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WATER RESOURCES RESEARCH INTERESTS

IN THE

COLLEGES AND UNIVERSITIES

OF

NORTH CAROLINA

An

Institute Report

January 1, 1974

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FY 1973

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WATER RESOURCES RESEARCH INSTITUTE

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Appalachian State University
East Carolina University
Elizabeth City State University
North Carolina Agricultural and Technical State University
North Carolina Central University
Pembroke State University
Western Carolina University

NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

School of Agriculture and Life Sciences

Department of Animal Science

Name	Water Related Research Interest
Dr. Albert J. Clawson	Disposal of swine wastes
Dr. James M. Leatherwood	Utilization of fibrous wastes as animal nutrients
*Dr. John C. Wilk	Dairy cattle breeding and dairy management including waste management systems

Department of Botany

*Dr. Charles E. Anderson	Plant development
*Dr. Ernest D. Seneca	Seed germination and seedling response to various environmental factors by salt marsh plants
*Dr. Larry A. Whitford (Emeritus)	Taxonomy and floristics of freshwater algae
*Dr. Augustus M. Witherspoon	The use of structural changes in algal communities to assess pollution

Department of Crop Science

*Dr. Joseph C. Burns	Changes in the nutritive value of forage crops under water stress conditions
Dr. Douglas S. Chamblee	Moisture levels and plant management systems for optimal water efficiency and growth of forage species and the relative importance of moisture as a factor limiting establishment, growth, and adaptation of major forage species
Dr. Frederick T. Corbin	Interactions between pesticides and microorganisms
Dr. William B. Gilbert	Water management for turf grasses and turf establishment and maintenance along highways
*Dr. R. P. Patterson	Growth, development, and metabolic changes which occur in field crops in response to changes in leaf water potential

Department of Crop Sciences (continued)

Name	Water Related Research Interest
*Dr. Jerome B. Weber	The chemistry and biological availability of pesticides and other organic chemicals applied to soils
*Dr. A. D. Worsham	Water and soil conservation and pesticide and plant nutrient pollution reduction through no-tillage crop production

Department of Economics

*Dr. Gerald A. Carlson	Efficient municipal waste water treatment; demand and supply of mosquito control
*Dr. Leon E. Danielson	Timing of investment in water resource projects
Dr. Edward W. Erickson	Efficiency of resource allocation and water resources economics
Professor Cleon Harrell	Benefit-cost analysis and economics of recreation
Dr. James A. Seagraves	Water quality management and optimal charges for industrial wastes

Department of Entomology

*Dr. Richard C. Axtell	Biology and control of flies and gnats associated with man and aquatic situations
*Dr. J. R. Bradley	Water quality as affected by pesticides in surface runoff from soybean fields
*Dr. William V. Campbell	Insects attacking marsh grass *Spartina alterniflora* in natural and dredge spoil sites
Dr. Walter C. Dauterman	Structure-activity relationship of organophosphate insecticides
*Dr. Frank E. Guthrie	Mechanisms of pesticide toxicity
*Dr. Kenneth L. Knight (Head of Department)	Taxonomy, biology, and control of mosquitoes
Dr. H. H. Neunzig	Taxonomy and biology of immature Megaloptera
*Dr. Thomas J. Sheets (Director, Pesticides Laboratory)	Water quality as affected by agricultural land runoff with emphasis on pesticides

Department of Microbiology

Name	Water Related Research Interest
*Dr. Gerald H. Elkan	Microbiological problems related to the deep well disposal of liquid industrial wastes; microbiological conversions of domestic and agricultural wastes
Dr. James B. Evans	Bacterial indicators of pollution
*Dr. Jerome Perry	Hydrocarbons, crude oil degradation, and effects of pesticides and other pollutants on microbes in littoral areas

Department of Plant Pathology

*Dr. Ellis B. Cowling	Enzymatic degradation of lignin by microorganisms; changing acidity of precipitation and its effects on vegetation
Dr. Donald Huisingh	Movement of metallic pesticidal components (especially heavy metals) from agricultural fields and recreational facilities like golf courses into water courses and reservoirs
*Dr. David Shriner	Changing acidity of precipitation and its effects on vegetation

Department of Sociology and Anthropology

*Dr. A. Clarke Davis	Social and social-psychological aspects of water-related problems
Dr. Selz C. Mayo (Head of Department)	Social aspects of water resources management
Dr. John G. Peck	The impact of the development of water resources based tourism on the quality of life of the indigenous populations
*Dr. James M. Stewart (Associate Director for Research Application, Water Resources Research Institute)	Adult education and utilization of water resources research

Department of Soil Science

*Dr. S. W. Buol	Relationship of soil and water
*Dr. B. L. Carlile	Land treatment systems for utilization and renovation of industrial, domestic, and agricultural wastewaters

Department of Food Science

Name	Water Related Research Interest
*Mr. Roy E. Carawan	Water management and waste control in the food processing industries
Dr. Dan E. Carroll	Wastes from sweet potato processing facilities; utilization of food processing wastes using fermentation
Dr. George G. Giddings	Seafood processing wastes
Dr. Max E. Gregory	Wastes from dairy processing
Dr. D. D. Hamann	Mechanical devices to reduce water use and prevent wastes in food processing
*Dr. Arthur P. Hansen	Wastes from dairy processing
*Dr. V. A. Jones	Water use and waste control in the dairy processing industry
*Mr. Norman C. Miller, Jr.	Wastes from fruit and vegetable processing
*Dr. Frank B. Thomas	Scallop viscera utilization; utilization and prevention of seafood processing wastes; wastewater characterization of seafood processing plants
*Dr. Neil B. Webb	Utilization of wastes from seafood processing plants

