


WATER RESOURCES
RESEARCH INSTITUTE
OF THE UNIVERSITY OF NORTH CAROLINA
North Carolina State University at Raleigh
University of North Carolina at Chapel Hill



WATER RESOURCES
RESEARCH INTERESTS
IN THE
SENIOR COLLEGES AND UNIVERSITIES
OF
NORTH CAROLINA

August 15, 1966

APPENDIX A - RESEARCH PLAN
WATER RESOURCES RESEARCH INSTITUTE

WATER RESOURCES RESEARCH INTERESTS
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The Water Resources Research Institute has undertaken the preparation of a research plan to guide the development of its long-term program. This will be oriented toward the State's overall economic development policy and related water resources plan and will include an assessment of the State's water resources problems, a report on water resources research interests in the senior colleges and universities of North Carolina, an inventory of water resources research projects currently underway throughout the State, and a schedule of water resources research needs.

This report on Water Resources Research Interests in the Senior Colleges and Universities of North Carolina is a part of the Research Plan. A closely associated Inventory of Active Water Resources Research Projects in North Carolina will be released within a few weeks.

The reports on water-related research interests and research projects are being distributed in advance of the full report to make this information immediately available for use in program development, to further communication between scientists and the private and public agencies sharing a common interest, and to provide opportunity for change prior to the published report.

Many of the scientist listed in this report, while presently devoting their full attention to non-water related research, have

indicated sufficient interest in water resources to suggest their potential involvement in this field. This represents a reservoir of potential research capability which can be drawn upon as circumstances permit. The extent of current participation in water resources research by scientists reporting water-related research interests is summarized as follows:

<u>University</u>	<u>Faculty Members</u>	
	<u>Reporting Water-Related Research Interest</u>	<u>Currently Involved in Water-Related Research</u>
Consolidated University of North Carolina		
North Carolina State University at Raleigh	81	45
University of North Carolina at Chapel Hill	39	29
University of North Carolina at Charlotte	2	2
University of North Carolina at Greensboro	1	1
Duke University	16	14
East Carolina College	6	3
Guilford College	1	1
North Carolina College at Durham	1	0
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Total	147	95

Consolidated University of North Carolina - N. C. State University at Raleigh

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Ag. and Life Sc.	Animal Science	Dr. Albert J. Clawson	Disposal of swine wastes
"	Botany	*Dr. Arthur W. Cooper	Coastal ecology, salt marshes, forest ecology
"	"	*Dr. Larry A. Whitford	Floristics and ecology of fresh water algae
"	Crop Science	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	Influence of herbicides on growth of aquatic microorganisms, detoxication mechanisms enabling microorganisms to detoxify herbicides, and persistence of herbicides in reservoirs and lake bottom soils
"	"	*Dr. William B. Gilbert	Water management for turf grasses and turf establishment and maintenance along highways
"	"	Dr. H. Douglas Gross	Water management for hay, pasture, and ensilage crops
"	"	*Dr. Glenn C. Klingman	Growth of crops in stubble mulch or sod-mulch planting as a means for control of soil erosion
"	"	Dr. R. C. Long	Relationships between water use and plant metabolism
"	"	Dr. Donald L. Thompson	Drought resistance in corn and surface irrigation

