INVENTORY

OF

ACTIVE WATER RESOURCES RESEARCH PROJECTS

IN

NORTH CAROLINA

An

Institute Report

July 1, 1969

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TABLE OF CONTENTS

Federal Agencies (continued)

SENIOR COLLEGES AND UNIVERSITIES

CONSOLIDATED UNIVERSITY OF NORTH CAROLINA

NORTH CAROLINA STATE UNIVERSITY

School of Agriculture and Life Sciences

Department of Animal Science

Dr. James M. Leatherwood and Dr. Harold A. Ramsey

1. Title: Utilization of Fibrous Wastes as Sources of Nutrients

   Location: Raleigh, North Carolina

   Description: To develop a biological technique for the conversion of natural cellulosic wastes such as newspaper-sawdust to products that can be used as sources of nutrients for animal feeding.

   Starting Date: 1968 Completion Date: 1972

Department of Botany

Dr. Charles E. Anderson

1. Title: The Effect of Fluoride on Reproduction and Metabolism in *Chlamydomonas reinhardtii*

   Location: Aurora, North Carolina

   Description: Analyzing rates of cell division and the ability of these cells to manufacture protein and also changes in permeability of the cells; changes of ultrastructure of the cells.

   Starting Date: January 1967 Completion Date: Continuing

2. Title: Ability of the Environment to Control Reproduction and Growth of *Juncus roemerianus*

   Location: North Carolina Coast

   Description: Working with seed germination and the ability of the seedlings to germinate in various salinity concentrations; the ability of the seedlings once germinated to adapt to various salinity concentrations.

   Starting Date: November 1968 Completion Date: Continuing

Dr. Arthur W. Cooper

1. Title: A Preliminary Study of the Ecology, Present and Alternative Future Land Use Patterns in the Dismal Swamp Area of North Carolina

   Location: Dismal Swamp Area

Description: To assemble available information from all sources on the geology, ecology and land use pattern of the Dismal Swamp, to determine its present land use pattern and the various alternative future land use proposals, and determine the feasibility of a full-scale evaluation, in cooperation with Virginia, of alternative land use proposals for the Dismal Swamp and their predicted effects on the area.

Starting Date: 1967 Completion Date: 1969

2. Title: Seed and Seedling Ecology of Salt Marsh Plants

Location: North Carolina Salt Marshes

Description: Factors affecting germination of seed of salt marsh grasses and growth of seedlings.

Starting Date: 1967 Completion Date: 1969

Dr. Larry A. Whitford

1. Title: The Fresh-water Algae in North Carolina

Location: Raleigh, North Carolina

Description: A fresh-water algal flora of the state is being written for publication within the next two years. It will name and indicate the habitat of more than 1700 taxa of algae. The book is based on ten years' work by one of the authors and more than twenty years by the other.

Starting Date: 1966 Completion Date: 1969

2. Title: The Ecology of Algae in Small Streams

Location: Piedmont

Description: Studies of the communities, and species of algae occurring in small Piedmont streams and their seasonal changes are being made. The effect of temperature, light and current on individual species is being studied.

Starting Date: 1965 Completion Date: Continuing

3. Title: A Study of the Winter Algal Flora of Small Pools and Ponds

Location: Eastern North Carolina

Description: More or less rare species of algae which are found only in winter are being studied. New and rare species will receive special attention.

Starting Date: 1966 Completion Date: Continuing

Department of Crop Science

Dr. Jerome B. Weber

1. Title: Reactions of Soil Constituents and Organic Chemicals

   Location: North Carolina State University

   Description: Adsorption-desorption reactions between organic and inorganic soil colloids and aromatic organic compounds in aqueous systems.

   Starting Date: 1962 Completion Date: Continuing

2. Title: Reactions and Movement of Herbicides in Modified Soils

   Location: Upper Coastal Plain Experiment Station, Rocky Mount, North Carolina

   Description: The relationships among soil constituents, such as clay minerals and organic matter, and herbicide phytotoxicity and soil movement on modified soil environments under field conditions.

   Starting Date: 1968 Completion Date: Continuing

3. Title: Effect of Soil pH on Herbicide Phytotoxicity and Movement

   Location: Tidewater Experiment Station, Plymouth, North Carolina

   Description: The relationship of soil pH and herbicide phytotoxicity and movement are being examined on a high organic soil under field conditions.

   Starting Date: 1968 Completion Date: Continuing

Department of Economics

Dr. William M. Crosswhite, Dr. James A. Seagraves, Mr. John Macon, and Mr. Roy E. Carawan (Department of Food Science)

1. Title: Water and Waste Management in Poultry Processing

   Location: Durham, North Carolina

   Description: See Gold Kist Poultry under industry listing

   Starting Date: 1969 Completion Date: 1971

Dr. William M. Crosswhite (and seven other Southeastern Land-grant Colleges)

2. Title: Regional Income and Employment Effects of Investments in Natural Resources

   Location: Southeastern States

Description: The general objective of this study is to provide information on the effectiveness of water and other natural resources in accelerating local and regional economic growth and alleviating problems of low-income unemployment and under-employment. Specific types of investments include water projects, land-development projects, and forestry development.

Starting Date: July 1, 1969 Completion Date: 1973

Department of Entomology

Dr. Richard C. Axtell

1. Title: Populations of Sciomyzid Flies Predocious on Snails

Location: Raleigh area and other sites to be chosen

Description: Measurement of the population sizes, degree of dispersal and species composition of sciomyzid flies in marshes. Determination of the effect of these flies on snail populations. (Supported in part by PHS Training Grant in Medical Entomology.)

Starting Date: January 1, 1969 Completion Date: June 1972

Dr. Frank E. Guthrie

1. Title: Adaptation of Organisms to Pesticides

Location: Raleigh, North Carolina

Description: The physiological mechanisms permitting adaptation of organisms to pesticides are examined. The contribution of tissue, cellular, and subcellular components are separated in an attempt to explain effects of pesticides at the molecular level.

Starting Date: 1964 Completion Date: 1971

Dr. Thomas J. Sheets

1. Title: Persistence of Pesticides in Soil

Location: Peanut-growing area of North Carolina

Description: A survey of levels of contamination in soils with certain chlorinated hydrocarbons under conditions of normal agricultural practice and persistence of several pesticides in soils under field conditions.

Starting Date: 1966 Completion Date: Continuing

2. Title: Movement of Pesticides From Fields Into Ground and Surface Waters

Location: Lewiston and Rocky Mount, North Carolina

Description: Study of the movement of 2, 3, 5 - Trichloro - 4 - pyridinal (DAXTRON) laterally in surface water and downward in soil. Removal of DAXTRON from small plots by surface runoff from natural rainfall will be determined. Water will be taken from wells located in large fields and analyzed several times each year.

Starting Date: 1968 Completion Date: 1971

3. Title: Persistence and Movement of BHC in a Mountain Watershed

Location: Mount Mitchell

Description: A watershed on the north side of Mount Mitchell was sprayed with BHC in 1967 to control balsam wooly aphid. The persistence of BHC in surface litter and soil of small plots located within watershed is being determined. BHC levels in water draining from the area and small mammals inhabiting the area will also be determined.

Starting Date: 1967 Completion Date: 1969

Dr. Thomas J. Sheets and Dr. J. R. Bradley

1. Title: Contamination of Surface and Ground Water with Insecticides and Herbicides Applied to Cultivated Crops

Location: Rocky Mount and Lewiston, North Carolina

Description: An experiment will be established at two locations and runoff from small plats analyzed for the pesticides. Ground water samples from wells of different depths will be analyzed periodically. Persistence and movement in soil will also be followed.

Starting Date: 1969 Completion Date: 1972

Department of Food Science

Mr. Roy E. Carawan

1. Title: Water and Waste Management in Poultry Processing

Description: See project (1) Dr. W. M. Crosswhite, et al, Department of Economics for the description.