Department of Horticultural Science

*Dr. T. F. Cannon	Irrigation and cooling of nursery crops
*Mr. G. R. Hughes	Irrigation and atmospheric cooling for vegetable production
*Dr. Conrad H. Miller	Irrigation, evaporative cooling
*Dr. W. B. Nesbitt	Irrigation of grapes
*Dr. Douglas C. Sanders	Irrigation, crop cooling, soil heating, soil moisture stress
*Mr. V. H. Underwood	Irrigation of grapes
*Dr. C. Richard Unrath	Environmental control (evaporative cooling and frost control) of apples using sprinkler irrigation

Department of Soil Science (continued)

Name	Water Related Research Interest
*Dr. George A. Cummings	Fate of possible pollutants in animal waste after land spreading on manure; movement of fertilizer nutrients
*Dr. James W. Gilliam	Release of fertilizer nitrogen and phosphorus to ground and surface waters
Dr. J. Fulton Lutz	Water conservation, storage and movement in soils availability to plants; contamination by fertilizers and organic wastes
*Dr. C. K. Martin	A method of monitoring soil moisture in growing crops
Dr. Charles B. McCants (Head of Department)	Infiltration, percolation, leaching of mineral elements & soil moisture regimes
Dr. R. E. McCollum	Irrigation and atmospheric cooling for vegetable production
Dr. Joseph Phillips	Animal and industrial waste disposal on land; sediment control
*Dr. Charles D. Sopher	Interactions between rainfall distribution and plant growth
Dr. David Terry	Infiltration, percolation, leaching of mineral elements and soil moisture regimes
Dr. W. G. Woltz	Infiltration, percolation, leaching of mineral elements and soil moisture regimes
*Dr. S. B. Weed	Inactivation and loss of pesticides from soils
*Dr. W. W. Woodhouse, Jr.	Effect of vegetation on water movement in and over soils, water losses, stabilization against erosion and water use by plants

Department of Zoology

*Dr. B. J. Copeland (Director, N. C. Sea Grant Program)	Structure and function of coastal systems in response to stresses; eutrophication; heated water disposal
Dr. David E. Davis (Head of Department)	Animal populations associated with land disposal of municipal and industrial wastes

Department of Zoology (continued)

Name	Water Related Research Interest
*Dr. William W. Hassler (Director, Hatteras Laboratory)	Life history studies and population dynamics of marine and estuarine fishes; aquaculture of marine fishes
*Dr. John E. Hobbie	Limnology, estuarine biology, bacterial heterotrophy in fresh and marine waters, modeling of arctic aquatic systems
*Dr. Melvin T. Huish (Leader, Fisheries Unit)	Fish and wildlife biology, fish genetics and hybridization, intensive culture systems
*Dr. Garland Pardue (Assistant Leader, Fisheries Unit)	Fish and wildlife biology, fish genetics and hybridization, intensive culture systems
*Dr. Thomas G. Wolcott	Environmental physiology of marine and estuarine invertebrates

Note: The following members of the professional staff, Atlantic Estuarine Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U. S. Department of Commerce, Beaufort, North Carolina, hold adjunct appointments on the Department of Zoology faculty:

*Dr. Ford A. Cross	Marine, estuarine and radio-ecology
*Dr. Gene R. Huntsman	Marine and estuarine ecology, dynamics of fish populations
*Dr. Theodore R. Rice	Marine, estuarine and radio-ecology
*Dr. J. E. Sykes	Marine, estuarine and radio-ecology
*Dr. Gordon W. Thayer	Marine, estuarine and radio-ecology
*Dr. Douglas A. Wolfe	Marine, estuarine and radio-ecology

School of Design

Department of Landscape Architecture

Professor Joseph A. Porter	Land use and development planning and design
Professor R. R. Wilkinson (Head of Department)	Integration of multiple objectives of urbanizing watersheds through landscape planning techniques

Schools of Engineering and Agriculture and Life Sciences

Department of Biological and Agricultural Engineering

Name	Water Related Research Interest
*Professor David H. Howells (Director, Water Resources Research Institute)	Water resource planning and management
*Dr. Frank J. Humenik (Associate Department Head in Charge of Extension)	Animal waste management and biological treatment of wastewater
Dr. George J. Kriz (Assistant Director, Agricultural Experiment Station)	Drainage, irrigation and agricultural pollution control
*Dr. Michael R. Overcash	Waste utilization and stabilization unit processes and water monitoring
*Dr. R. Wayne Skaggs	Water and heat movement in porous media
*Dr. Robert S. Sowell	Operations research applications
*Dr. Ronald E. Sneed	Water requirements of plants, environmental modification with sprinkler irrigation, agricultural water requirements, trickle irrigation land disposal of wastes using irrigation
*Dr. Edward H. Wiser	Statistical methods and simulation in hydrology

School of Engineering

Department of Chemical Engineering

*Dr. Harold Hopfenberg	Membrane separations including reverse osmosis, ultrafiltration, and pervaporation applied to ocean, brackish, waste, by-product, and biological water solutions
Dr. David B. Marsland	Engineering economy in pollution abatement
*Dr. Vivian T. Stannett	Membrane separations including reverse osmosis, ultrafiltration, and pervaporation applied to ocean, brackish, waste, by-product, and biological water solutions