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Ag. and Life Sc.	Crop Science	Dr. Jerome B. Weber	Adsorption and desorption of herbicides to clay minerals
"	Economics	Dr. Edward W. Erickson	General
"	"	Prof. Cleon Harrell	Benefit-cost analysis and economics of recreation
"	"	Dr. Dale M. Hoover	Analysis of effects of irrigation on land values and aggregate output, and relationship between crowding and quality as related to demand for recreation
"	Entomology	Dr. Richard C. Axtell	Biology and control of Diptera associated with man including flies & gnats breeding in water and waste treatment plants, midges and gnats of impounded waters, and mosquitoes associated with drainage systems
"	"	Dr. Walter C. Dauterman	Structure-activity relationship of organo-phosphate insecticides
"	"	*Dr. Frank E. Guthrie	Mechanisms of pesticide toxicity
"	"	Dr. Robert L. Raab	Faunistic studies of aquatic insects in North Carolina
"	"	*Dr. T. Jack Sheets	Water quality as affected by agricultural land runoff with emphasis on pesticides
"	Plant Pathology	*Dr. Ellis B. Cowling	Enzymatic degradation of lignin by micro-organisms and development of useful products from pulp and paper wastes
"	Soil Science	*Dr. S. W. Buol	Relationship of soil and water
"	"	*Dr. J. Fulton Lutz	Water conservation, storage and movement in soils, availability to plants, contamination by herbicides, pesticides, etc.

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water-Related Research Interest</u>
Ag. and Life Sc.	Soil Science	*Dr. Charles B. McCants	Infiltration, percolation, leaching of mineral elements and soil moisture regimes
"	"	*Mr. Charles D. Sopher	Interactions between rainfall distribution and plant growth
"	"	*Dr. W. G. Woltz	Infiltration, percolation, leaching of mineral elements and soil moisture regimes
"	"	*Dr. William W. Woodhouse, Jr.	Effect of vegetation on water movement in and over soils, water losses, stabilization against erosion and water use by plants
"	Zoology	*Dr. William W. Hassler (Director Hatteras Laboratory)	Life history studies and population dynamics of marine and estuarine fishes
"	"	*Dr. F. Eugene Hester (Leader Coop. Fisheries Unit)	Fishery and waterfowl biology
"	"	*Dr. John E. Hobbie	General limnology, heterotrophy in fresh and marine waters, new methods of studying heterotrophy
"	"	*Dr. Donald B. Horton (Director Pamlico Laboratory)	Marine and estuarine ecology
"	"	*Dr. Bryant T. Sather	Absorption, retention and elimination of micronutrients and heavy metals in the aquatic ecosystem; the ionic regulation of invertebrates; and crustacean mineral metabolism
Education	Recreation and Park Admin.	Prof. Thomas I. Hines (Head-Department)	Human and economic values related to recreational use of water resources
"	"	Dr. Robert E. Sternloff	Programming of water resources for recreational use
"	"	*Prof. Charles C. Stott	Water-based recreation facilities

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Education	Recreation & Park Administration	Mr. Roger Warren	Maintenance and operation practices in water-based recreation areas
Engineering and Ag. and Life Sc.	Biological & Agricultural Engineering	*Dr. George J. Kriz	Moisture movement through porous media in the saturated and unsaturated states
"	"	*Mr. Ronald E. Sneed	Water requirements of plants and water quality as related to home water systems
"	"	*Dr. Cliff R. Willey	Water movement in soil, drainage, and water use
"	"	*Dr. Ralph E. Williamson	Drainage requirements of plants
"	"	*Dr. Edward H. Wiser	Hydrology
Engineering	Chemical Engineering	Dr. David B. Marsland	Desalination, industrial water pollution, and waste-water reuse
"	Civil Engineering	*Dr. Michael Amein	Stream flow, river basin planning, rainfall runoff, and wave motion
"	"	*Dr. William S. Galler	Application of systems analysis to water problems
"	"	*Dr. A. I. Kashef	Flow toward wells, seepage through dams, drainage problems, soil mechanics, and ground water hydrology
"	"	*Dr. Jay Langfelder	Coastal erosion
"	"	*Prof. Charles Smallwood, Jr.	Water supply & pollution control
"	Engineering Research (Minerals Research Lab)	Mr. W. T. McDaniel (Chief Engineer)	Utilization of mining and ore processing wastes as useful products