Department of Plant Pathology (& Department of Wood & Paper Science)

Dr. Ellis Cowling and Dr. Wyn Brown (Department of Wood & Paper Science)

1. Title: The Structure of Lignin in Relation to the Morphology of the Cell Wall

Location: North Carolina State University

Description: This study is also directed towards examining the nature and structure of lignin with the ultimate objective of either developing commercially valuable products from it or modifying its nature if it is left in paper. Water effluent problems will be reduced substantially if these goals are attained.

Starting Date: Spring 1969 Completion Date: Spring 1971

Department of Soil Science

Dr. S. W. Buol

1. Title: North Carolina Soil Survey

Location: Entire State

Description: In cooperation with the USDA the North Carolina Agriculture Experiment Station is engaged in the survey of the state. In addition to mapping the soils studies are made to determine water-holding capacity, runoff, water-table depth and frequency and duration of flooding on these soils.

Starting Date: Continuing Completion Date: Continuing

Dr. Charles B. Davey and Dr. William S. Galler (Department of Civil Engineering)

1. Title: Animal Waste Composting with Carbonaceous Material

Location: Raleigh, North Carolina

Description: Combining of two waste products (poultry manure and sawdust) and composting by means of aerobic-thermophilic process to produce soil amendment.

Starting Date: 1968 Completion Date: 1970

Dr. J. Fulton Lutz

1. Title: Water Contamination by Fertilizer Nitrogen and Phosphorus

Location: Waynesboro Watersheds

Description: To determine direct contribution of fertilizers to nitrogen and phosphorus contamination of surface and subsurface runoff and consequent enrichment of streams and lakes as affected by type fertilizer, application, crops, soil properties meteorological and hydrological conditions.

Starting Date: 1968 Completion Date: 1971

Dr. J. Fulton Lutz and Dr. Thomas J. Sheets (Department of Entomology)

1. Title: The Movement of Herbicides Off, Into, and Through Soils

Location: Waynesville, North Carolina, and North Carolina State University, Raleigh

Description: To determine lateral and vertical movement of several herbicides of different physical and chemical properties in soils of known physical, chemical, and mineralogical properties; to study movement into and contamination of runoff water; to investigate accumulation and distribution of several herbicides in the soil profile; to relate lateral and vertical movement in soil, movement into runoff water, and accumulation and distribution of chemicals in the soil profile, to physical and chemical properties of the herbicides, to physical, chemical and mineralogical properties of the soils, and to climatological and hydrological data.

Starting Date: 1967 Completion Date: 1971

Dr. Charles B. McCants, Dr. W. G. Woltz and Dr. David Terry

1. Title: Quantitative Prediction of Leaching Losses of Nutrients in Soils

Location: Coastal Plains and Piedmont Sections of North Carolina

Description: Experiments are conducted on soils in their natural geographic position to determine: (a) The relationship between soil properties and infiltration and percolation of water and movement of mineral elements in the soil. Studies on mineral element movement are generally restricted to the surface 36 inches of soil.

Starting Date: 1960 Completion Date: Continuing

2. Title: Effect of Different Soil Moisture Regimes on Growth of Tobacco

Location: Experiments are conducted at various sites in the Piedmont and Coastal Sections of the State

Description: Irrigation experiments are conducted to evaluate the effects of different soil moisture regimes at different periods of plant growth on yield and quality of tobacco.

Starting Date: 1960 Completion Date: Continuing

Dr. Charles D. Sopher

1. Title: Soil Productivity and Affects of Soil Properties and Their Interactions With Management Practices and Climatic Factors

Location: North Carolina Lower Piedmont and Coastal Plains

Description: In part, this project involves studying the moisture supplying power of various soil series. Included in the study will be the effects of rainfall amounts and distribution on crop yields produced on selected soils.

Starting Date: 1966 Completion Date: 1971

Dr. William W. Woodhouse, Jr.

1. Title: The Hydrology of Small Agricultural Watersheds

   Location: Near Waynesville, North Carolina

   Description: See project (1) T.V.A. for description

2. Title: Vegetative Stabilization of the Outer Banks of North Carolina

   Location: Outer Banks of North Carolina

   Description: Study of the role of vegetation in the protection of these areas and factors involved in production and maintenance of suitable vegetation for this purpose. A small related project is the stabilization and reclamation in the phosphate mining area in Beaufort County.

   Starting Date: 1961 Completion Date: Continuing

Department of Zoology

Dr. William W. Hassler

1. Title: Status and Abundance of Striped Bass in the Roanoke River, Albemarle Sound and Tar River, North Carolina

   Location: Roanoke River, Albemarle Sound, Tar River, North Carolina

   Description: Population estimates of striped bass in the Roanoke River; creel census surveys of sport and commercial fishing; tagging studies; estimate of spawning success; survival and mortality; trawling studies, etc.

   Starting Date: 1955 Completion Date: Continuing

2. Title: Life History Studies of Marine Fishes

   Location: Oregon Inlet, Hatteras, Ocracoke, Morehead City, North Carolina

   Description: Life history studies involving age-growth, reproduction, maturation, spawning, movements, migrations, food and ecology.

   Starting Date: 1958 Completion Date: Continuing

Dr. F. Eugene Hester

1. Title: Cooperative Fishery Unit (F&WLS - USDI)

   Location: Raleigh, North Carolina

   Description: This program trains graduate students in fishery biology. Current projects involve studies of fish reproduction, growth, and genetics; movements of tagged fish in streams; effects of water quality on fish survival; and population dynamics of fishes in reservoirs.

   Starting Date: 1962 Completion Date: Continuing

2. Title: Fishery Management Investigation of Lake Mattamuskeet

   Location: North Carolina State University, Raleigh, North Carolina, and Lake Mattamuskeet, New Holland, North Carolina

   Description: A survey of the species of fish present and their seasonal and annual fluctuations in abundance. The distribution and movements of certain species in the lake and canals will be studied.

   Starting Date: 1966 Completion Date: Continuing

Dr. John E. Hobbie

1. Title: Heterotrophic Bacteria in Aquatic Ecosystems

   Location: Raleigh, North Carolina, Pamlico River, Antarctic Ocean

   Description: Flux rates of amino acids and glucose will be related to bacterial numbers and bacterial heterotrophy. Corrections will be established for isotope loss due to respiration, and further studies will be made of bacterial heterotrophy rates and eutrophication.

   Starting Date: 1969 Completion Date: 1971

2. Title: Estuarine Ecosystems and High Temperatures

   Location: Pamlico River, North Carolina

   Description: The use of large microcosms, here plastic pools, will be tested for application to possible effects of heated water on estuaries. Both standing water and flow-through systems will be established with estuarine water plus fish, shellfish, rooted aquatics, and plankton. The effect of raising the temperature of one pool five degrees (C) over a control will be tested for species replacement, biomass, community respiration and photosynthesis.

   Starting Date: 1969 Completion Date: 1971

3. Title: Nutrients and Eutrophication in a North Carolina Estuary

Location: Pamlico River, North Carolina

Description: Measurement of annual nutrient cycling and related chemical and physical parameters, sources and quantities of phosphorus and nitrogen entering from estuaries, nutrient factors limiting phytoplankton photosynthesis, and tracing of algal blooms.

Starting Date: 1969 Completion Date: 1971

4. Title: Effect of Heated Water Effluents on the Lower Neuse River and Bay River Estuaries of North Carolina

Location: Pamlico Marine Laboratory, Aurora, North Carolina

Description: Hydrographic survey including temperature, salinity and dissolved oxygen; quantitative sampling of macrobenthic invertebrates; and determine temperature tolerance levels of selected components of biota.