Department of Civil Engineering

*Dr. Michael Amein	Unsteady flows, river and estuary analysis, wave motion

Department of Civil Engineering (continued)

Name	Water Related Research Interest
*Dr. Newton V. Colston, Jr.	Non-point pollution
*Dr. J. F. Ely	Optimization of structural systems having variable topology
Dr. William S. Galler	Application of systems analysis to water problems
*Dr. A. I. Kashef	Soil mechanics, seepage through dams, water well hydraulics, salt water intrusion, irrigation and drainage
*Dr. Jay Langfelder (Director, Center for Marine and Coastal Studies)	Seepage problems in lagoon systems, coastal erosion and protection, soil mechanics
*Dr. Jerry L. Machemehl	Coastal engineering, ocean engineering, estuary engineering
Dr. H. R. Malcolm	Urban sedimentation, urban hydrology, storm-water management, quality of storm flows
*Professor Charles Smallwood, Jr.	Water supply and pollution control; industrial wastes
*Dr. C. C. Tung	Physical oceanography, ocean engineering

Engineering Research Services Division

Mr. Edwin H. Bentzen, III (Minerals Research Lab)	Utilization of mining and ore processing wastes
*Mr. Robert M. Lewis (Minerals Research Lab)	Cleaning industrial wastewater, particularly in mining
Mr. Philip Neal (Minerals Research Lab)	Tails utilization
Professor F. M. Richardson	Removal of radioactive contaminants from water

Department of Industrial Engineering

Dr. William A. Smith, Jr. (Head of Department)	Water resource management information systems

Industrial Extension Service

Name	Water Related Research Interest
*Mr. Norman B. Angel	Aquaculture
*Dr. John R. Canada	Marine industry harvesting and processing wastes

Department of Mechanical and Aerospace Engineering

Dr. Francis J. Hale	Dynamic analysis and control system design of desalination and water control processes
Dr. M. Necati Ozisik	Heat and mass transfer problems including thermal pollution of water and atmosphere

Department of Nuclear Engineering

Professor J. R. Bohannon	Application of neutron activation analysis and other nuclear methods to water resources management and research with particular attention to trace element detection and industrial waste process control
Dr. Robin P. Gardner	Applying radioisotope trace techniques to water resources problems
Dr. F. J. Steinkruger	Applications of neutron activation analysis to problems in water pollution and industrial waste disposal, with emphasis on trace heavy metals
Dr. L. R. Zumwalt	Applications of neutron activation analysis to problems of trace element pollution of streams resulting from manufacturing processes

School of Forest Resources

Department of Forestry

Dr. Charles B. Davey (Head of Department)	Prevention of water pollution through processing of agricultural wastes to convert them into useful soil amendments
Dr. William L. Hafley	Forest influences; biometry with emphasis on sampling and regression problems related to land resources
*Mr. L. Wayne Haines	Forest ecosystems, forest nutrition, forest fertilization, mineral cycling
*Dr. Joe O. Lammi	Application of aerial photo interpretation to the studies of land use and watershed management

Department of Forestry (continued)

Name	Water Related Research Interest
*Dr. T. Ewald Maki	Forest influences and hydrology, with emphasis on forest floor and forest rhizosphere interrelationships with infiltration, percolation and subsurface flow; soil stabilization, site quality alteration, and moisture control effects on forest production
Dr. Thomas O. Perry	Nitrogen cycling and biomass production in forest ecosystems
Dr. Donald H. J. Steensen	Economics of forest resources and wood utilization

Department of Recreation Resources Administration

Mr. Harold K. Cordell	Economic evaluation of direct and secondary benefits derived from water-based recreational resources
Professor G. A. Hammon	Description and quantification of resource-based recreation opportunities
Professor T. I. Hines (Head of Department)	Human and economic values related to recreational use of water resources

Department of Wood and Paper Science

*Dr. H. M. Chang	Biological degradation of lignin and pollution abatement in pulp and paper industry through process modification
*Dr. Josef S. Gratzl	Pollution abatement in the pulp and paper industry through process modification
Professor R. G. Hitchings	Pulp and paper mill effluent control and reduction
*Dr. William T. McKean, Jr.	Pollution abatement in the pulp and paper industry through process modification
Professor C. N. Rogers	Water use and waste control in pulp and paper industry

School of Liberal Arts

Department of Politics

Dr. William J. Block (Head of Department)	Rural zoning, including flood-plain zoning

Department of Politics (continued)

Name	Water Related Research Interest
*Dr. Jackson M. McClain	Defining natural resources programs; quantifiable results that can be applied for budgetary purposes
Dr. J. Oliver Williams	Land use planning; analysis of public policies

School of Physical and Mathematical Sciences

Department of Chemistry

*Dr. Kenneth W. Hanck	Determination of organic chelates; transport mechanisms of trace metals
Dr. William L. Switzer	Fingerprinting oil spills for the purpose of identifying the violator

Department of Computer Science

Mr. James D. Powell	Water resources information systems and simulation models
Mr. Charles William Skinner	Water resources information systems and simulation models

Department of Geosciences

Dr. Henry S. Brown	Heavy metal concentrations in North Carolina
*Dr. R. J. Carson, III	Application geomorphology and photogeology of water use
*Dr. Norden E. Huang	Physical oceanography and coastal processes
*Dr. C. E. Knowles	Estuarine dynamics and coastal and deep water currents and long waves
Dr. C. J. Leith (Head of Department)	Coastal erosion and sand movement
*Dr. Leonard J. Pietrafesa	Estuarine, coastal, and deep water dynamics
Dr. Walter J. Saucier	Meteorology; atmospheric water resources and processes

