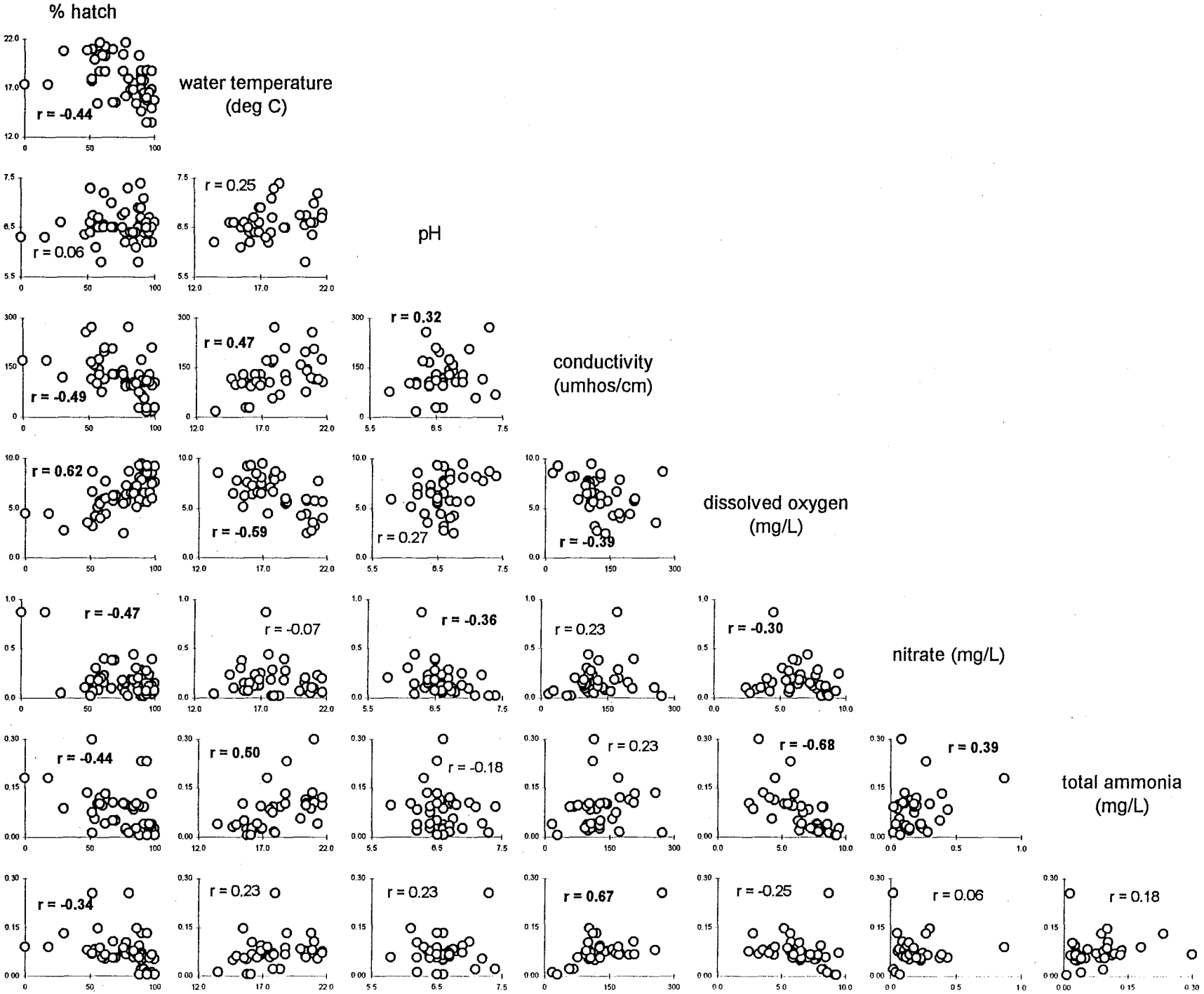

pH
5.0
5.5
6.0
6.5
7.0
7.5
8.0
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
■ 1996 daily measurements ▬ 1996 mean ◆ 1997 daily measurements ··· 1997 mean

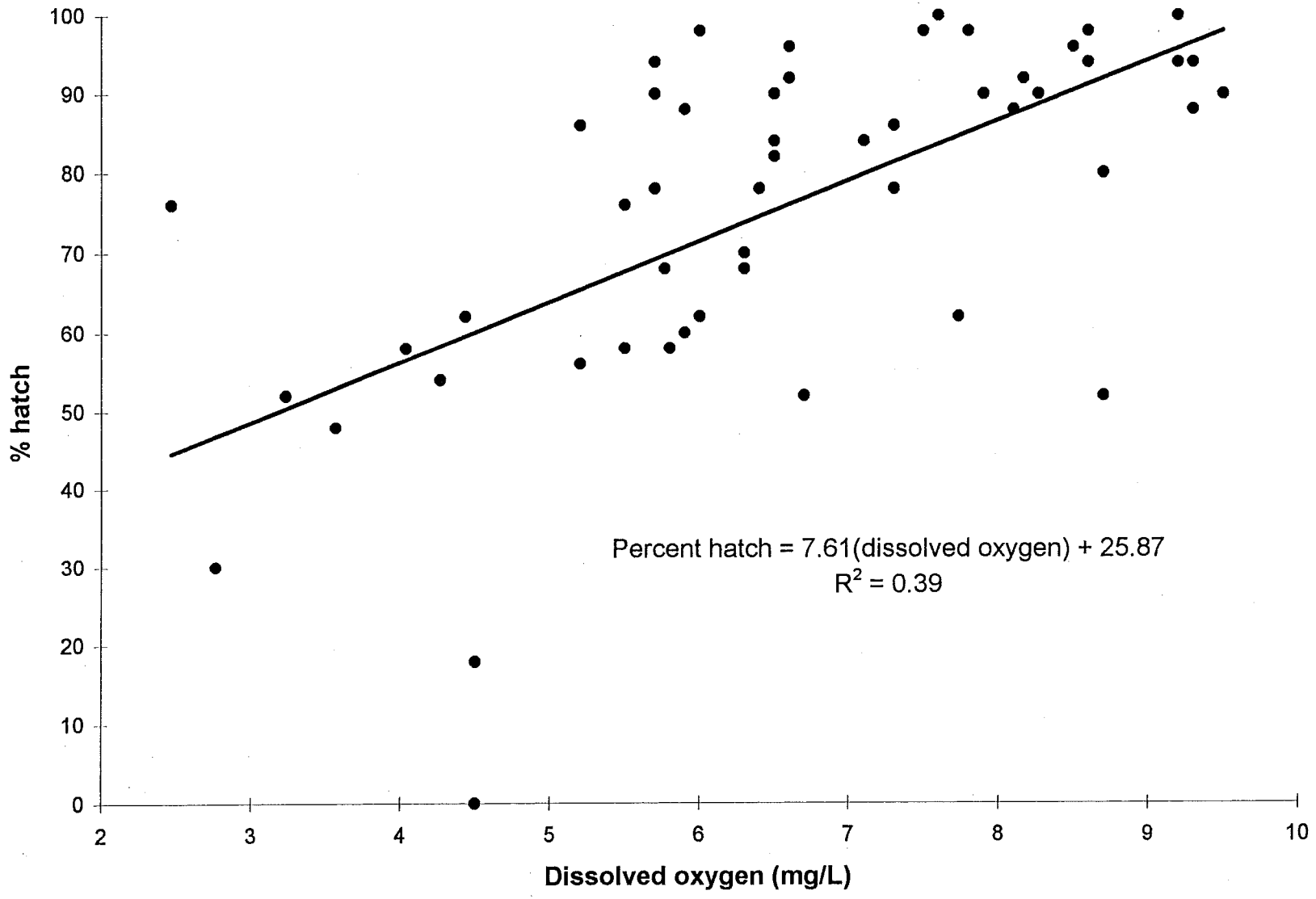

Conductivity (umhos/cm)
0
50
100
150
200
250
300
350
400
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 daily measurements
1996 mean
1997 daily measurements
1997 mean