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Engineering	Mechanical Engineering	Prof. Jesse S. Doolittle	Saline water conversion, particularly in the field of thermodynamics and heat transfer
"	"	Dr. M. Necati Ozisik	Heat and mass transfer problems, diffusion problems related to removal of aerosols or particulates from fluid streams
"	Mineral Industries	*Dr. C. J. Leith	Erosion, sand origin and sand movement in coastal areas
"	"	*Dr. John M. Parker III	Occurrence of ground water in metamorphic and igneous rocks
"	"	*Dr. Charles W. Welby	Ground water occurrence and management and legal and economic aspects of ground water use
Forestry	Forest Management	*Dr. T. Ewald Maki (Department Head)	Forest influences (humus type-infiltration interrelationships); stand density & composition--evapotranspiration and production
"	Hardwood Research Program	*Prof. R. L. McElwee	Influence of changing water regimes resulting from alteration of natural water cycles on reproduction, development, growth and harvesting of bottomland hardwood timber
"	Wood Science & Technology	*Dr. Eric L. Ellwood (Head-Department)	Processing and manufacturing of pulp and paper and the physics and chemistry of wood utilization
"	"	Prof. R. G. Hitchings	Influence of pulp-making processes on mill effluents as related to waste treatment
"	"	Dr. Alfred J. Stamm	Pulp mill and chemical plant effluents and processing with less water
Liberal Arts	Politics	*Dr. William J. Block	Rural zoning-including flood-plain zoning
Physical Sci. & Applied Math.	Chemistry	*Dr. Lawrence H. Bowen	Behavior of water-soluble organic and organometallic compounds in aqueous solution

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Physical Sci. & Applied Math.	Chemistry	*Dr. Forrest C. Hentz, Jr.	Solubility equilibria of metal oxides and corresponding metal perchlorates
"	Experimental Statistics	Dr. R. L. Anderson	Statistics and economic application
"	"	Dr. R. J. Hader	Statistical theory and methodology as related to industry and engineering applications
"	"	Dr. H. K. Hamann	Statistical theory and methodology as related to biological applications
"	"	*Dr. Don W. Hayne	Sampling, aquatic biology, pollution biology, and fishery biology
"	"	Dr. A. H. E. Grandage	Statistical theory and methodology as related to industry and engineering applications
"	"	Mr. Ray R. Lassiter	Quantitative ecology, biostatistics, computerizing biological problems (especially simulation), and fisheries
"	"	Dr. H. L. Lucas, Jr.	Mathematical description, mathematical modeling, and experimental design for dynamic systems with biological components
"	"	Mr. A. R. Manson	Model building for spread of pollution, design of experiments for monitoring pollution levels, and related areas
"	"	*Dr. Robert E. Mason	Quantitative ecology, biostatistics, and adaptation of biological problems to the computer
"	"	Dr. F. E. McVay	Statistics and economic application

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Physical Sci. & Applied Math.	Experimental Statistics	Dr. David D. Mason	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
"	"	*Dr. L. A. Nelson	Design and analysis of experiments and surveys relating to the effect of soil characteristics, topography, and management factors on the hydrology of an area
"	"	*Dr. C. H. Proctor	Sample design and analysis to survey recreation activities and resources
"	"	Dr. R. G. D. Steel	Statistical theory and methodology as related to biological applications
"	"	*Dr. David W. Turner	Statistics as applied to fisheries problems
"	"	Dr. H. R. van der Vaart	Mathematical models for representing physical and biological processes
"	"	Dr. J. A. Warren	Statistical theory and methodology as related to biological applications
"	"	Dr. O. Wesler	Mathematical models for representing physical and biological processes
Textiles	Textile Chemistry	*Dr. H. Y. Jennings	Recovery of warp sizes
Weather Bureau- ESSA	State Climatologist	*Mr. Albert V. Hardy	Relationships of precipitation, temperature, evaporation, evapotranspiration, soil moisture and soil temperature to agricultural and industrial production, human health and welfare

Consolidated University of North Carolina - University of North Carolina at Chapel Hill