Starting Date: 1967 Completion Date: 1969

School of Engineering and Agriculture and Life Sciences

Department of Biological and Agricultural Engineering

Professor David H. Howells

1. Title: Water Resources Research Institute

Location: Raleigh, North Carolina

Description: An intercampus program of the Consolidated University of North Carolina for the promotion and support of multidisciplinary research on water problems of North Carolina and coordination of research and educational programs dealing with water resources.

Starting Date: 1965 Completion Date: Continuing

2. Title: Relationship of Municipal Water and Sewer Charges to Industrial Water Use and Wastes Discharged to Municipal Systems

Location: North Carolina

Description: Exploratory study of the effects of municipal water and sewer service charges on water use and waste disposal practices by industry discharging wastes to municipal sewer systems.

Starting Date: 1968 Completion Date: Continuing

Professor David H. Howells (with Mr. Jackie W. D. Robbins)

3. Title: Role of Animal Wastes in Agricultural Land Runoff

Location: Piedmont Region of North Carolina

Description: To investigate the actual and potential importance of animal wastes in agricultural land runoff with respect to water quality in receiving streams. The first year was devoted to swine. The second year will include poultry and cattle.

Starting Date: 1968 Completion Date: 1970

Dr. George J. Kriz

1. Title: Evaluation of Water Supply on the Outer Banks (In cooperation with U.S. Geological Survey)

Location: Raleigh and North Carolina Coast

Description: Analog modeling of fresh-water supply of the Outer Banks as a basis for determination of available supply and criteria for safe yield to avoid overdraft and salt-water intrusion.

Starting Date: 1968 Completion Date: 1970

2. Title: Water Level Control in Coastal Plain Soils

Location: Lower Coastal Plain in North Carolina

Description: Development of criteria for subsurface irrigation in the Coastal Plain in the interest of improved water management for both organic and mineral soils.

Starting Date: 1968 Completion Date: 1971

3. Title: Unsaturated Moisture Movement Through Porous Media

Location: Raleigh, North Carolina

Description: Study moisture movement through porous media to seeds and plant roots to determine moisture uptake in various soil types.

Starting Date: 1966 Completion Date: Continuing

4. Title: Saturated Moisture Movement Through Porous Media

Location: Raleigh, North Carolina

Description: Develop drainage criteria utilizing a Hele-Shaw model. Deep seepage, intermittent and constant recharge and

varying depths of drains and ditches to the impermeable layer will be investigated as to their effect on drainage design criteria.

Starting Date: 1966 Completion Date: Continuing

Mr. Ronald Sneed

1. Title: Muscadine Grape Irrigation and Control Practices Study

Location: Sand Hills Research Station, Jackson Springs, North Carolina

Description: Deals with the effects of nitrogen and potassium fertilization, irrigation, and vine size upon vigor, survival, yield, fruit set and fruit quality.

Starting Date: July 15, 1968 Completion Date: July 15, 1978

Mr. Ronald Sneed and Dr. Conrad Miller (Horticulture Department)

2. Title: Crop Response of Snap Beans and Cucumbers to Irrigation

Location: Coastal Plains Vegetation Research Station, Faison, North Carolina

Description: Involves irrigation, plant population and varieties

Starting Date: January 1968 Completion Date: December 1970

Dr. Cliff R. Willey

1. Title: Effect of Anaerobic Root Environment on Water Uptake

Location: Raleigh, North Carolina

Description: Plant roots grown in nutrient and solution mist are treated with gas mixtures to created anaerobic conditions with varying levels of CO_2. Effects of treatments on root respiration, water uptake, and growth are measured.

Starting Date: 1967 Completion Date: 1971

Dr. Ralph E. Williamson

1. Title: The Influence of Root Physiology and Morphology on Plant Response to Aeration

Location: Raleigh, North Carolina

Description: Experiments are conducted to ascertain the physiological, morphological, and cytological changes that occur in roots under conditions of poor aeration. An attempt is being made to define poor aeration in terms of the level of oxygen and carbon dioxide. Some experiments are conducted to determine the length of time that roots can tolerate inadequate soil oxygen and excess carbon dioxide without permanent damage to the root system.

Starting Date: 1964 Completion Date: 1969

2. Title: Effect of Water Table Depth on Crop Performance

Location: Raleigh, North Carolina

Description: Crop plants are grown in the field in lysimeters which hold one or more cubic yards of soil. The lysimeters are protected from rain by automatic movable shelters. Water table depths are maintained at 6-12-18-24-30-36 and 40 inches below the soil surface during the growing season. Certain measurements such as the soil moisture content, oxygen diffusion rate in the root zone and oxygen partial pressure are made. Yields both as to quantity and quality are determined.

Starting Date: 1963 Completion Date: 1971

Dr. Edward H. Wiser

1. Title: Rainfall Disposition Over a Sloping Land Mass

Location: Raleigh, North Carolina

Description: Soil-filled flume to be studied for moisture movement.

Starting Date: 1965 Completion Date: Continuing

2. Title: Water Balance Ahoskie Creek

Location: Bertie County, North Carolina

Description: See entry for SCS-USDA for description.

Starting Date: 1965 Completion Date: Continuing

School of Engineering

Department of Chemical Engineering

Dr. V. T. Stannett and Dr. H. B. Hopfenberg

1. Title: Preparation and Properties of Grafted Membranes for Desalination

Location: Raleigh, North Carolina

Description: Research on novel methods of membrane preparation and modification for use in reverse osmosis process for purification of saline waters.

Starting Date: 1967 Completion Date: 1969

2. Title: Abatement of Pollution from Pulp and Paper Wastes by Modification and Utilization of Lignin Waste Products

Location: Raleigh, North Carolina

Description: See Dr. Wyn Brown, Department of Wood and Paper Science.

Department of Civil Engineering

Dr. William S. Galler

1. Title: Animal Waste Composting with Carbonaceous Material

Description: See Dr. Charles B. Davey, Department of Soil Science.

Dr. A. I. Kashef

1. Title: Salt Water Mounds in Coastal Aquifers Under Transient Conditions

Location: North Carolina State University at Raleigh

Description: Analytic determination of contour lines of salt water mounds under various combined effects of pumping, recharge and natural flow systems under the transient (unsteady) state conditions.

Starting Date: 1968 Completion Date: Continuing

2. Title: Multiple Gravity Well Systems

Location: North Carolina State University at Raleigh

Description: Effect of pumping multiple wells on the ground water levels under both the steady and transient conditions.

Starting Date: 1967 Completion Date: 1969

3. Title: Leaky Confining Beds of Time-dependent Properties

Location: North Carolina State University at Raleigh

Description: The study of the factors and soil properties affecting leakage of confining layers above and below artesian aquifers

by considering the change in the hydraulic conductivity and storage by time.

Starting Date: March 1966 Completion Date: Continuing

Professor Charles Smallwood, Jr., and Dr. William S. Galler

1. Title: The Optimization of Water Supply from the Neuse River in the Research Triangle Area

Location: Raleigh, North Carolina

Description: A study to optimize the distribution of waters from the Neuse River to the Counties and Towns of the Research Triangle Area.

Starting Date: September 1966 Completion Date: Continuing

Department of Engineering Research

Mr. Robert D. Kauffman and Mr. Immo H. Redeker (Minerals Research Laboratory)

1. Title: Recovery of By-products from Feldspar Plant Tailings

Location: Spruce Pine area

Description: Development of uses for tailings through waste examination, beneficiation research, market studies, and product development studies.

Starting Date: 1968 Completion Date: 1971

Department of Nuclear Engineering

Professor J. R. Bohannon, Jr.

1. Title: Application of Neutron Activation Analysis to Water Resource Research

Location: North Carolina State University

Description: Exploratory study on the use of neutron activation analysis as it fits North Carolina's water monitoring program and investigation of specific water and pollution problems.