Department of Geosciences (continued)

Name	Water Related Research Interest
*Dr. Charles W. Welby	Ground water occurrence and management and legal and economic aspects of ground water use; ground water occurrence and management in crystalline rocks; use of remote sensing techniques for water quality monitoring
Dr. Allen H. Weber	Micrometeorology, boundary layer transport of water vapor, heat, momentum and particulates

Department of Statistics

Dr. R. J. Hader	Statistical theory and methodology as related to industry and engineering applications
Mr. H. K. Hamann	Statistical theory and methodology as related to biological applications
*Dr. Don W. Hayne	Sampling, aquatic biology, pollution biology, and pesticide ecology
*Mr. Paul H. Geissler	Statistical ecology, aquatic biology, pollution biology, and sampling
Dr. Francis G. Giesbrecht	Consultant in design and analysis of experiments and surveys in biological sciences
Dr. A. H. E. Grandage	Statistical theory and methodology as related to industry and engineering applications
Dr. H. L. Lucas, Jr.	Mathematical description, mathematical modeling, and experimental design for dynamic systems with biological components
Dr. A. R. Manson	Model building for spread of pollution, design of experiments for monitoring pollution levels, and related areas
*Dr. David D. Mason (Head of Department)	Design and analysis of experiments and surveys relating to the effect of soil characteristics, topography, and management to the hydrology of an area
Dr. R. J. Monroe	Statistical consultant in estuarine biology research and to bacteriologists engaged in water pollution studies

Department of Statistics (continued)

*Dr. L. A. Nelson	Design and analysis of experiments and surveys relating to the effect of soil characteristics, topography, and management factors on the pesticide retaining characteristics of an area
Dr. C. H. Proctor	Sample design and analysis to survey recreation activities and resources
Dr. Charles Quesenberry	Applications of statistical theory and methods to problems of science
Dr. R. G. D. Steel	Statistical theory and methodology as related to biological applications
*Mr. David W. Turner	Sampling, aquatic biology, pollution biology, and pesticide ecology
Dr. H. R. van der Vaart	Mathematical models for representing physical and biological processes
Dr. O. Wesler	Mathematical models for representing physical and biological processes

School of Textiles

Department of Textile Chemistry

Dr. Carl E. Bryan	In-plant control of textile wastes; biodegradation of textile processing chemicals
Professor H. A. Rutherford (Head of Department)	Water use and waste control in textile industry

Division of University Studies

Professor J. C. Wallace	Sociopolitical aspects of water resources management

D. H. Hill Library

*Mr. William C. Lowe (Assistant Director for Reference Services)	Water resources information storage and retrieval

D. H. Hill Library (continued)

*Ms. Susan S. Rose (Assistant Librarian and Supervisor, Southern Water Resources Scientific Information Center)	Water resources information storage and retrieval

*Either conducting research or awaiting action on research proposals

UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE

UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE

Department of Biology

Name	Water Related Research Interest
*Mr. John Bernhardt	Water quality, effects of thermal inputs
Dr. Harry H. Johnston	Water quality of local waters, microbiology of effluents

*Either conducting research or awaiting action on research proposals

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

School of Arts and Sciences

Department of Anthropology

Name	Water Related Research Interest
Dr. J. L. Peacock	Social and cultural aspects of water resources in Chatham County area

Department of Botany

Dr. R. Malcolm Brown, Jr.	Algal viruses
*Dr. Max H. Hommersand	Systematics, morphology, physiology, and phytogeography of marine algae
Dr. William J. Koch	Aquatic fungi development, systematics, ecology
Dr. Helmut Lieth	Water use by terrestrial vegetation
*Dr. J. Frank McCormick	Estuarine and fresh water ecology, particularly environmental impact studies on Smith Island

Department of Chemistry

*Dr. Richard P. Buck	Membrane electrochemistry and trace analysis by spark source mass spectrometry
Dr. James L. Coke	Organic compounds in aquatic ecosystems
Dr. Charles N. Reilley	Electrochemical determination of dissolved oxygen

Department of Geography

*Dr. Arthur J. Hawley	The role of water supply in technologically advanced agricultural systems
Dr. Richard J. Kopec	Urban climatology, climatic change, bioclimate
Dr. Peter J. Robinson	Evaporative losses from surface waters

Department of Geology

*Mr. J. Robert Butler	Distribution of trace elements during chemical weathering

Department of Geology (continued)

Name	Water Related Research Interest
*Dr. Roy L. Ingram	Principles controlling variations in porosity and permeability in modern and ancient sediment; geology of North Carolina Coastal Plain
*Dr. Ben J. Korgen	Physical oceanography; circulation of continental shelf waters
*Dr. Virgil Mann	Trace and major cations in natural waters
*Dr. Paul C. Ragland	Distribution of trace elements during chemical weathering
*Dr. David M. Stewart	Groundwater resource evaluation by geophysical means. Location of subterranean cavities to determine their control on groundwater movement and occurrence--for examine, if sand-filled cavities can be located in limestone, they make good aquifers
*Dr. Daniel A. Textoris	Solution of mineral matter, precipitation in sedimentary rocks and influence on permeability and porosity
*Dr. Joel Watkins	Application of reflection and refraction seismology to ground water problems