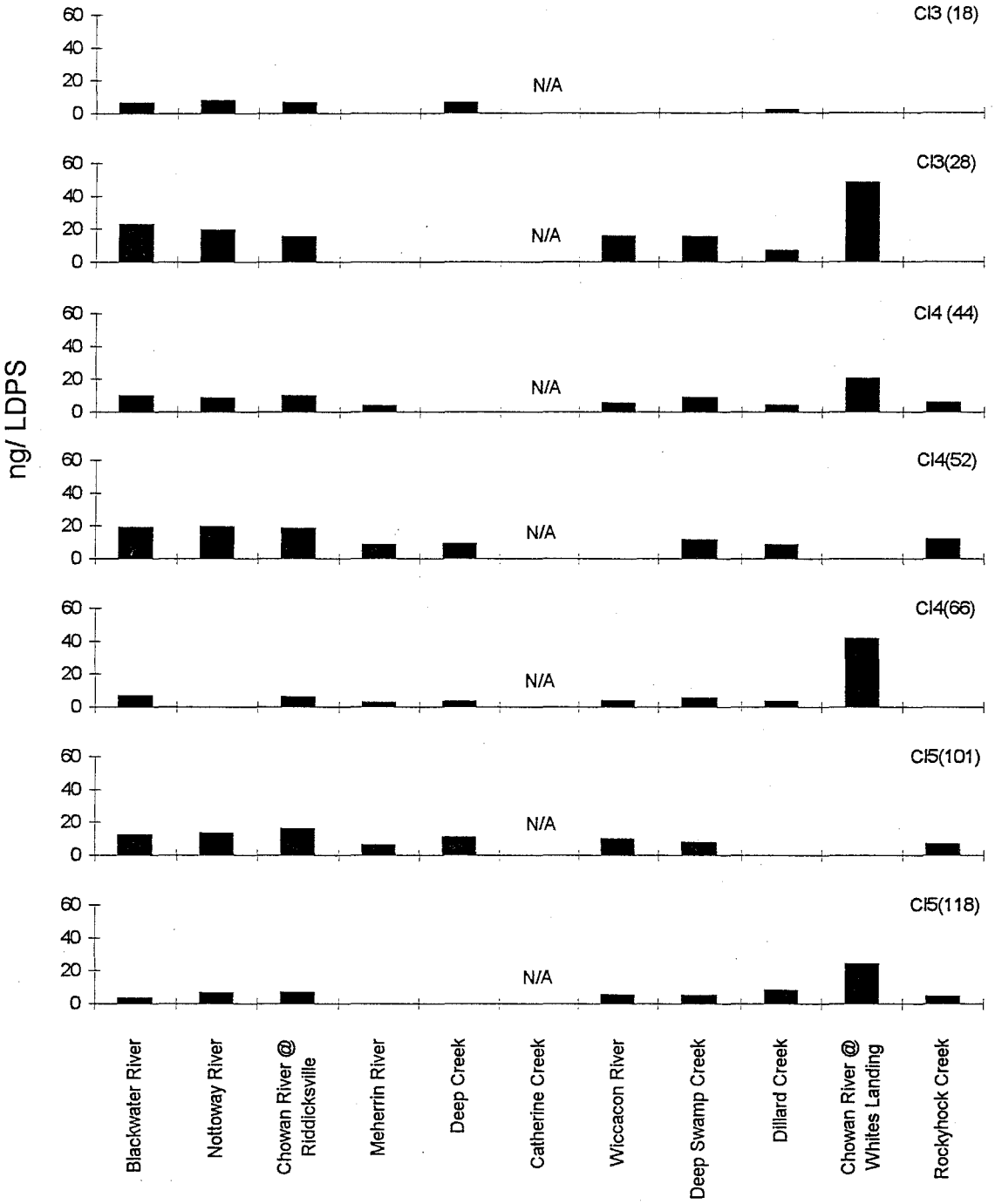

Total phosphorus (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 measurements
1996 mean
1997 measurements
1997 mean