Starting Date: 1968 Completion Date: 1969

2. Title: Study of In-line Paper Mill Process Variables

Location: Weyerhaeuser Paper Company, Plymouth, North Carolina

Description: A complete study using N.A.A. to follow paper mill process variables from point of entry to mill effluent for budgetary, product control, and pollution purposes.

Starting Date: 1967 Completion Date: Continuing

School of Forest Resources

Department of Forestry

Dr. T. Ewald Maki

1. Title: Drainage, Site Preparation and Site Improvement in Relation to Regeneration of Marketable Tree Species and Development of Stands on Pocosin Lands

   Location: Hofmann Forest, Onslow and Jones Counties, North Carolina

   Description: Evaluation of the effects of physical treatments, including ditching, disking, bedding, and burning, and various chemical treatments such as liming and fertilizing on the rhizosphere, on the changes in native vegetation, on watertable behavior and on the survival, initial growth and development of seedlings, saplings, and pole stands of pines and hardwoods.

   Starting Date: 1962 Completion Date: Continuing

2. Title: Relative Productivity of Lower Piedmont Sites for Pines or Hardwoods

   Location: Mainly Hill and Hope Valley Forests, Durham and Chatham Counties, but also on industry lands

   Description: Assessment of site quality in relation to establishment and growth of different species of pine and hardwood, and the influence of vegetation control and site preparation and improvement measures on soil moisture, particularly during the critical stand establishment period.

   Starting Date: 1958 Completion Date: Continuing

3. Title: Water Quality and Yield in Relation to Silvicultural Treatments

   Location: Hill Forest (Durham County) and Schenck Memorial Forest (Wake County)

   Description: Exploration of possible changes in water quality and yield from small watersheds in response to silvicultural treatments such as thinnings, stand conversion, fertilization, prescribed burning, and the like.

   Starting Date: 1968 Completion Date: Continuing

4. Title: Effect of Inundation and Deer-browsing on Hardwood Regeneration in the Roanoke River Bottomlands

Location: Halifax and Bertie Counties, North Carolina (A joint study by the Forestry Extension and Forestry Departments of North Carolina State University, certain industrial interests, the U.S. Forest Service, and the Corps of Engineers)

Description: The study is investigating the relative influence of the changed water regimes imposed on Roanoke River bottomlands by Kerr Dam and the browsing of a very heavy deer herd on the establishment and growth of hardwood timber. Three forest stand conditions, tupelo-cypress-swamps, ash flats, and sweetgum sites are being studied by comparing regeneration protected from the deer herd with those exposed to browsing.

Starting Date: Continuing Completion Date: Continuing

Dr. T. Ewald Maki with Dr. W. L. Hafley, Dr. J. O. Lammi and Dr. H. J. Steensen

5. Title: Effects of Changes in Land Use on Water Yields from Municipal Watersheds

Location: Durham Watershed

Description: Economic evaluation of the effects of changing land use and land treatment on increases in water yield and quality from a forested municipal watershed.

Starting Date: 1968 Completion Date: 1971

Department of Recreation Resources Administration

Professor Gordon A. Hammon

1. Title: Recreational Capacity of Water Resources

Location: United States

Description: To formulate concepts and methodology for estimating the volume of recreation use which can be properly supported by various types of water bodies.

Starting Date: 1968 Completion Date: 1970

Department of Wood and Paper Science

Dr. Wyn Brown

1. Title: Abatement of Pollution from Pulp and Paper Wastes by Modification and Utilization of Lignin Waste Products

Location: Raleigh, North Carolina

Description: Grafting of monomers of synthetic polymers to lignin. Color in pulp wastes comes largely from the conjugated groups in lignin. Grafting breaks the continuity of single and double bonds rendering the lignin colorless and soluble thereby making it an attractive raw material for industry rather than a waste product.

Starting Date: 1967 Completion Date: 1969

Dr. Peder Kleppe

1. Title: Reuse of White Water in Pulp and Paper Mill

Location: Raleigh, North Carolina

Description: This study is in cooperation with a pulp and paper manufacturing company in North Carolina and will examine the effect of water reuse on paper quality.

Starting Date: 1969 Completion Date: 1970

2. Title: Oxidation of Sulfur and Organic Sulfur Compounds in Kraft Pulping

Location: Raleigh, North Carolina

Description: This study is directed toward in-plant and water pollution control.

Starting Date: 1969 Completion Date: 1972

Dr. Knut Kringstad

1. Title: (a) Development of Very High Yield Pulps (b) Color Stability in Lignin and High Yield Pulps

Location: Raleigh, North Carolina

Description: This work proposes to examine the possibilities of overcoming the disadvantages of leaving high residual contents of lignin in paper pulp. Initial emphasis will be on the color problem. The impact of successful work in this field could be very significant in terms of effluent generation by the paper industry as lignin and carbohydrates are removed from wood in the pulping operation.

Starting Date: 1968 Completion Date: Continuing

Professor Charles N. Rogers

1. Title: Southern Pulp and Paper Industry Liquid Effluent Survey

Location: Southeastern United States

Description: Characteristics and amounts of effluents, methods of water conservation, waste control and treatment, effectiveness, costs, and researchable problem areas.

Starting Date: 1968 Completion Date: 1969

School of Physical Sciences and Applied Mathematics

Department of Experimental Statistics

Dr. Don W. Hayne (cooperatively with Mr. Robert E. Mason)

1. Title: Consulting on Fisheries Problems

Location: On campus, North Carolina State University, and throughout ten Southeastern States

Description: The Southeastern Cooperative Fish and Game Statistics Project, a unit of the Institute of Statistics, services the statistical needs of member States insofar as fisheries (and game) projects are concerned. Many problems in aquatic biology are covered. These are of wide variety covering fisheries biology and management, physical and biological limnology and the ecology of aquatic fauna and flora. The largest category of problems is concerned with the appraisal of sport fishing, both fresh water and marine.

Starting Date: 1969 Completion Date: Continuing

2. Title: Distribution and Kinetics of Pesticides in Ecosystems

Location: New Hope Drainage Basin, North Carolina

Description: To compare the present distribution of chlorinated hydrocarbon pesticides (primarily DDT and various analogs) in three components of the basin: Terrestrial, streambed and flood plain, and running water system.

Starting Date: 1967 Completion Date: Continuing

Mr. Robert E. Mason

1. Title: Southeastern Cooperative Fish and Game Statistics

Location: On campus, North Carolina State University, and throughout thirteen Southeastern States

Description: Larger problems of relationships among wild populations and measurable variables, especially those involving the use of a computer.

Starting Date: 1959 Completion Date: Continuing

Department of Geosciences

Dr. C. J. Leith

1. Title: Erosion, Sand Origin, and Sand Movement in the Coastal Areas of North Carolina

Location: Raleigh and Outer Banks, North Carolina

Description: Sampling and analysis of dynamics of beach areas in terms of materials making up the beach.

Starting Date: June 1966 Completion Date: 1970

Dr. John M. Parker, III

1. Title: Geology of Wake County, North Carolina

Location: Wake County, North Carolina

Description: Mapping of bedrock units in county, determination of structure and history, and examination of mineral deposits. The resulting map and report are to be published by the North Carolina Division of Mineral Resources. This is not primarily a water resources research project but it relates to any ground water investigations within this area and to others elsewhere where similar geologic conditions exist.

Starting Date: Continuing Completion Date: Continuing

Mr. Albert V. Hardy

1. Title: Weekly Precipitation Normals, North Carolina Stations

Location: State Climatologist's Office

Description: Plan to compute normals of precipitation for standard calendar weeks for all North Carolina stations having sufficient record; to be used to supplement present monthly normals. The weekly normals will be useful in planning for farm activity such as planting and harvesting dates and for planning other outdoor activity.