Department of Zoology

Dr. Ernest A. Carl	Ecology, water pollution, environmental impacts
*Dr. Charles E. Jenner	Invertebrate zoology and aquatic ecology
Dr. Seth R. Reice	Leaf litter decomposition in streams
*Dr. Reinhard M. Rieger	Systematics and ecology of the lower metazoa in marine sandy beaches
*Dr. Alan E. Stiven	Ecological processes in aquatic systems, decomposition and detrital food chains in fresh and marine waters

School of Business Administration

Department of Economics

Dr. Kenneth Wertz	Public revenue and expenditure evaluation

Graduate School

Department of City and Regional Planning - Center for Urban and Regional Studies

Name	Water Related Research Interest
*Dr. Raymond J. Burby, III	Social, economic, and environmental impacts of water resource projects; multipurpose water use and urban expansion; water-based recreation and new community development
*Dr. Thomas G. Donnelly	Adaptive simulation analysis of reservoir development patterns; models of new town development and water use
*Dr. Edward J. Kaiser	Residential development and new community development utilizing water resources as a part of the environment
*Dr. Shirley F. Weiss	Water as a key factor in urban and regional land use, misuse, and reuse; environmental quality and control in urban growth; new town development adjacent to man-made and natural bodies of water
*Dr. Robert B. Zehner	Planned residential environments; satisfaction with neighborhoods: effects of social compatibility, residential density, and site planning; comparative study of black and white lifeways

Department of City and Regional Planning

*Dr. Karl Elfers	Urban water management
*Dr. M. M. Hufschmidt	Water resources and environmental planning, policy and administration, and system analysis techniques. Urban and metropolitan aspects of water resources; interrelating land use policy and planning with water resource policy and planning
*Dr. David H. Moreau	Regional water resource and environmental planning; systems analysis techniques; operation policy for multiunit-multipurpose water resource systems; planning and management models for state planning and management for water resources
Dr. Francis H. Parker	State and regional land policy; coastal zone management

Institute of Marine Sciences

Name	Water Related Research Interest
*Dr. A. F. Chestnut (Director of Institute)	Marine and estuarine ecology
*Dr. William E. Fahy	Ecology of marine and brackish water fishes; experimental study of influence of environmental factors on skeleton of developing marine fishes
*Dr. Jan J. Kohlmeyer	Marine fungi
*Professor Hugh J. Porter	Marine and estuarine mollusca
*Dr. Frank J. Schwartz	Systematics zoogeography and ecology of fishes and turtles
*Dr. William J. Woods	Hydrography and plankton of western Pamlico Sound, and productivity-nutrient cycles in Bogue Sound

Institute of Government

*Professor W. A. Campbell	Natural resources law and administration, property tax law and administration, criminal law
*Professor M. S. Heath, Jr.	Natural resources law and administration, legislation, and municipal government
Dr. Charles D. Liner	Evaluation of public expenditures on water resources; economics of water and sewage services
Professor W. J. Wicker	Public control and provision of water and sewerage services, with emphasis on governmental organization, management, finance, and intergovernmental relations

School of Law

*Professor Thomas Schoenbaum	Water law
*Dr. Seymour W. Wurfel	Marine resources conservation, legal research

School of Public Health

Department of Biostatistics

Name	Water Related Research Interest
Dr. Elizabeth J. Coulter	Demography, economic factors in health, studies of environment in relation to long-term illness, health planning and evaluation
Dr. Ronald Helms	Consultation with research workers on design of experiments and analysis of data
Dr. James E. Grizzle (Head of Department)	Consultation with research workers on design of experiments and analysis of data
Dr. Lawrence L. Kupper	Consultation with research workers on design of experiments and analysis of data

Department of Environmental Sciences and Engineering

*Professor James C. Brown (Director, UNC Wastewater Research Center)	Water and wastewater treatment, planning and finance of water resource facilities
*Dr. Donald E. Francisco (Deputy Director, UNC Wastewater Research Center)	Eutrophication processes, control, and identification; wastewater treatment; effects of wastewater effluents on lakes and streams
*Dr. J. Donald Johnson	Water chemistry, chlorination, bromination, disinfection, fluoridation, estuarine pollution, and ionic interaction in saline waters
*Dr. Edward J. Kuenzler	Aquatic ecology, phytoplankton, nutrient cycling, marshes, and swamps
*Dr. James C. Lamb, III	Water and waste treatment processes, stream pollution, water resources economics, industrial wastes, water research applications in practice, continued education techniques
*Dr. Donald T. Lauria	Mathematical modeling, systems analysis, water resources planning, water supply, water demand
*Dr. Linda W. Little	Environmental biology, advanced waste treatment processes, biological waste treatment

Department of Environmental Sciences and Engineering (continued)

Name	Water Related Research Interest
*Professor F. E. McJunkin (Associate Director, Water Resources Research Institute)	Water supply and pollution control; water quality surveillance; environmental impact, water resources planning; water resources in developing countries
*Dr. Daniel A. Okun	Water supply and pollution control for developing countries; regional water supply planning and water supplies
*Dr. Charles R. O'Melia	Aquatic chemistry, models for streams, lakes, and estuaries, chemical aspects of water and wastewater treatment processes
*Dr. Frederic K. Pfaender	Organic pollutant mobility and degradation in natural waters and the activity of micro-organisms in lakes and rivers
*Dr. Jabbar K. Sherwani	Systems analysis approach to water resources, hydrology, and economics of water quality management
*Dr. Mark Shuman	Heavy metals, organic associations with trace metals in natural waters, anodic stripping voltammetry, development of improved monitoring devices
*Dr. Philip Singer	Water and wastewater treatment processes; water chemistry; groundwater quality
*Dr. Charles M. Weiss (Acting Head)	Aquatic ecology, limnology, effects of pollution environmental stresses including heat on the aquatic environment, water resource and water quality management