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Arts and Sciences	Botany	Dr. C. Ritchie Bell	Variation and evolution in certain aquatic and marsh or bog plants
"	"	Dr. Aris Domnas	Salt water adaptation in fungi with respect to enzymes and proteins
"	"	*Dr. Max H. Hommersand	Metabolism, respiration, and photosynthesis of algae
"	"	*Dr. William J. Koch	Taxonomy of aquatic fungi
"	"	*Dr. J. Frank McCormick	Marine and fresh water ecology, particularly pollution, algae and fungi studies
"	"	*Dr. Clyde J. Umphlett	Aquatic fungi, ecology of fresh water flagellated forms, and aquatic fungus parasites of mosquito larvae
"	Chemistry	*Dr. Royce W. Murray	Basic research on adsorption of metal ions and complexes at metal surfaces
"	"	Dr. Charles N. Reilley	Electrochemical determination of dissolved oxygen
"	"	*Dr. Henry C. Thomas	Adsorption and motion of ions on and through soil minerals
"	Geology	*Dr. Daniel A. Textoris	Solution of mineral matter, precipitation in sedimentary rocks and influence on permeability and porosity
"	Zoology	*Dr. Charles E. Jenner	Invertebrate zoology and aquatic ecology
"	"	*Dr. Allen E. Stiven	Population systems including aquatic

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water-Related Research Interest</u>
Graduate	City & Regional Planning	*Dr. Maynard M. Hufschmidt	Water resources planning, policy and administration, and system analysis techniques
"	Curriculum in Recreation Administration	Dr. H. Douglas Sessoms	Outdoor recreation patterns, relationship of socioeconomic characteristics to leisure use, and motivating factors in outdoor recreation participation
Institute of Fisheries Research	-----	*Dr. A. F. Chestnut (Director-Institute)	Marine and estuarine ecology
"		*Dr. Earl E. Deubler, Jr.	Systematics and ecology of fishes
"		*Dr. William E. Fahy	Ichthyology--marine and brackish water fishes
"		*Dr. Jan J. Kohlmeyer	Marine fungi
"		*Prof. Hugh J. Porter	Marine and estuarine mollusca
"		*Dr. Austin B. Williams	Systematics and ecology of Decapod Crustacea
"		*Dr. William J. Woods	Hydrography and plankton of western Pamlico Sound, and productivity-nutrient cycles in Bogue Sound
Institute of Government		*Prof. Milton S. Heath, Jr.	Water resources law and administration, legislation, and municipal government
"		*Prof. Warren J. Wicker	Public control and provision of water and sewerage services, with emphasis on governmental organization, management, finance, and intergovernmental relations

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water-Related Research Interest</u>
Institute for Research in Social Science	Center for Urban and Regional Studies	*Dr. Edward J. Kaiser	Impact of water and sewerage policies on urban development
"	"	*Prof. Shirley F. Weiss	Water as a key factor in urban and re- gional land use, misuse, and reuse
Public Health	Environmental Sciences and Engineering	*Dr. J. Donald Johnson	Chlorination, disinfection, fluoridation, and flotation tertiary treatment processes
"	"	*Dr. Edward J. Kuenzler	Nutrient cycling, ecology of phytoplankton, and estuarine ecology
"	"	*Dr. James C. Lamb, III	Water and waste treatment processes, stream pollution, and water resources economics
"	"	*Dr. Robert A. Mah	Microbiology of anaerobic sludge fer- mentation
"	"	*Mr. Gerrit van R. Marais	Bacteriological standards for waste effluents, oxidation ponds, B. O. D. determinations, sanitation in under- developed countries
"	"	*Dr. Daniel A. Okun (Head-Department)	Water supply and pollution control for developing countries
"	"	*Dr. Jabbar K. Sherwani	Systems analysis approach to water re- source, hydrology, and economics of water quality management
"	"	Dr. S. J. Weidenkopf	Inactivation of viruses in water
"	"	*Dr. Charles M. Weiss	Aquatic ecology, effects of pollution on the aquatic environment, water re- sources and water quality, and detection and assessment of organic constituents in water