Starting Date: 1967 Completion Date: Continuing

Dr. Charles W. Welby

1. Title: Model and Probability Study of Occurrence of Water in Crystalline Rocks

Location: Piedmont Region of North Carolina

Description: Develop curves, tables, and diagrams useful in predicting yields of wells drilled into crystalline rocks of Piedmont Region of North Carolina

Starting Date: 1968 Completion Date: 1970

School of Textiles

Department of Textile Chemistry

Dr. Carl E. Bryan

1. Title: Textile Waste Reduction Through Recovery and Reuse of Synthetic Warp Sizes

Location: Raleigh, North Carolina

Description: Investigation of the recovery of warp size materials for possible reuse or disposal.

Starting Date: 1969 Completion Date: 1970

CONSOLIDATED UNIVERSITY OF NORTH CAROLINA

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

College of Arts and Sciences

Department of Botany

Dr. Max H. Hommersand

1. Title: Morphological Studies of Some Red Algae

Location: Chapel Hill, North Carolina

Description: An investigation of the growth, development and differentiation of vegetative filaments and reproductive systems of marine red algae. Comparative morphological and anatomical studies of different species, genera and families of red algae have been carried out in an attempt to determine natural relationships useful in classification. Experimental morphogenetic studies on filament development at the growing apex, and the initiation of the reproductive system have been started.

Starting Date: Continuing Completion Date: Continuing

2. Title: Systematic and Phytogeographic Studies of Benthonic Marine Algae

Location: Chapel Hill, North Carolina

Description: The proposed study is intended to adapt modern concepts of developmental morphology, population genetics and physiological ecology to the study of migration, geographical distribution and evolution of benthonic marine algae.

Starting Date: 1969 Completion Date: Indefinite

Dr. Max H. Hommersand and Charles F. Rhyne

3. Title: Growth, Life History and Ecological Adaptations of Species of Ulva and Enteromorpha

Location: Chapel Hill and Morehead City, North Carolina

Description: A comparative morphological, taxonomic and life history study is being carried out on species of Ulva and Enteromorpha, growing in artificial ponds supplied with treated sewage effluent or occurring in eutrophic water of Calico Creek, Morehead City, North Carolina.

Starting Date: 1968 Completion Date: Continuing

Dr. William J. Koch

1. Title: Studies of Aquatic Fungi

   Location: Chapel Hill, North Carolina

   Description: Evaluation of cytological and developmental features of special importance in taxonomic, systematic, and evolutionary interpretations within aquatic fungi.

   Starting Date: 1963 Completion Date: Continuing

2. Title: Ecology and Systematics of Estuarine Fungi

   Location: Marine Science Institute, Morehead City, and Chapel Hill, North Carolina

   Description: Qualitative and quantitative studies of the planomycetes fungi in the Morehead City area estuary with emphasis on the role these fungi play in degrading sewage dumped into the estuary.

   Starting Date: 1969 Completion Date: 1972

Dr. J. Frank McCormick

1. Title: Primary Production in Bogue Sound, North Carolina

   Location: Morehead City, North Carolina

   Description: A field sampling program, field experiments, and controlled laboratory experiments are being used to estimate primary production in Bogue Sound. The chief method is to measure fixation of C^{14} in the field and laboratory.

   Starting Date: 1968 Completion Date: 1970

Dr. Clyde J. Umphlett

1. Title: Studies of Some Fungus Parasites of Mosquitoes

   Location: Southeastern United States and India (Hdq. at Chapel Hill)

   Description: Primarily a study of Coelomomyces spp., emphasizing taxonomy, morphology, cytology and ecology, and involving experimental infection of mosquitoes with the fungus, and an evaluation of any potential use of the fungus for controlling mosquito populations with biological agents.

   Starting Date: 1960 Completion Date: Continuing

2. Title: Planomycetes of Watersheds and Lentic and Lotic Environments

Location: Southeastern United States

Description: Systematic and ecologic studies of Chytridiomycetes: (1) Presence and frequency; (2) motility in the soil and water; (3) substratum preference; (4) contribution of these forms to litter decomposition.

Starting Date: 1968 Completion Date: Continuing

3. Title: Planomycetes from Distinctive Habitats

Location: Southeastern United States

Description: Systematic studies of Chytridiomycetes and Oomycetes in habitats with certain peculiar characteristics: (1) Granite outcrops; (2) old sawdust piles; (3) Sphagnum bogs; (4) seral stages in secondary succession in Piedmont North Carolina.

Starting Date: 1968 Completion Date: Continuing

Department of Chemistry

Dr. Richard P. Buck

1, Title: Electrical Properties of Specific Ion Electrodes

Location: Chapel Hill, North Carolina

Description: Characterization of crystals used as specific ion electrodes. Impedance of membranes used in membrane electrodes.

Starting Date: 1968 Completion Date: 1970

2. Title: Trace Analysis by Spark Source Moss Spectrometry

Location: Chapel Hill, North Carolina

Description: Ultra-trace analysis of elemental compositions (parts per billion range) of solids using spark excitation to yield ions for mass analysis.

Starting Date: 1967 Completion Date: Continuing

Dr. Royce W. Murray

1. Title: Electrochemical Studies of Adsorption

Location: Chapel Hill, North Carolina

Description: Basic research into the reasons for and factors controlling adsorption of metal complexes from aqueous solutions at metal surfaces is being conducted with electrochemical techniques serving as tools for measuring surface excess.

Starting Date: 1964 Completion Date: Continuing

Dr. Henry C. Thomas

1. Title: Self-diffusion of Ions Through Siliceous and Organic Gels

Location: Chapel Hill, North Carolina

Description: Study of self-diffusion coefficients as related to solution composition, temperature, and clay content in suspensions of montmorillonite and other gels at chemical equilibrium. (Present grant is a continuation of some eleven years of work.)

Starting Date: 1967 Completion Date: 1970

Department of Geography

Dr. Richard J. Kopec

1. Title: Effects of Chapel Hill on Its Thermal Climate

Location: Chapel Hill, North Carolina

Description: Using an automobile equipped with a thermistor thermometer, temperature observations are being conducted along a fifty-mile transect through and around Chapel Hill. These data are mapped, and the spatial pattern of Chapel Hill's "Heat Island" identified and analyzed. Future measurements will include vapor pressure and relative humidity values.

Starting Date: 1968 Completion Date: 1969

Department of Geology

Dr. Roy L. Ingram

1. Title: Sediments and Sedimentary Structures of the Coastal Inland Waters of North Carolina

Location: North Carolina Coastal Area

Description: Collection of cores and describing sedimentary structures found in cores.

Starting Date: Continuing Completion Date: Continuing

2. Title: Subsurface Cretaceous Sediments of the North Carolina Coastal Plain

Location: Southeastern North Carolina

Description: Using information from wildcat oil wells to determine subsurface cretaceous sediments of the North Carolina Coastal Plain.

Starting Date: 1966 Completion Date: Continuing

Dr. Daniel A. Textoris

1. Title: Petrology of the Castle Hayne Fm. and Related Aquifer Rocks, North Carolina

Location: Vicinity of Castle Hayne to New Bern, North Carolina

Description: After field samples are taken, the rocks will be studied by thin section analysis, x-ray diffraction, and Cathode luminescence to determine the disgenesis of the limestone. The unit is an important aquifer, and realization of how and why the permeability and porosity developed can lead to better control and development of the water.

Starting Date: 1966 Completion Date: 1972

Department of Zoology

Dr. Charles E. Jenner

1. Title: Environmental Control of Seasonal Activity--Seasonal Distribution of Marine Zooplankton

Location: Chapel Hill, North Carolina

Description: Effect of photo-periodism on the growth and reproduction of various aquatic insects.

Starting Date: 1950 Completion Date: Continuing

Dr. Howard T. Odum

1. Title: Radiation and Rain Forest Ecological System in Puerto Rico

Location: Puerto Rico, and Chapel Hill, North Carolina

Description: Manuscripts and final calculations are being assembled for a 104 chapter book entitled "A Tropical Rain Forest." Experimental work was done in Puerto Rico by sixty scientists between 1963-66. This is a project of the Atomic Energy Commission, Division of Biology and Medicine, through the Puerto Rico Nuclear Center, Rio Piedras, Puerto Rico.