*Either conducting research or awaiting action on research proposals

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

College of Sciences and Mathematics

Department of Biology

Name	Water Related Research Interest
Dr. D. P. Bashor	Olfaction in fishes
Dr. J. C. Darner	Water as a vector for bacterial infections
*Dr. Edward F. Menhinick	Effect of heated effluents, pollution and ratioactive wastes on plants and animals

College of Engineering

Department of Urban and Environmental Engineering

Dr. Carlos G. Bell	Erosion, drainage, pollution control
Dr. Jack B. Evett	Water resources planning and development; computer applications to water resources problems; urban water problems

Department of Engineering Technology

*Professor Richard R. Phelps	Solid waste and water quality

College of Sociology and Behavioral Sciences

Department of Geography and Earth Sciences

Dr. John Bedford	Climatological water and energy balance studies
Dr. James W. Clay	Water resource use
*Dr. E. A. Keller	Land-water use planning; fluvial geomorphology

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*Either conducting research or awaiting action on research proposals

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

Department of Biology

Dr. Robert E. Cannon	Biology of blue-green algae viruses

Department of Chemistry

Dr. David E. Henrie	Spectroscopic (IR, VIS, UV, NMR) studies of the structure of water and mixed solvent systems containing inorganic solutes
*Dr. John R. Jezorek	The effect of nonelectrolytes (e.g., alcohols, urea, sugars, etc.) on the structure of water

*Either conducting research or awaiting action on research proposals

UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

Department of Biology

Name	Water Related Research Interest
*Dr. Paul E. Hosier	Oceanic overwash
*Dr. James F. Parnell	Ecology of coastal communities, particularly study of plants and vertebrates
*Dr. Anne B. McCrary	Zooplankton

Department of Chemistry

Dr. Louis Adcock	Development of a technology for the sampling and analysis of certain toxic metallic pollutants in North Carolina rivers

Department of Geology

*Dr. Paul A. Thayer	Porosity and permeability in carbonate

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*Either conducting research or awaiting action on research proposals

APPALACHIAN STATE UNIVERSITY

APPALACHIAN STATE UNIVERSITY

Department of Chemistry

Name	Water Related Research Interest
Dr. Donald W. Sink	Watersheds as high grade trout fisheries for public use; chemical analysis of waters

EAST CAROLINA UNIVERSITY

EAST CAROLINA UNIVERSITY

School of Arts and Sciences

Department of Biology

Name	Water Related Research Interest
*Mr. Francis P. Belcik	Parasitic, estuarine, fresh-water, and marine copepods; also coastal vegetation (Cryptogamic and vascular)
Dr. Vincent J. Bellis	Algal ecology and algae as indicators of water quality
*Dr. Charles Bland	Fungi parasitic on marine invertebrates
*Dr. J. G. Boyette	Ecology and natural history of native vertebrates including aquatic and marine forms
*Dr. Mark Brinson	Aquatic ecosystems
*Dr. Graham J. Davis (Chairman of Department)	General and physiological ecology of benthic aquatic macrophytes
Dr. Takeru Ito	Analysis of pesticides in natural water; metabolism of pesticides by soil micro-organism; and biochemistry of *Thiobacillus ferrooxidans*
*Dr. John S. Laurie	Parasitism in marine and other aquatic organisms, physiology, and ultrastructure
*Dr. James S. McDaniel	Aquatic stages of parasites of vertebrates
*Dr. Susan J. McDaniel	Limnology
*Dr. Charles W. O'Rear, Jr.	Fish production, chemistry of natural water, heavy metal toxicology in fish
*Dr. Edward P. Ryan	Crustacean biology

Department of Geography

Dr. Edward P. Leahy	Effects of water pollution on industry in the Roanoke River Basin
Dr. Donald Steila	Drought phenomena
*Dr. Richard A. Stephenson	Fluvial geomorphology, shoreline morphology of seashores and estuaries, hydraulic geometry, land form

Department of Geology

Name	Water Related Research Interest
Dr. C. Q. Brown	Sediment transport and geochemistry
*Dr. A. Ray Jennings (Head of Department)	Ground water hydrology
Dr. Jean Lowry	Ground water
*Dr. Michael P. O'Connor	Marine and estuarine geology
*Dr. S. R. Riggs	Ground water as related to stratigraphic variables, sediment processes, and estuarine and coastal geology

Department of Physics

Dr. J. William Byrd (Chairman of Department)	Velocity measuring stream devices
*Dr. Ramesh Chand Ajmera	Development of marine industries processing system

Department of Sociology and Anthropology

*Dr. David Sutton Phelps	Prehistoric and early historic adaptation of man to marine/estuarine environment; settlement systems, cultural support and elaboration; prehistoric population levels
Dr. Avtar Singh	Community structure and planning, organization, implementation of water systems; i.e., types of viable community structures most conducive to the success and effectiveness of watershed programs