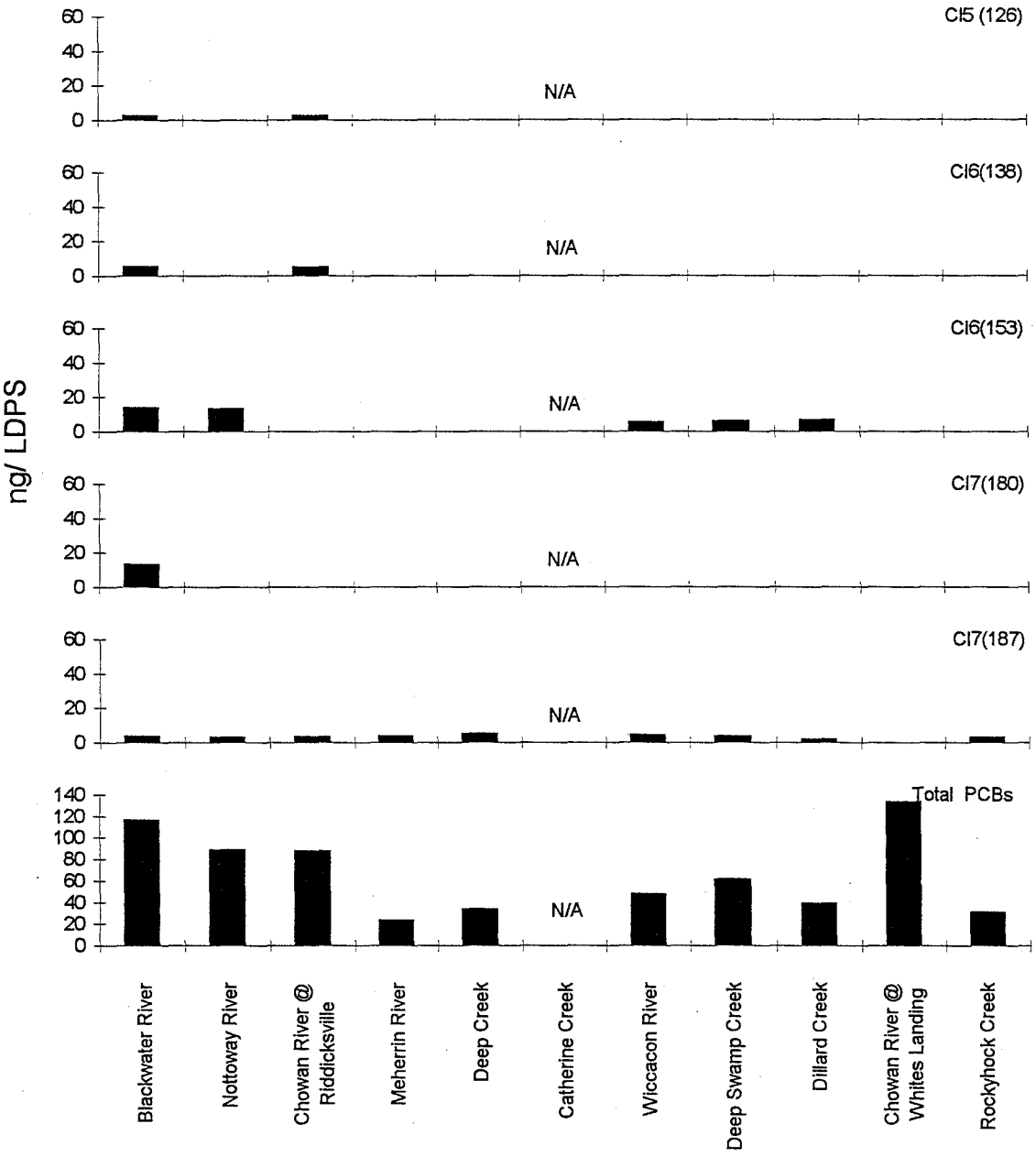

Nitrate (mg/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 measurements
1996 mean
1997 measurements
1997 mean

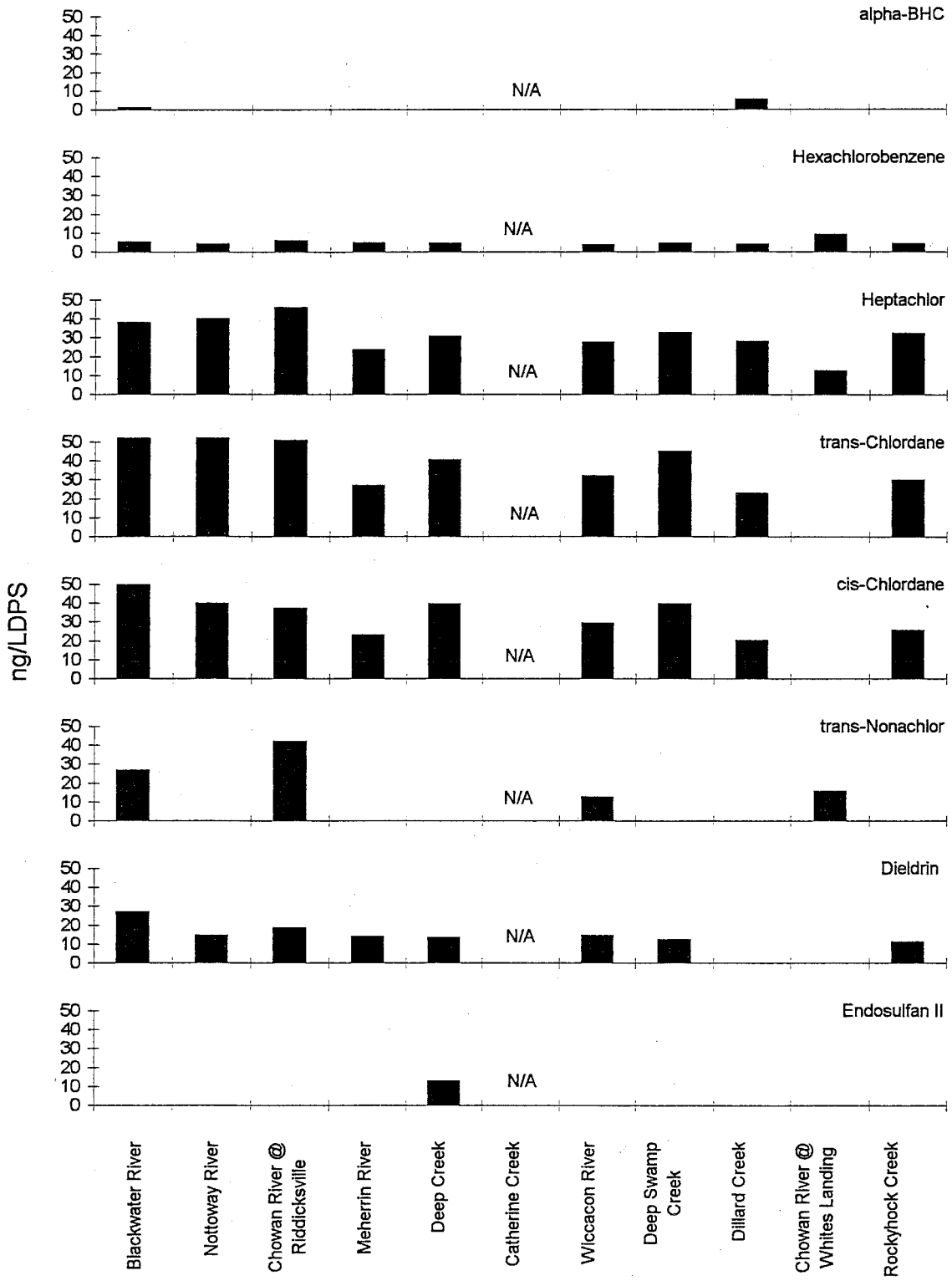

Total ammonia (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
1996 measurements
1996 mean
1997 measurements
1997 mean