Starting Date: 1963 Completion Date: 1969

2. Title: Brine Ecological Systems

Location: Chapel Hill, North Carolina

Description: Study of basic principle of ecological systems in the simplified situations of natural, industrial and laboratory

ecological systems. Objectives include analog simulation, preparation of defined system, frequency analysis, energetics of electrochemical phenomena of algal mats, and role of energetic stress in controlling diversity.

Starting Date: 1967 Completion Date: 1969

3. Title: Development of an Energy Circuit Language and Passive Analog Simulator for Energy Flows for Systems of Man and Nature

Location: Chapel Hill, North Carolina

Description: The relations of energy flows of system parts to stability and disintegrating influences are studied by connecting compartment modules, each of which has a mathematical formulation. Microcosms are used to test reality of theoretical contiguations.

Starting Date: February 1967 Completion Date: Continuing

Dr. Howard T. Odum and A. F. Chestnut, E. J. Kuenzler, C. M. Weiss, C. Jenner, A. Williams, M. Hommersand, R. Mah, and W. J. Woods

4. Title: Optimum Ecological Designs for Estuarine Systems of North Carolina

Location: Institute of Marine Science, Morehead City, North Carolina

Description: A study of the self-design process in experimental marine ponds toward the aim of establishing new ecological combinations capable of mineralizing the river wastes of urban North Carolina and providing alternative new types of food harvest.

Starting Date: 1968 Completion Date: Continuing

Dr. Alan E. Stiven

1. Title: Experimental Epidemiology of Aquatic Host-pathogen Systems

Location: Chapel Hill, North Carolina

Description: Host-pathogen relationships of populations of fresh water organisms (eq. Hydra); artificial epidemics and the significance of host species diversity of long-term epidemics. Modeling of spidemic processes.

Starting Date: 1963 Completion Date: Continuing

2. Title: Population Biology of Fresh Water Gastropods

Location: Chapel Hill, North Carolina

Description: Population dynamics and energetics of stream gastropods. Role of gastropods in detrital based stream ecosystems. Investigations of the significance of genetic mechanisms in the natural control process of populations.

Starting Date: 1964 Completion Date: Continuing

Graduate School

Department of City and Regional Planning

Dr. Maynard M. Hufschmidt

1. Title: Adapting the Water Resource Planning Process to Problems and Needs of Metropolitan Areas

Location: Chapel Hill and selected metropolitan areas

Description: Investigation of changes required in existing water resource planning theory, process, technique and practice to adapt water resource planning to meet emerging needs and problems of metropolitan areas and their natural resource hinterlands. The approach will be (1) establishment of a conceptual public investment model for water resources in an urban metropolitan context, (2) analysis of applicability of the model to actual cases such as the Baltimore metroregion, and the Research Triangle region in North Carolina, and (3) refinement of model and development of specific, detailed methodology for water resource planning in conjunction with comprehensive metropolitan planning, with associated criteria, standards and techniques.

Starting Date: 1967 Completion Date: 1970

Dr. David B. Moreau

1. Title: Superposition of Subseasonal Flows on Seasonal Flows in Multivariate Synthetic Hydrology

Location: Chapel Hill, North Carolina

Description: The project will develop a superposition principal for flows of short duration on monthly flows in snythetic hydrology.

Starting Date: 1969 Completion Date: 1970

Institute of Marine Sciences

Dr. A. F. Chestnut (Director)

1. Title: Estuarine Monitoring Program

Location: Coastal Area of North Carolina

Description: Eighteen stations selected in various salinity levels in the estuary will be sampled at monthly intervals to determine measurable residues of chlorinated hydrocarbons in oysters, clams, fish and plankton samples. Chemical analyses will be made at Department of Interior, Bureau of Commercial Fisheries Biological Laboratory, Gulf Breeze, Florida.

Starting Date: June 21, 1966 Completion Date: Continuing

2. Title: Artificial Culture of Marine Lamellibranchs

Location: Bogue Sound

Description: Rearing of larvae of various marine lamellibranchs from fertilized ova secured by spawning under laboratory conditions. Adults reared from the larvae are planted in natural areas to determine growth rates, mortalities and feasibility of "farming" species of economic importance.

Starting Date: Continuing Completion Date: Continuing

Dr. William E. Fahy

1. Title: Influence of Environment (Temperature) upon Developing Meristic Structures in Developing Marine Fishes

Location: U.N.C., Institute of Marine Sciences, Morehead City, North Carolina

Description: Eggs and larvae of the mayfish, Fundulus majalis, are reared in a saltwater circulating, temperature-controlled apparatus to determine the influence of different temperature regimes upon the number of developing meristic structures (vertebrae, fin rays, basalia, and scales). Time of fixation of number of structures as well as the numbers themselves are being determined.

Starting Date: 1958 Completion Date: Continuing

2. Title: Experimental Study of Influence of Environmental Factors on Developing Skeleton of Marine Fishes

Location: Morehead City, North Carolina

Description: Ova from female Fundulus majalis (Cyprinodontidae; Teleosts) are fertilized and placed in incubation apparatus. Different constant temperatures and different pulsing temperature regimes are utilized to discover nature, time and extent of response of skelectal structures (vertebrae, fin rays, scales and other meristic elements to them). Proper statistical procedures are used to evaluate results.

Starting Date: 1960 Completion Date: Indefinite

Dr. Jan J. Kohlmeyer

1. Title: Morphological and Taxonomical Studies of Marine Fungi

   Location: Mainly United States East Coast

   Description: All species of higher marine fungi are examined microscopically and are illustrated. Taxonomy of these organisms is reevaluated.

   Starting Date: Continuing Completion Date: Continuing

2. Title: Survey of Distribution of Marine Fungi in the Tropics

   Location: Tropical and Subtropical Oceans

   Description: Higher marine fungi from tropical habitats, especially from mangrove stands are identified. Their geographical distribution and ecological importance are determined.

   Starting Date: Continuing Completion Date: Continuing

3. Title: Study of Algicolous Marine Fungi

   Location: U.S. East and West Coasts (and herbarium studies)

   Description: Parasitic, saprophytic, and symbiotic fungi from algae are identified and described. The role of fungi in the degradation of the hosts is examined.

   Starting Date: Continuing Completion Date: Continuing

Dr. Howard T. Odum, A. F. Chestnut, W. J. Woods, et al

1. Title: Optimum Ecological Designs for Estuarine Systems of North Carolina

   See Odum Project No. 4, Department of Zoology, University of North Carolina, for description.

Professor Hugh J. Porter

1. Title: Ecological Study of the Hard Clam (mercenaria) Populations in North Carolina Waters

   Location: Bogue Sound, Core Sound and Coastal Waters Off Shackleford Banks

   Description: Morphometric characteristics of two species and their intergrades in nature are being investigated; gonadal cycles in relation to time and temperature are followed; factors influencing hatchery culture of juvenile stocks are being investigated.

   Starting Date: Continuing Completion Date: Continuing

2. Title: Survey of Marine and Estuarine Mollusca in North Carolina Waters

Location: All marine and brackish water areas in North Carolina

Description: Permanent catalogued collections of North Carolina mollusca is established at the Institute. Additions from collecting trips in brackish and marine areas and from ecological investigators. This collection will aid in a published list of North Carolina mollusca with their known North Carolina range.

Starting Date: Continuing Completion Date: Continuing

Dr. Austin B. Williams

1. Title: Studies on Macroplanktonic Crustaceans and Ichthyoplankton of the Pamlico Sound Complex

Location: Western Pamlico Sound, Pamlico River and Neuse River in North Carolina

Description: (a) Secure data on recruitment of larval forms in, (b) establish index of the nature of the larval complex before possible alterations by mining and other engineering projects, (c) analysis of relationship between certain physical events and relative larval abundance.