School of Business

Department of Economics

Dr. Jack W. Thornton, Jr.	Water resource economics, marine resource management

Division of Continuing Education

*Mr. James A. McGee	Continuing education for commercial fishermen

*Either conducting research or awaiting action on research proposals

ELIZABETH CITY STATE UNIVERSITY

ELIZABETH CITY STATE UNIVERSITY

Department of Physical Sciences and Mathematics

Name	Water Related Research Interest
*Dr. Maurice C. Powers	Shoreline erosion, geochemistry of estuarine and swamp-fed streams, water pollution

*Either conducting research or awaiting action on research proposals

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

School of Agriculture

Department of Plant Science and Technology

Name	Water Related Research Interest
Dr. Samuel J. Dunn (Chairman of Department)	Septic fields, farm wastes, and urban runoff
*Dr. Isiah Ruffin	Water pollution resulting from animal waste disposal

Division of Natural Science and Mathematics

Department of Biology

Dr. Artis Graves (Chairman of Department)	Study of fish and amphibians, particularly *Gambusia affinis*; effects of toxicity and household detergents on *Gambusia affinis*
Dr. Eugene Marrow	Plant ecology as influenced by pollution

Department of Chemistry

Dr. William Delauder	Stability of colloidal type systems; removal of suspended solids from water systems
Dr. John Weaver	Determination of fluorides and chlorides; water samples, heavy metals

Department of Physics

Dr. Jason Gilchrist	Identification sources and fate of pollutants; specifically, analytical techniques for the identification of pollutants

Division of Social Sciences

Department of Economics

Dr. David Chen	Pollution abatement benefit and cost studies, and economics of water-oriented activities
Dr. Basil Coley	Cost and benefit studies of air and water pollution

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*Either conducting research or awaiting action on research proposals

NORTH CAROLINA CENTRAL UNIVERSITY AT DURHAM

NORTH CAROLINA CENTRAL UNIVERSITY AT DURHAM

School of Arts and Sciences

Department of Biology

Name	Water Related Research Interest
Professor Nell Hirschberg	Effect of pesticides on bacteria

PEMBROKE STATE UNIVERSITY

PEMBROKE STATE UNIVERSITY

Departments of Mathematics and Supportive Services

Name	Water Related Research Interest
Dr. Alton B. King	Linear programming in water resources

WESTERN CAROLINA UNIVERSITY

WESTERN CAROLINA UNIVERSITY

School of Arts and Sciences

Department of Chemistry

Name	Water Related Research Interest
Dr. Hubert L. Youmans	Organic pollution in mountain waters

OTHER COLLEGES AND UNIVERSITIES:

Campbell College
Duke University
Guilford College
Livingstone College
Mars Hill College
St. Andrews Presbyterian College
St. Augustine's College
Warren Wilson College

CAMPBELL COLLEGE

CAMPBELL COLLEGE

Department of Biology

Name	Water Related Research Interest
*Dr. Charles Yarbrough	Water quality--surface and groundwater

Department of Geology

*Mr. Arthur W. Hayes	Surface and subsurface water; location and development of supplies, contamination, and pollution of salt-water encroachment, injection
Dr. C. Edward Howard (Head of Department)	Pollution of the Cape Fear River
Professor R. H. Martin	Groundwater pollution; groundwater supplies as related to terrace gravels
*Dr. Robert L. Perkins	Water quality--surface and groundwater

*Either conducting research or awaiting action on research proposals

DUKE UNIVERSITY

DUKE UNIVERSITY

Graduate School of Arts and Sciences

Department of Botany

Name	Water Related Research Interest
Dr. Henry Hellmers	Watershed management
Dr. T. W. Johnson, Jr.	Aquatic fungi: marine, estuarine, and fresh water
*Dr. Paul J. Kramer	Effects of water stress on plant growth and plant processes
*Dr. Richard B. Searles	Biology of benthic marine algae

Department of Physiology and Pharmacology

*Dr. Daniel B. Menzel	Distribution of man-made chemicals in the ecosystem
*Dr. Toshio Narahashi	Neurophysiology and neuropharmacology of squid nerves
*Dr. Gerald M. Rosen	Effects of organomercurials on nerve membranes
Dr. D. C. Tosteson (Chairman of Department)	Lipid and energy metabolism during osmoregulation process

Department of Political Science

Dr. Richard H. Leach	Intergovernmental relations in water development, regulation, and use

Department of Zoology

Dr. Joseph A. Bailey	Vertebrate fauna of local streams and drainage systems
Dr. D. A. Livingstone	African climatic history, lakes, water geochemistry, controls of production
Dr. John G. Lundberg	Vertebrate fauna of local streams and drainage systems
Dr. Vance A. Tucker	Aerodynamics of bird flight
Dr. Steven Vogel	Stream hydrodynamics

Department of Zoology (continued)

Name	Water Related Research Interest
Dr. Stephen A. Wainwright	Mechanical adaptation to water flow; functional morphology of aquatic invertebrates and their support systems
Dr. Karl M. Wilbur	Calcification processes in various aquatic organisms

Duke Marine Laboratory, Beaufort, North Carolina

Note: The following persons are affiliated with Duke University departments as indicated, but are presently conducting research at the Duke Marine Laboratory in Beaufort, North Carolina.