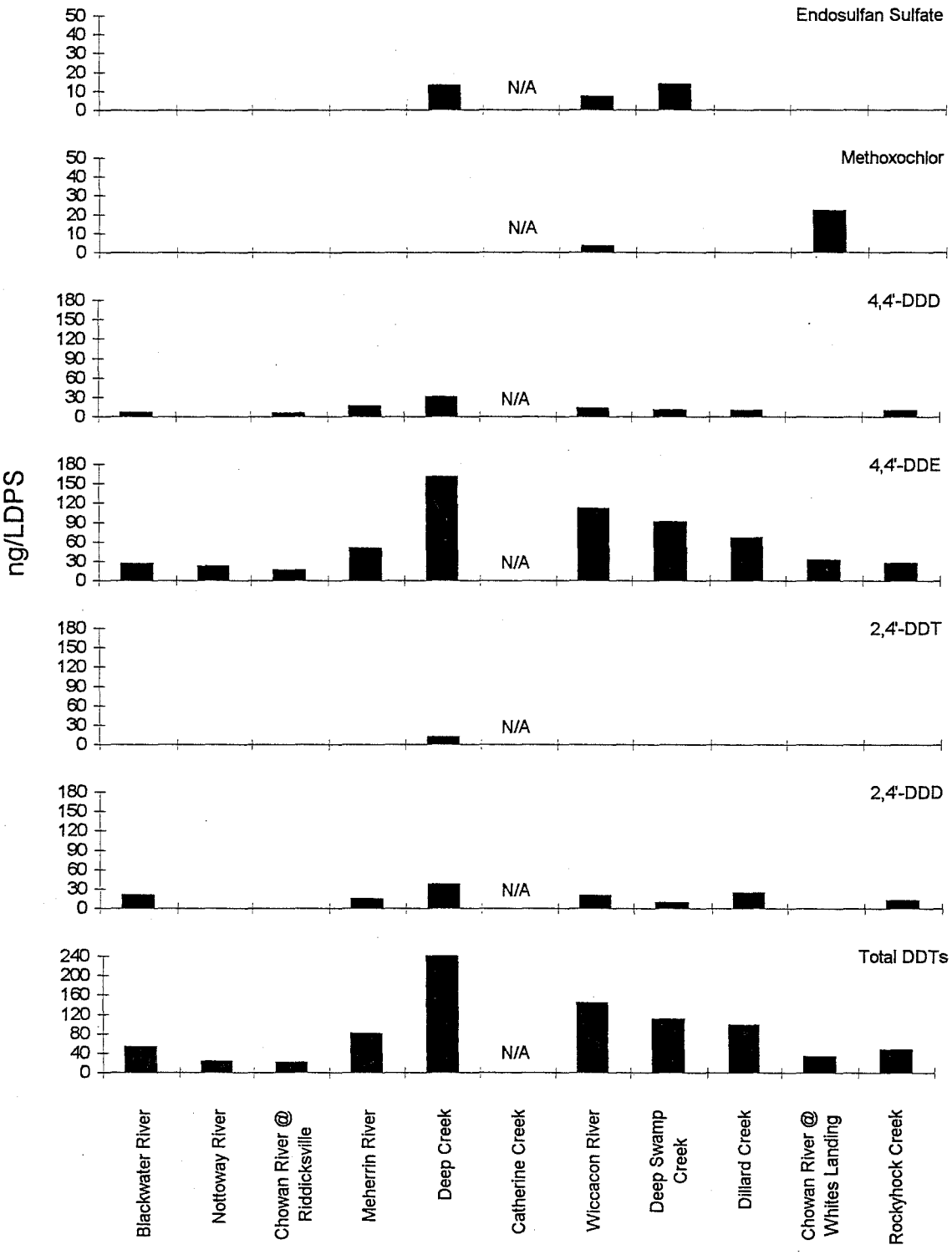

% hatch
water temperature (deg C)
pH
conductivity (umhos/cm)
dissolved oxygen (mg/L)
nitrate (mg/L)
total ammonia (mg/L)
total phosphorus (mg/L)
r = -0.44
r = 0.25
r = 0.06
r = 0.32
r = 0.47
r = -0.49
r = 0.62
r = -0.59
r = 0.27
r = -0.39
r = -0.47
r = -0.07
r = -0.36
r = 0.23
r = -0.30
r = -0.44
r = 0.50
r = -0.18
r = 0.23
r = -0.68
r = 0.39
r = -0.34
r = 0.23
r = 0.23
r = 0.67
r = -0.25
r = 0.06
r = 0.18

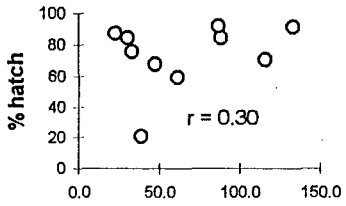

100
90
80
70
60
50
40
30
20
10
0
% hatch
2
3
4
5
6
7
8
9
10
Dissolved oxygen (mg/L)
Percent hatch = 7.61(dissolved oxygen) + 25.87
R2 = 0.39

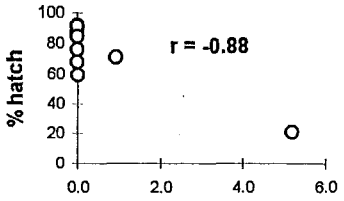

ng/ LDPS
Cl3 (18)
Cl3(28)
Cl4 (44)
Cl4(52)
Cl4(66)
Cl5(101)
Cl5(118)
N/A
60
40
20
0
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek

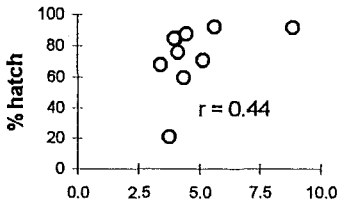

ng/ LDPS
Cl5 (126)
Cl6(138)
Cl6(153)
Cl7(180)
Cl7(187)
Total PCBs
N/A
60
40
20
0
140
120
100
80
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek

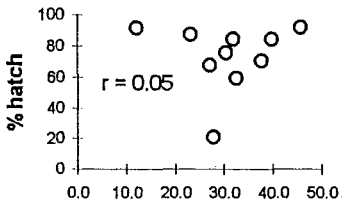

alpha-BHC
Hexachlorobenzene
Heptachlor
trans-Chlordane
cis-Chlordane
trans-Nonachlor
Dieldrin
Endosulfan II
N/A
50
40
30
20
10
0
ng/LDPS
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek

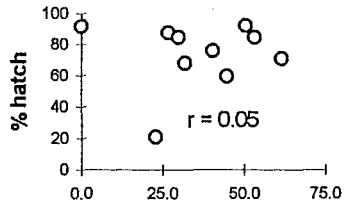

Endosulfan Sulfate
Methoxochlor
4,4'-DDD
4,4'-DDE
2,4'-DDT
2,4'-DDD
Total DDTs
N/A
ng/LDPS
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek

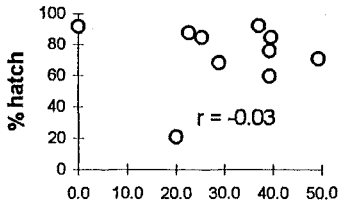

% hatch
r = 0.30
ng/LDPS
Total PCBs

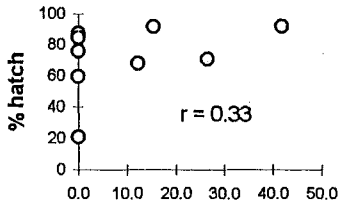

% hatch
r = -0.88
ng/LDPS
alpha-BHC

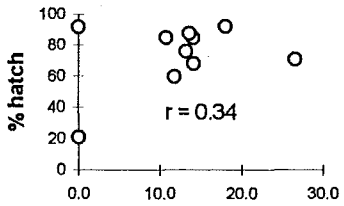

% hatch
r = 0.44
ng/LDPS
Hexachlorobenzene

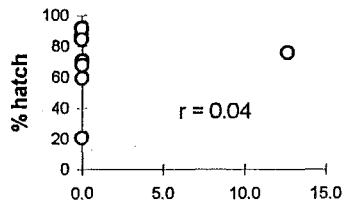

% hatch
r = 0.05
ng/LDPS
Heptachlor

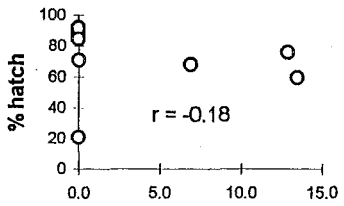

% hatch
r = 0.05
ng/LDPS
trans-Chlordane

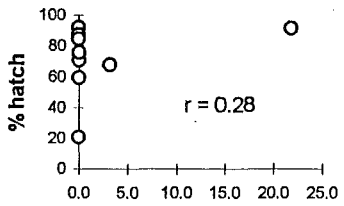

% hatch
r = -0.03
ng/LDPS
cis-Chlordane

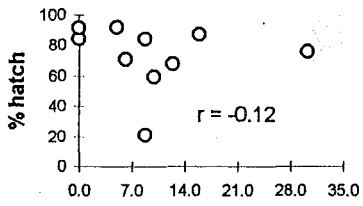

% hatch
r = 0.33
ng/LDPS
trans-Nonachlor

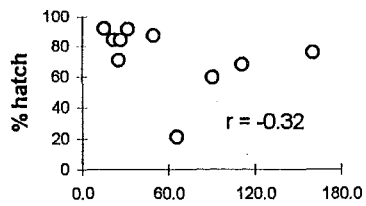

% hatch
r = 0.34
ng/LDPS
Dieldrin

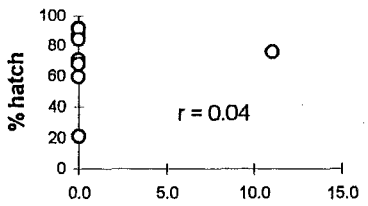

% hatch
r = 0.04
ng/LDPS
Endosulfan II

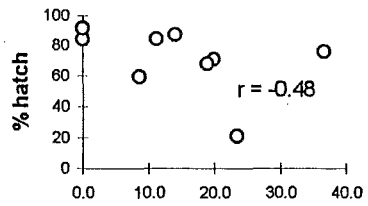

% hatch
r = -0.18
ng/LDPS
Endosulfan Sulfate

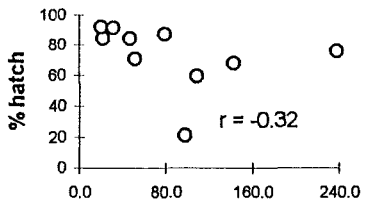

% hatch
r = 0.28
ng/LDPS
Methoxychlor

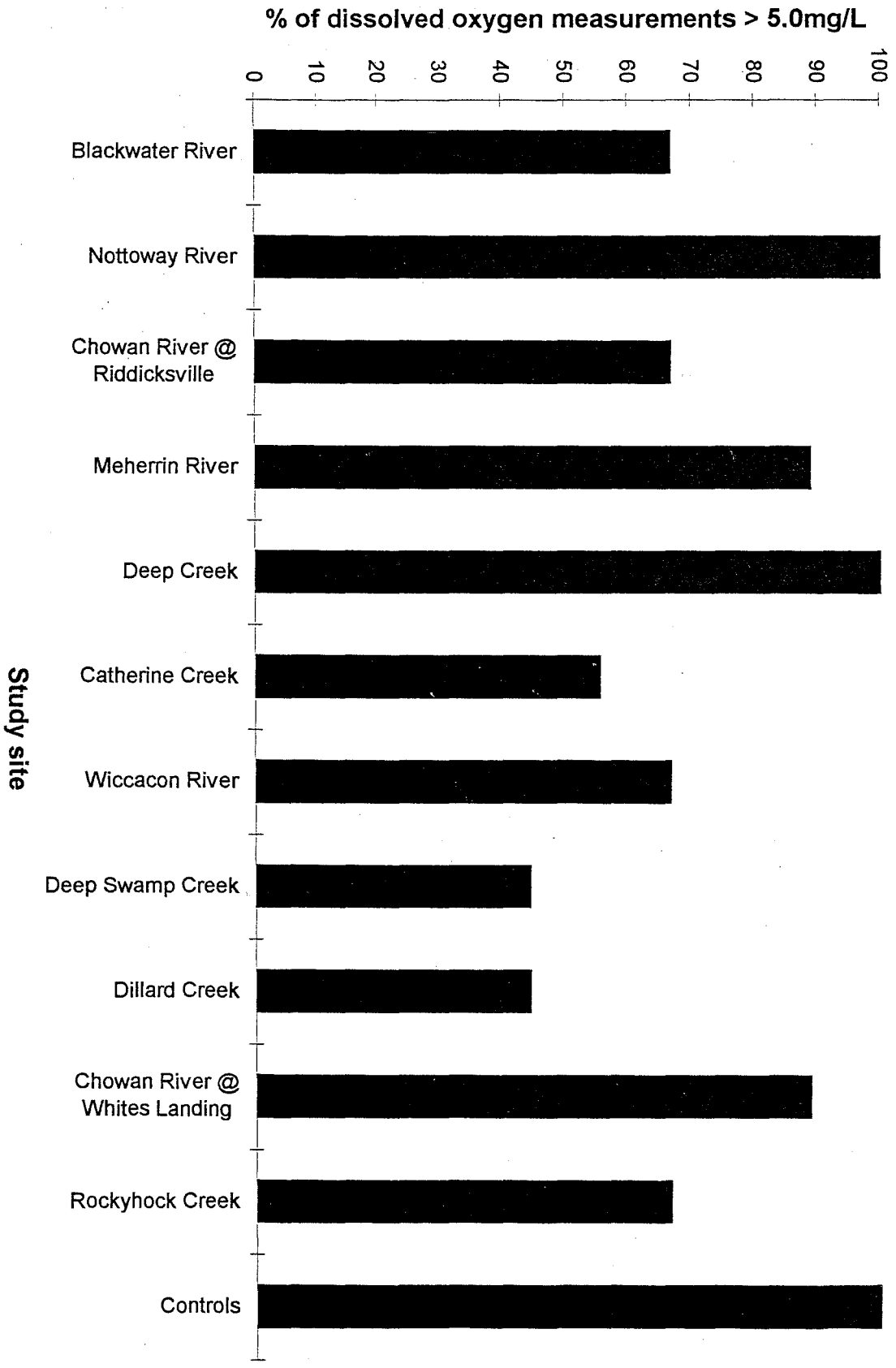

% hatch
r = -0.12
ng/LDPS
4,4'-DDD


% hatch
r = -0.32
ng/LDPS
4,4'-DDE


% hatch
r = 0.04
ng/LDPS
2,4'-DDT


% hatch
r = -0.48
ng/LDPS
2,4'-DDD


% hatch
r = -0.32
ng/LDPS
Total DDTs


% of dissolved oxygen measurements > 5.0mg/L
0
10
20
30
40
50
60
70
80
90
100
Blackwater River
Nottoway River
Chowan River @ Riddicksville
Meherrin River
Deep Creek
Catherine Creek
Wiccacon River
Deep Swamp Creek
Dillard Creek
Chowan River @ Whites Landing
Rockyhock Creek
Controls
Study site

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Next meeting

DATE: May 11, 1998

The next meeting of the Chowan River Basin Regional Council will be held on **May 19, 1998** in the Seminar Room of the College of the Albemarle - Edenton Campus, beginning at 10:00am. The Edenton Campus of COA is located within the Food Lion shopping center on N. Broad St.