Starting Date: December 1, 1966 Completion Date: Continuing

2. Title: A Revision of the Genus Callinectes

Location: Principal Museums in Western Hemisphere and Europe

Description: A taxonomic revision of the genus Callinectes (blue crab of commerce and its relatives) on a world-wide basis.

Starting Date: 1967 Completion Date: 1969

3. Title: Studies on Macroplanktonic Crustaceans of the Pamlico Sound Complex and Associated Inlets

Location: Western Pamlico Sound, Pamlico and Neuse Rivers, and Inlets

Description: Publication of continuing analyses of relationship between certain physical events and relative abundance of meroplanktonic crustaceans.

Starting Date: 1957 Completion Date: Continuing

Dr. William J. Woods

1. Title: Studies on Hydrography and Plankton of Western Pamlico Sound

Location: Western Pamlico Sound

Description: In situ studies of primary production, nutrient enrichment experiments and analyses of various factors that influence and measure production.

Starting Date: Continuing Completion Date: Continuing

2. Title: Chemical Composition of Primary Producers in Polluted and Non-polluted Salt Ponds

Location: North Carolina Coast

Description: Determination of the carbon, nitrogen fat and mineral content of benthic plants and phytoplankton as related to the chemical composition of water.

Starting Date: 1969 Completion Date: 1971

Institute of Government

Professor Milton S. Heath, Jr.

1. Title: Legal Framework for Delivery of Stored Water from Impoundments

Location: North Carolina

Description: Examination of the law concerning rights in natural and artificial water courses and statutory authority in such matters as: Monitoring releases from storage to cities and counties, determination of quantity of water entitlements, and discretion of the State Board of Water and Air Resources in regard to management of release and delivery of stored water allocations to recipients through natural water courses.

Starting Date: 1968 Completion Date: 1969

2. Title: Review and Recodification of Drainage and Watershed Improvement Legislation

Location: North Carolina

Description: Review of small watershed and drainage laws of North Carolina and preparation of report to Legislative Research Commission.

Starting Date: 1968 Completion Date: 1969

Professor Warren J. Wicker and Professor Milton S. Heath, Jr.

1. Title: Organizational Arrangements for Public Water Services in North Carolina

Location: Chapel Hill, North Carolina

Description: Survey of existing organizational arrangements; legal authority for the provisions of services; and identification of areas of inadequate coverage.

Starting Date: 1963 Completion Date: Continuing

Institute for Research in Social Science

Center for Urban and Regional Studies

Professor Shirley F. Weiss, Dr. Edward J. Kaiser, & Dr. R. J. Burby, III

1. Title: Environmental Engineering Policies and Urban Development

   Location: Center for Urban and Regional Studies, Evergreen House

   Description: A continuing effort at perfecting a system of linked producer and consumer models which will have operational utility in evaluating public policies, including water and sewer systems, for their land development implications.

   Starting Date: 1965 Completion Date: 1969

2. Title: Multipurpose Reservoirs and Urban Development

   Location: Center for Urban and Regional Studies, Evergreen House

   Description: Study involves the development of a forecast model for the testing of alternative policy mixes for their effectiveness in promoting desirable land development patterns around multipurpose reservoirs.

   Starting Date: 1968 Completion Date: 1971

3. Title: New Town Development-Convergence of Concept and Reality

   Location: Center for Urban and Regional Studies, Evergreen House

   Description: An exploratory study of new town development as a healthful and viable alternative to other forms of planned or unplanned growth.

   Starting Date: 1969 Completion Date: 1971

Professor Shirley F. Weiss and Dr. Edward J. Kaiser

4. Title: Environmental Innovation and the Residential Development Industry

   Location: Center for Urban and Regional Studies, Evergreen House

   Description: Study of residential development which is characterized by innovations in environmental amenity and recreation resources in order to identify decision factors and feasible governmental policies.

Starting Date: 1968 Completion Date: 1969

School of Public Health

Department of Environmental Sciences and Engineering

Dr. J. Donald Johnson

1. Title: The Chemistry of Bromine as a Water Disinfectant

Location: Chapel Hill, North Carolina

Description: The rates of reaction of bromine in natural water are being compared with those of chlorine. Bromine and bromine products appear to be equally effective and sometimes more so compared to chlorine as a water disinfectant. The rates of reaction and decomposition of bromine and bromine products are being studied to determine whether bromine can be expected to maintain more effective residuals for a longer period than chlorine.

Starting Date: 1967 Completion Date: 1972

2. Title: Ion Flotation for the Selective Removal of Low Concentration of Metal Ions

Location: Chapel Hill, North Carolina

Description: Studies are being conducted using radio tracer techniques for the removal of low levels of metal ions of possible public health significance from water.

Starting Date: 1966 Completion Date: 1970

3. Title: Coordination Reactions in Estuarine Waters Using Selective-ion Electrodes

Location: Chapel Hill, North Carolina

Description: In situ as well as laboratory measurements of both metal ion and non-metals using selective-ion electrodes are being made on estuarine waters. These activity results are compared to concentrations using standard analytical methods such as colorimetric and atomic absorption techniques. Activity and concentration measurements are compared considering both non-specific ionic strength effects and specific ion association, coordination or pairing reactions to define the extent of the effective concentrations of these ions in solution.

Starting Date: 1967 Completion Date: 1972

4. Title: Water-clay Interactions in Estuarine Sediments

Location: Chapel Hill, North Carolina

Description: Pore water to bottom water ratios of cationic equivalents are being measured in an estuarine system. Comparisons are

made between the exchange capacities of the clays present in the sediments as a function of extraction technique and clay mineralogy.

Starting Date: 1967 Completion Date: 1972

Dr. Edward J. Kuenzler

1. Title: Cycling of Phosphorus in Marine Ponds

Location: Morehead City, North Carolina

Description: Measurement and analysis of the kinetics of phosphorus cycling between the water and the phytoplankton of control and polluted marine ponds.

Starting Date: 1968 Completion Date: Continuing

Dr. James C. Lamb, III

1. Title: Improvement of Performance of Trickling Filter Plants

Location: Chapel Hill, North Carolina

Description: Development of information on techniques and design criteria to enhance the performance of trickling filter plants through optimizing operating procedures and use of techniques requiring minimum plant modification.

Starting Date: 1969 Completion Date: 1972

Dr. Donald T. Lauria

1. Title: Macroeconomic Model for Water Supply Planning in Development Countries

Location: Chapel Hill, North Carolina, and Developing Countries

Description: Cost minimizing model for water supply facilities in several communities of developing countries. Will include staging; size; and backlogs, uncertainties, quality, and quantity of demand.

Starting Date: 1968 Completion Date: 1970

2. Title: Location, Timing and Scale of Water Supply Investments in Developing Countries

Location: Chapel Hill, North Carolina, and Guatemala, Central America

Description: Development of cost minimization models for use by central planning agencies to determine optimal construction time and scale of water systems for unspecified number of towns in the presence of demand and budgetary constraints.

Starting Date: 1968 Completion Date: 1970

3. Title: Water Demand Study for Central America

Location: Chapel Hill, North Carolina, and Guatemala, Central America

Description: Collection and analysis of water demand data in newly served communities in Central America.

Starting Date: 1967 Completion Date: 1971

Dr. John Lyman

1. Title: Office of Marine Sciences

Location: North Carolina

Description: Director of Office of Marine Sciences, North Carolina, and Marine Science Coordinator, Consolidated University of North Carolina.

Starting Date: Completion Date: Continuing

Mr. Frederick E. McJunkin

1. Title: Surveillance of Drinking Water Quality

Location: Worldwide (Chapel Hill, North Carolina)

Description: Review, analysis, and development of methodology and protocol for insuring drinking water quality in developing countries.