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Public Health	Biostatistics	Dr. Elizabeth J. Coulter	Demography, economic factors in health, vital statistic studies of environment in relation to long-term illness
"	"	Dr. R. C. Elston	Statistical methods in bioassay
"	"	Dr. James E. rizzle	Consultation with research workers on design of experiments and analysis of data
"	"	Dr. P. A. Lachenbruch	Simulation and data analysis
"	"	Dr. Dana Quade	Statistical inference, especially nonparametric

Consolidated University of North Carolina - University of North Carolina at Charlotte

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
_____	Chemistry	*Dr. James R. Koppers	Diffusion of water through organic and inorganic membranes with applications to the reverse osmosis process for reclaiming saline water
_____	Mechanical Engineering	*Dr. Fred J. Dunkerley	Water treatment for commercial boilers as related to boiler scale formation and other boiler tube corrosion phenomena

Consolidated University of North Carolina - University of North Carolina at Greensboro

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
<u> </u>	Chemistry	*Dr. Henry L. Anderson II	Thermodynamics of aqueous electrolyte solutions

Duke University

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water-Related Research Interest</u>
Graduate School of Arts and Sciences	Botany	*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 algae, particularly the benthic marine algae
"	Civil Engineering	*Dr. Edward H. Bryan	Water pollution, waste water characterization, water quality, and waste water treatment
"	Economics & Business Administration	Dr. Thomas H. Naylor	Econometric, computer simulation and operations research
"	"	Dr. Wallace Reed	Development of urban systems and regional planning
"	"	Dr. William H. Wallace	Regional economic studies and econometric models
"	Political Science	Dr. Richard N. Leach	Intergovernmental relations in water development, regulation and use
"	Zoology--Marine Laboratory	*Dr. C. G. Bookhout (Director-Marine Laboratory)	Rearing estuarine and oceanic invertebrates in relation to environmental factors and planktonic studies of estuarine and oceanic crustacea
"	"	*Dr. John D. Costlow, Jr.	Environmental effects on crustacean development and endocrine mechanisms of crustacean development
"	"	*Dr. I. E. Gray	Community studies of the continental shelf and estuaries of North Carolina

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Graduate School of Arts and Sciences	Zoology - Marine Laboratory	*Dr. Daniel A. Livingston	Development of lakes as ecological systems, mud-water reactions in lakes, and geochemistry of the hydrosphere
"	"	*Dr. Robert J. Menzies (Director-Oceanographic Program)	Marine biology
"	"	*Dr. Unnsteinn Stefansson	Chemical oceanography - particularly nutrients and water masses analyses
"	"	*Dr. F. John Vernberg	Physiological ecology of marine animals
"	"	*Dr. W. B. Vernberg	Host-parasite physiological relationships and invertebrate physiology

East Carolina College

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Resources Research Interest</u>
Arts and Sciences	Biology	*Mr. Francis P. Belcik	Parasitic copepods--especially on marine invertebrates
"	"	Dr. Vincent J. Bellis	Algae ecology and algae as indicators of pollution
"	"	*Dr. J. G. Boyette	Animal ecology, including aquatic and amphibious forms
"	"	Dr. Patricia Daugherty	Fish taxonomy and distribution
"	"	*Dr. Edward P. Ryan	Ecological biology of aquatic invertebrates
"	"	Dr. Edgar F. Stillwell	Ion uptake in fishes

Guilford College

School

Department

Name

Water-Related Research Interest

Biology

*Dr. Robert R. Bryden

Limnology of ponds and streams

North Carolina College at Durham

<u>School</u>	<u>Department</u>	<u>Name</u>	<u>Water Related Research Interest</u>
Arts and Sciences	Geography	Dr. Theodore R. Speigner (Head - Department)	Small watershed legislation

* Currently active in field of water resources research