As you can see by the enclosed agenda, a full schedule is planned. Please make every attempt to be present and, as always, thank you for your dedication and committment to protecting the Chowan River. Travel safely.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

_____July 21, 1998 _____July 22, 1998 _____July 23, 1998

_____I am interested in having dinner following the meeting

_____I am not interested in having dinner, but will attend the meeting

NAME_____

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

any day is OK

_____July 21, 1998 _____July 22, 1998 _____July 23, 1998

___✓___I am interested in having dinner following the meeting

_____I am not interested in having dinner, but will attend the meeting

NAME _____

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

____July 21, 1998 ____July 22, 1998 ✓ July 23, 1998

____I am interested in having dinner following the meeting

✓ I am not interested in having dinner, but will attend the meeting

NAME Marjorie Rayburn

note - precision farming field day is July 22-23 at Vernon James Center (finishes up on July 23rd at 3:00pm)

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

_____July 21, 1998 _____July 22, 1998 _____July 23, 1998

_____I am interested in having dinner following the meeting

_____I am not interested in having dinner, but will attend the meeting

NAME Nan Laughton

I'm sorry but I will be on vacation that entire week. If you do need to get someone else to take the minutes. Let me know!

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

__✓__ July 21, 1998 _____ July 22, 1998 _____ July 23, 1998

__✓__ I am interested in having dinner following the meeting

_____ I am not interested in having dinner, but will attend the meeting

NAME Billy Griffin

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

✓ July 21, 1998 _____ July 22, 1998 _____ July 23, 1998

✓ I am interested in having dinner following the meeting

_____ I am not interested in having dinner, but will attend the meeting

NAME Victor Lee

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

____July 21, 1998 __✓__July 22, 1998 ____July 23, 1998

____I am interested in having dinner following the meeting

__✓__I am not interested in having dinner, but will attend the meeting

NAME_____

Capt Joe —
I'll pick
you up for this
if you like!
Joan

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

X July 21, 1998 ← OR → July 22, 1998 NO X July 23, 1998

X I am interested in having dinner following the meeting

_____I am not interested in having dinner, but will attend the meeting

NAME [signature]

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

✓ July 21, 1998 ✓ July 22, 1998 ✓ July 23, 1998

✓ I am interested in having dinner following the meeting Always interested in eating

____ I am not interested in having dinner, but will attend the meeting

NAME Joe Stutts

Thanks, Joan
Well done

HRPDC
ORIG COPY
6/29 ~~6/29~~ ~~6/29~~ 6/30

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

(1) July 21, 1998 (2) July 22, 1998 No July 23, 1998

✓ I am interested in having dinner following the meeting

____ I am not interested in having dinner, but will attend the meeting

NAME John M. Carlock

was Chowan

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

_____July 21, 1998 _____July 22, 1998 _____July 23, 1998

__X__ I am interested in having dinner following the meeting

_____I am not interested in having dinner, but will attend the meeting

NAME Lee Wynns

Any Day is ok.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joe Stutts, Chairman

SUBJ: Choice of dates for next meeting

DATE: June 25, 1998

In order to accommodate the greatest number of Regional Council members' needs regarding a time and place for the next Chowan River Basin Regional Council meeting, please return the bottom portion of this memo, by July 8th to:

Joan Giordano
NC Dept. of Environment and Natural Resources
943 Washington Square Mall
Washington, NC 27889

The dates under consideration are July 21, 22 or 23. The meeting is proposed to begin at 4:00pm and conclude at 7:00pm and will occur on the west side of the river. There is a possibility of holding the meeting at an area restaurant if the majority of members are interested in ordering dinner at the meeting's conclusion.

We have much to discuss given the possibility of a new industry being situated along the banks of the Chowan River. Please make every effort to respond to this memo and, as always, thank you for your dedication and commitment to serving on the Chowan River Basin Regional Council.

****

My choice for the next meeting date of the Chowan River Basin Regional Council is:

✓ July 21, 1998 _____ July 22, 1998 _____ July 23, 1998

✓ I am interested in having dinner following the meeting

_____ I am not interested in having dinner, but will attend the meeting

NAME Roger C Stutts Tree Farmer

MEMORANDUM

TO: Chowan and Pasquotank River Basin Regional Council Members

FROM: Joe Stutts and Erie Haste, Jr., Chairmen

SUBJ: Joint Meeting

DATE: July 17, 1998

Chairman Stutts and Chairman Haste have requested that a joint meeting of the Chowan and Pasquotank River Basin Regional Councils be held on **July 23, 1998, at the Riverside Restaurant, which is located just outside of Winton**. A map is included with this mailing showing directions to the restaurant. The meeting will begin at 4:00pm and last until approximately 7:00pm when a "dutch" dinner will be served.

A joint meeting is being held because of concern and interest expressed by both Councils regarding the proposed siting of a steel mill (Nucor) on the Chowan River. While no proposal, site plan, or permit applications have been filed with the state, concern is mounting among citizens and property holders in the area. This meeting's agenda will be dedicated to discussion of this topic and communication, to appropriate persons, of any concerns expressed by the Councils' members. Upon communication of any concerns, representatives from the Departments of Environment and Natural Resources and Commerce, Nucor, and other "players" can be invited to future Regional Council and Coordinating Council meetings to address the Councils' concerns.

Please make every effort to attend this important meeting. We look forward to seeing you on the 23rd in Winton. Please travel safely.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Brewster Brown, Vice Chairman

SUBJ: Next Regional Council Meeting

DATE: September 28, 1998

The next meeting of the Chowan River Basin Regional Council will be held in Ahoskie, on **October 1, 1998 at the Roanoke-Chowan Community College, Small Business Center.** The meeting will begin at **4:00pm** and is expected to last until 6:00pm.

As you can see from the enclosed agenda, we will discuss only two items, but they are of great interest and importance. Please make every attempt to be present and, as always, thank you for your dedication to protecting the Chowan River and its watershed. Please travel safely.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Brewster Brown, Vice Chairman

SUBJ: Next Meeting - January 19, 1999

DATE: January 7, 1999

The next meeting of the Chowan River Basin Regional Council will be held on January 19,1999 at the **Bertie Campus** of the Martin Co. Community College, in Windsor. I have included a map with directions to the College, with this mailing. The meeting will begin at 4:00pm and, as in past meetings, is expected to last until approximately 6:30pm.

As you can see from the enclosed agenda, our meeting promises to be an interesting and informative one. Please make every effort to attend. I look forward to seeing you on the 19th!

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Brewster Brown, Chairman

SUBJ: Next meeting

DATE: March 17, 1999

The next meeting of the Chowan River Basin Regional Council is scheduled for **April 13, 1999** at the Martin County Community College - **BERTIE CAMPUS** - in Windsor, beginning at 4:00pm. I have included a map directing you to this location, for your convenience. Also included in this agenda mailing are the minutes from our last meeting and guidance for developing a demonstration projects.