Department of Biochemistry (Marine Lab)

Dr. J. B. Sullivan	Comparative aspects of protein chemistry

Departments of Botany and Zoology (Marine Lab)

*Dr. Richard Barber (Director, Oceanographic Program)	Coastal upwelling ecosystems analysis; biogeochemical cycling of organic matter and metals and phytoplankton nutrition and organometallic complexes in the sea
Dr. William Blankley	Phytoplankton systematics
Dr. Celia Bonaventura	Photochemical reactions of protein molecules
Dr. Joseph Bonaventura	Protein structure and function

Department of Chemistry (Marine Lab)

Dr. Rodger W. Baier	Trace metal transport in marine systems

Department of Geology (Marine Lab)

*Dr. Orrin H. Pilkey	Eastern terminus of Hudson Canyon in the divide Sohm and Hatteras abyssal plains; seaward extensions of Washington and Wilmington submarine canyons on the lower continental rise; turbidity flow mapping, Hispaniola abyssal plain; contour current and N. C. rise formation

Oceanographic Program (Marine Lab)

Name	Water Related Research Interest
Dr. Susan Huntsman	Phytoplankton nutrition and organometallic complexes in the sea
*Dr. Charles Johnson	Life history studies of protozoan parasites in the blue crab, Callinectes sapidus
*Dr. William W. Kirby-Smith	Influence of food concentration on the growth of scallops
*Mr. John G. Newton	Topography of the sea floor; marine biological atlas of North Carolina
*Mlle. Genevieve Payen	Realization and control of sexual differentiation in Decapods crustaceans

Department of Physiology and Pharmacology (Marine Lab)

Dr. John Gutknecht	Membrane physiology: permeability and transport properties of marine algae and phospholipid bilayer membranes
Dr. Ernest Schoffeniels	Lipid and energy metabolism during osmoregulation process

Department of Zoology (Marine Lab)

*Dr. C. G. Bookhout	Effects of controlled environmental factors on the development of estuarine and oceanic Crustacea
Dr. Marit Christiansen	Salinity and temperature effects on crab larvae, and effects of the larvicide ZR 515 on the development of crab larvae in various salinities and temperatures
*Dr. John D. Costlow (Director, Marine Lab)	Effects of controlled environmental factors on the development and distribution of estuarine and oceanic Crustacea; the effect of cyclic temperature on larvae of marine invertebrates; and studies on molting and growth in larval and adult barnacles and larval decapods
*Dr. Richard Forward	Photobiology
Dr. Hans Fyhn	Osmoregulation in marine invertebrates
Dr. Unni Fyhn	Cement glands in barnacles; protein polymorphisms in fish
*Dr. I. E. Gray	Distribution of marine benthic fauna

Department of Zoology (Marine Lab) (continued)

Name	Water Related Research Interest
*Dr. John Sutherland	Experimental studies of the dynamics of fouling communities
Dr. Roy Weber	Respiratory physiology

School of Engineering

Department of Civil Engineering

Dr. G. Wayne Clough	Erosion and sediment transport; landfill leachate problems
*Dr. Jarir S. Dajani	Optimization of wastewater collection networks
*Dr. Bruce J. Muga	Hydrology and geophysical random processes, ocean engineering
*Dr. P. A. Vesilind	Wastewater solids handling and disposal; wastewater treatment processes
Dr. Dennis Warner	Water resource planning and project evaluation

Department of Electrical Engineering

Dr. Paul Wang	Operations research and systems analysis

School of Forestry

*Dr. Kenneth R. Knoerr	Experimental evaluation and computer simulation of the energy and water balance processes of natural and managed forest ecosystems
Dr. Charles W. Ralston (Head of Department)	Effects of forest land use practices on water quality and nutrient cycling of forested watersheds
Dr. James E. Wuenscher	Ecological basis for land and water use planning

School of Law

Dr. Melvin G. Shimm	Natural resources law

*Either conducting research or awaiting action on research proposals

GUILFORD COLLEGE

GUILFORD COLLEGE

Department of Biology

Name	Water Related Research Interest
*Dr. Robert R. Bryden (Head of Department)	Taxonomy of the hydras using limnological method

*Either conducting research or awaiting action on research proposals

LIVINGSTONE COLLEGE

LIVINGSTONE COLLEGE

Department of Biology

Name	Water Related Research Interest
*Professor Levi V. Walker (Chairman of Department)	Heavy metals

Department of Chemistry

Dr. S. Munavalli (Chairman of Department)	Organic contaminants and bioanalysis

*Either conducting research or awaiting action on research proposals

MARS HILL COLLEGE

MARS HILL COLLEGE

Department of Biology

Name	Water Related Research Interest
*Dr. L. M. Outten	Ecology, distribution, life patterns, and natural history of aquatic vertebrates, freshwater fishes especially; aquatic ecology, water resources and water quality

*Either conducting research or awaiting action on research proposals

ST. ANDREWS PRESBYTERIAN COLLEGE

ST. ANDREWS PRESBYTERIAN COLLEGE

Division of Mathematics and Natural Science

Department of Biology

Name	Water Related Research Interest
*Dr. Clarence E. Styron	Estuarine ecology, systems; effects of calefaction, salinity stress, and ionizing radiation on commercial shellfish and finfish; effects of temperature and hydrostatic pressure on routes, rates, and reservoirs of cadmium in the deep sea

*Either conducting research or awaiting action on research proposal

ST. AUGUSTINE'S COLLEGE

ST. AUGUSTINE'S COLLEGE

Department of Chemistry

Name	Water Related Research Interest
Dr. Jeffrey Gipson (Head of Department)	Water chemistry
Dr. Roamless Hudson, Jr.	Water chemistry

WARREN WILSON COLLEGE

WARREN WILSON COLLEGE

Department of Biology

Name	Water Related Research Interest
Dr. Willis A. Eggler (Head of Department)	Aquatic biology