I'm sure you will agree with me that our agenda promises to be both interesting and challenging! Please make every effort to attend so that we may continue the important work of protecting the beautiful and valuable natural resources in the Chowan River basin. I look forward to seeing you on the 13th.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Brewster Brown, Chairman

SUBJ: Next Meeting - April 13, 1999

DATE: April 1, 1999

This is just a reminder that we are holding our next Chowan River Basin Regional Council meeting on **April 13, 1999** at the **Bertie Campus** of the **Martin County Community College in Windsor.** The meeting notice, agenda and various other materials were sent to you in the March 17th mailing.

I have received word that Paulette Wester, Eva Clayton's field representative from Gates Co., may be joining us for our meeting. Please make every effort to attend and make Ms. Wester and our new Regional Council members feel welcomed. I look forward to seeing you on the 13th.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Brewster Brown, Vice Chairman

SUBJ: Next Meeting - August 5, 1999

DATE: July 19, 1999

Enclosed are the minutes of our last Chowan River Basin Regional Council meeting which was held in Windsor on June 15th. Please pay particular attention to the description of the demonstration project proposals which were discussed.

As you will see also, our next meeting is scheduled for **August 5, 1999** at the Bertie Campus of the Martin County Community College. Our meeting will begin at 4:00pm and will last until approximately 6:30-7:00pm. Please make note of this date (August 5th) as it differs from the date which was discussed at the conclusion of our last meeting. We will have only one agenda item to discuss and act upon - the finalization of our demonstration project proposals.

Between now and the 5th, our demonstration project proposal subcommittee (see meeting minutes for those members who are involved) will meet to "flesh-out" the details of the proposals identified for further development. At our next meeting on the 5th, they will be presented according to the subcommittee's recommendations and we will discuss them preparatory to sending them on to the Technical Committee of the Coordinating Council for final consideration.

Please make every effort to attend our next meeting. The demonstration project effort has been a long and arduous one, but we are nearing the end and our work. I thank you for your commitment and dedication to protecting the natural resources of the Chowan River basin.

NCDENR

JAMES B. HUNT JR.
GOVERNOR

WAYNE MCDEVITT
SECRETARY

KERR T. STEVENS
DIRECTOR

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF WATER QUALITY

Albemarle-Pamlico National Estuary Program

November 19, 1999

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Guy Stefanski
Albemarle-Pamlico National Estuary Program

SUBJECT: Next Meeting on December 7, 1999

The next meeting of the Chowan River Basin Regional Council is scheduled for December 7, 1999 at the Martin County Community College - **BERTIE CAMPUS** - in Windsor, beginning at 4:00 pm. This will be our first meeting since we last met in August and I look forward to seeing you there.

Our agenda is a good one, featuring a presentation by John Carlock and Eric Walberg about the Southern Watershed Area Management Program (SWAMP) which is underway in the Back Bay, Northwest River and North Landing River areas of Virginia. You've heard John talk about this program before, and I'm sure you'll find his presentation very interesting. For your reading pleasure, I've enclosed a newsletter produced by the Hampton Roads Planning District Commission which focuses on SWAMP.

We also plan to discuss the impacts of Hurricane Floyd and learn what your major concerns might be. And I'll provide updates on our demonstration projects and the MOA between North Carolina and Virginia that the Coordinating Council has been working on. It is also time to elect new officers -- so we'll need to form a Nominating Committee at this meeting. Brewster Brown and Nan Laughton, as Vice-Chair and Secretary respectively, have done an excellent job keeping our Council running. We will certainly miss them in these leadership roles. Their shoes will be hard to fill.

So- please make every effort to attend. Enclosed is the agenda and map to the meeting site. If you have any questions, please call me at 919/733-5083 ext. 585 or Joan Giordano at 252/946-6481 ext. 269.

Please travel safely.

P.O. BOX 29535, RALEIGH, NORTH CAROLINA 27626-0535
PHONE 919-733-5083 FAX 919-733-9919

MEMORANDUM

TO: Interested parties

FROM: Joan Giordano,
APNEP Public Involvement Coordinator

SUBJ: Chowan River Basin Regional Council Interest-group Vacancies

DATE: February 14, 2000

Enclosed is a current membership roster for the Chowan River Basin Regional Council. As you can see, there are a number of vacancies among interest-group representatives. You'll notice too, that we have tried to target certain interest-group slots to certain counties, in order to ensure topical and geographical parity among member counties. If this proves to be an impossibility, we may have to amend the distribution.

Please take the time to fill out the nomination form (also included) relative to the indicated interest-group vacancies on the membership roster. Please remember, when you propose someone's name, obtain the nominee's approval and determine his/her agreement to serve.

It has been some time since we undertook a campaign to fill the interest-group vacancies on our Council. I'm sure you will agree with me that in order to do the very best job possible, we need a full complement of members. Having a diversity of ideas, view points, and opinions is what produces the best outcome. Please return the nomination form to me by March 1st at:

Joan Giordano
NC DENR
943 Washington Square Mall
Washington, NC 27889

Thank you for your time and commitment to the Chowan River Basin Regional Council. I look forward to hearing from you soon.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joan Giordano

SUBJ: Next Meeting – **April 6, 2000**

DATE: March 17, 2000

Enclosed are the minutes from the last Chowan River Basin Regional Council meeting held on December 7, 1999 in Windsor. Also included are an up-to-date membership roster, nomination forms for proposing interest-group members, and the agenda for our next meeting, which again will be held in Windsor, at the Bertie Campus of the Martin Co. Community College, **beginning at 3:30pm**.

Please make every effort to attend, as our agenda contains items of interest and concern to the work of our Council. As always, thank you for your past participation and I look forward to seeing you on April 6th.

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joan Giordano

SUBJ: Next Meeting - **June 8, 2000**

DATE: June 5, 2000

This is just a reminder that the next Chowan River Basin Regional Council meeting is on **Thursday, June 8, 2000** at the **Bertie Campus** of the **Martin County Community College in Windsor**. The meeting is scheduled to start at 3:00 pm.

I have enclosed a map to this location. Unfortunately, the agenda is not complete yet and will be distributed at the meeting on Thursday. Please make every effort to attend and travel safely. I hope to see you on June 8th.

THE ALBEMARLE-PAMLICO NATIONAL ESTUARY PROGRAM

CHOWAN RIVER BASIN REGIONAL COUNCIL

MEMORANDUM

TO: Chowan River Basin Regional Council Members

FROM: Joan Giordano, Public Involvement Coordinator

SUBJ: Next Meeting - **January ~~19~~ 29, 2001**

DATE: January 12, 2001

Hi, and Happy New Year to all of you! I hope your Holiday Season was restful and joyous.

In addition to wanting to wish you a Happy New Year, I also want to let you know about the plans for our next meeting. As indicated at the end of our last meeting, we'll be gathering again on January ~~19th~~ 29th at the Bertie Campus of the Martin County Community College in Windsor. As is usual, we'll begin at 4:00pm and expect to be gone by 6:00pm.

As you know, time is nearing for updating of the Chown River Basinwide Water Quality Management Plan. Toward that end, at our next meeting, we will have an opportunity to hear from Darlene Kucken of the Basinwide and Estuary Planning Unit (formerly the Planning and Assessment Unit) of the Division of Water Quality. Darlene is the supervisor of that unit, overseeing, among other things, the development process of the plans. She also oversees the APNEP and is Guy's and my direct supervisor.

Along with Darlene, will be Kate Moore, the planner who will actually be writing the plan. Because there is the desire, and necessity, to obtain public input for plan development, and that is part of what the RCs are charged with doing, we will spend some time at our meeting going over the process that will be employed.

You will also hear from Guy and/or myself about an exciting new project the Albemarle-Pamlico National Estuary Program (APNEP) is engaging in, along with the other 27 NEPs across the nation. I think you'll be both surprised and impressed, but you'll have to wait until the 19th! I love secrets! These are just a couple of highlights of the items that will be included on our agenda, the final version of which will be distributed at the meeting.

I hope you'll make every effort to attend on the ~~19th~~ 29th, and I look forward to seeing each of you again. Hopefully we'll have some of our newest members in attendance too. As always, thank you for your dedication to protecting the natural resources of eastern North Carolina and all you undertake in doing that. Please drive safely.

Mailed 8/16/01

ALBEMARLE-PAMLICO NATIONAL ESTUARY PROGRAM

Public Involvement Office

MEMORANDUM

TO: River Basin Regional Council Members

FROM: Joan Giordano, Outreach Coordinator

SUBJ: Announcements and Fact Sheet

DATE: August 15, 2001

Enclosed are a few items that have come to my attention recently and I thought you might be interested in them as well?

First is a fact sheet that was produced by the Association of National Estuaries Programs for our program here in North Carolina. As you can see, the fact sheet includes information on the health of our estuary, as well as accomplishments we had attained at the time of printing. Also, please enjoy the crab and spinach dip recipe which features the best crab in the world - those taken from the estuarine waters of North Carolina! Similar fact sheets were also produced for the other 27 NEPs around the nation and, should you be interested in receiving them, just let me know.

Also enclosed is information on two upcoming workshops. One deals with the 2000-2003 Triennial Review of Water Quality Classifications and Standards which will be held during September at various locations, and the second pertains to Coastal Water Quality Workshops - Linking Land Use and Water Quality being held during October and November. The information for contact persons and registration is included.

I hope you find these items useful and, as always, thank you for your dedication and commitment to protecting the natural resources of eastern North Carolina.

Mailed 8/16/0

2000-2003 TRIENNIAL REVIEW

OF

WATER QUALITY CLASSIFICATIONS AND STANDARDS

BACKGROUND

Every three years the Federal Clean Water Act requires states to review their surface water quality classifications and standards and make any changes necessary. As part of the 2000-2003 triennial review, EPA has specifically requested we review the water quality standards for mercury and bacteria (fecal coliform). In addition, changes to EPA's arsenic and ammonia may result in modifications to our standards.

Mercury contamination of fish tissue is a widespread problem, not only in North Carolina, but throughout the United States. Recent research and EPA guidance have provided updated values and procedures for developing surface water quality standards for mercury. This rule-making is being initiated because EPA requires North Carolina to update its mercury standard to incorporate the best available science and to provide a scientifically defensible standard for the development of use ratings, permit limits and total maximum daily loads (TMDL).

In 1986, EPA published updated water quality criteria for bacteria. In 2000, EPA informed states that they had until 2003 to adopt these updated criteria or similar criteria that provide the same or more stringent protection of human health. If we do not adopt these criteria, then EPA will promulgate new standards for us. North Carolina will be reviewing data currently being collected by the Division of Environmental Health, other North Carolina-based researchers, as well as, researchers from other states to develop recommendations regarding bacterial criteria.

Other parameters that will be reviewed as part of this triennial review are turbidity, cyanide, MTBE (methyl tert-butyl ethanol, a gasoline additive) and MBAS (methylene blue active substances - surfactants, foaming agents). These parameters are being reviewed based on requests from the public. Other parameters may be included in this review based on additional public and EPA input.

PROCESS - August 2001 - January 2002

For this Triennial Review, the Division will be holding public meetings prior to and after developing draft standards. These meetings are intended to allow significant public input into the process at all stages of the standards development. The public meetings will be conducted similar to the Basin Workshops with a brief presentation at the beginning of the meeting. After the presentation and a question and answer period, the group will be divided into smaller units, if sufficient people are in attendance. These units or the whole group will answer the following questions:

* What changes are needed?
* Why is a particular change needed?
* How will it be implemented?
* What supporting data is available?

After brainstorming for a while, the group will come back together and review the results. There will be another question and answer period and then the meeting will be adjourned. Results from each of the meetings will be posted on this website and e-mailed to anyone requesting a copy. These results will be used in developing draft rule language.

In October, the Division will request permission from the Water Quality Committee of the Environmental Management Commission to publish the Notice of Subject Matter in the North Carolina Register. Included in the Notice of Subject Matter will be a brief description of the Triennial Review and a request for comments. The comment period will be open for 60 days. Any comments received during that period will be considered for inclusion in the Triennial Review.

Schedule & Locations for First Public Meetings

Raleigh
September 10
1:30 PM
Archdale Building
Ground Floor Hearing Room
(919) 733-5083 ext. 568
Directions:
The Archdale Building is the tall white building in downtown Raleigh, north of the state capital. **From Interstate 40 west**, take the Wade Avenue Exit 289 into Raleigh. Right exit Wade Avenue onto Glenwood Avenue then turn right onto Glenwood Avenue. At the first light turn left onto Peace Street. The building is at the intersection of Peace and Salisbury. **From I-40 east** follow the inner beltline (I-440) to the Wilmington Street exit. Take Wilmington Street into downtown Raleigh. The Archdale Building will be on the left at the end of Wilmington Street. Parking is available in state government lots near the building after 5 PM.

Mooresville
September 18
5:00 PM
Mooresville Citizens Center
215 North Main Street
(919) 733-5083 ext. 568
Directions:
From I-40 W, take the I-77 S/Charlotte exit. Travel south on I-77 about 18 miles and take Exit 36/Mooresville. Turn left off the exit ramp onto NC 150 east. Travel about 2 miles on Hwy 150. At the intersection with W. Iredell Avenue, turn right and travel to N. Main St. Turn right onto N. Main St. The Citizens Center will be in the middle of the block on the left. Follow Citizens Center parking signs for parking in rear of building. **From I-85**, take Exit 68/China Grove. Then take the next exit on right (Mooresville/Hwy 152). At top of the ramp turn right onto Hwy 152. Stay with Hwy 152. At second traffic signal, turn right. Stay with Hwy 152 as it joins and separates from Hwy 150. Hwy 152 becomes N. Main Street. The Citizens Center is on the left in the 200 block of N. Main St. Follow signs for parking in the rear.