Starting Date: 1969 Completion Date: 1970

2. Title: Engineering Measures for Control of Schistosomaisis

Location: Chapel Hill, North Carolina

Description: Preparation of state-of-art report on engineering measures for control of schistosomaisis and design of research program on same subject.

Starting Date: 1968 Completion Date: 1970

3. Title: Dual Water Systems

Location: Chapel Hill, North Carolina

Description: See Project 1, Daniel A. Okun, for description.

Starting Date: 1969 Completion Date: 1971

Dr. Daniel A. Okun and F. E. McJunkin

1. Title: Dual Water Systems

Location: Chapel Hill, North Carolina

Description: To investigate the circumstances in which it would be feasible to provide two separate urban water systems--potable and for all other purposes.

Starting Date: 1969 Completion Date: 1971

Dr. Charles R. O'Melia

1. Title: Transport Mechanisms in Water Filtration

Location: Chapel Hill, North Carolina

Description: A mathematical model for particle transport in water filtration has been developed. Experimental testing of the model is now being done. Results of the model and its experimental evaluation have application in water and waste water pollution, ion exchange, and adsorption with carbon columns.

Starting Date: 1968 Completion Date: 1971

2. Title: Adsorption of Hydrolyzed Metal Ions at Solid-solution Interfaces

Location: Chapel Hill, North Carolina

Description: Adsorption of hydrolyzed metal ions at solid-solution interfaces occurs in most natural systems and in many water and waste-water treatment processes. This research seeks to understand the mechanisms for this adsorption. Initial investigations suggest a coordination reaction, experimentation is required.

Starting Date: 1969 Completion Date: 1972

Dr. Jabbar K. Sherwani

1. Title: Sensitivity Analysis of Damage-Duration-Return Period Relationships of Low Flows

Location: Chapel Hill, North Carolina

Description: Economic consequences must explicitly be made a part of any criterion that governs water quality. As an extension of the present research project on low flows, it is proposed to arrive at optimum water quality management based on the total performance of a stream (not in the critical period alone) through a sensitivity analysis of damage-duration-return period relationships. To begin with, only two states of nature, i.e., magnitudes of low flow and temperatures will be considered. Because of the availability of

hydrologic data and considerable work on the potential economic development of the area, French Broad River in North Carolina will be taken as a model.

Starting Date: 1967 Completion Date: Continuing

2. Title: Computer Simulation of Aquifers of Coastal Plain of North Carolina

Location: Chapel Hill and Raleigh, North Carolina

Description: Investigations of the dynamic behavior of the Castle Hayne aquifer through:

(1) Specification of aquifer characteristics at different locations and of boundary configuration using general purpose analog and digital computers,

(2) Direct analog model of the groundwater system using a passive resistance-capacitance network,

(3) Use of passive analog and digital computers to predict response of the aquifer; i.e., to forecast the water-level changes under different assumed conditions of replenishment and extractance.

Starting Date: 1968 Completion Date: 1970

Dr. Charles M. Weiss

1. Title: Telemetering of Limnological Information

Location: Chapel Hill, North Carolina

Description: The development of sensing devices for rapid and sequential transmission of limnological information from University Lake to receivers in the Departmental laboratories. The received information is automatically coded for computer analysis.

Starting Date: 1960 Completion Date: Continuing

2. Title: Exchange of Phosphorus Species Between Living and Non-living Systems in Fresh Water Environments

Location: Chapel Hill, North Carolina

Description: An investigation of the short-term cycling of various phosphate species in several fresh-water environments to establish their desirability for algal growth.

Starting Date: 1966 Completion Date: 1969

3. Title: Water Quality Management of the New Hope Reservoir

Location: Chapel Hill and New Hope River Basin

Description: This project will develop a management plan for the New Hope Reservoir to prevent adverse effects and loss of beneficial uses because of water quality deterioration arising out of the large quantities of phosphorus and nitrogen discharged to the reservoir by tributary streams.

Starting Date: 1968 Completion Date: 1971

CONSOLIDATED UNIVERSITY OF NORTH CAROLINA

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

Department of Biology

Dr. Edward F. Menhinick (working with Dr. Charles Weiss of UNC-CH)

1. Title: Effect of Heated Effluents on Plankton

Location: Lake Norman

Description: Studies of species and numbers of plankton around Marshall Stream Plant

Starting Date: 1968 Completion Date: 1971

Department of Geography

Mr. James W. Clay

1. Title: Quality, Quantity, and Utilization of Available Water Resources in the Mexican Portion of the Colorado River Delta

Location: Baja, California

Description: The study examines and analyzes the problems of soil salinization and drainage resulting from the utilization of Colorado River water and the influence of these problems on the spatial structure of agricultural production.

Starting Date: 1965 Completion Date: Continuing

CONSOLIDATED UNIVERSITY OF NORTH CAROLINA

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

Department of Chemistry

Dr. Henry L. Anderson, II

1. Title: Thermodynamic Investigation of Mixed Electrolyte Solutions: Temperature Dependence

Location: Greensboro, North Carolina

Description: Measurement of the heats of mixing of salt mixtures at constant ionic strength as a function of temperature.

Starting Date: 1968 Completion Date: 1970

DUKE UNIVERSITY

Graduate School of Arts and Sciences

Department of Botany

Dr. T. W. Johnson, Jr.

1. Title: Systematics of Fungi in Marine Phytoplankton

   Location: Coastal North Carolina (Duke Marine Lab)

   Description: Collection and identification of marine "Phycomycetes." Occurrence and distribution of phytoplankton parasites, and their developmental morphology.

   Starting Date: 1964 Completion Date: 1970

2. Title: Aquatic Fungi of Icelandic Waters and Soil

   Location: Iceland

   Description: Collection, isolation, identification and ecological distribution of aquatic fungi (marine and fresh water).

   Starting Date: 1964 Completion Date: 1971

Dr. Paul J. Kramer

1. Title: Effects of Water Stress on Plant Processes

   Location: Durham, North Carolina

   Description: This includes measurements of effects of water stress on shoot and root growth, processes such as photosynthesis, respiration, translocation, absorption of salt and water and stomatal opening and study of causes for differences in susceptibility to injury from drought.

   Starting Date: Continuing Completion Date: Continuing

2. Title: Causes of Differences in Drought Resistance

   Location: Durham, North Carolina

   Description: An attempt to learn more precisely in terms of plant processes and structures why some species and varieties of plants are more drought resistant than others.

   Starting Date: 1969 Completion Date: Indefinite

Dr. Richard B. Searles

1. Title: Phenological Studies of Marine Algae Associated with Grass Beds

   Location: Duke University Department of Botany, Durham, North Carolina, and Duke Marine Laboratory, Beaufort, North Carolina

   Description: Collection and identification of algae from Zostera and Diplanthera beds in the Beaufort region throughout the year.

   Starting Date: 1968 Completion Date: Continuing

2. Title: Life History Studies of Phaeophyta from the Atlantic Coast of the United States

   Location: Durham and Beaufort, North Carolina

   Description: As indicated in title.

   Starting Date: 1966 Completion Date: 1969

3. Title: Cultural Studies of Marine Ulothricalian Green Algae

   Location: Durham and Beaufort, North Carolina

   Description: Taxonomic and cultural studies of Enteromorpa spp.

   Starting Date: 1969 Completion Date: Continuing

4. Title: Studies of Marine Algae from Off-shore Rock Outcrops

   Location: Durham and Beaufort, North Carolina

   Description: Collection and identification of attached marine algae growing on the rock outcrops off the Carolinas.

   Starting Date: 1968 Completion Date: Continuing

Department of Civil Engineering

Dr. Edward H. Bryan

1. Title: Quality of Storm Water Drainage from Urban Land Areas in North Carolina

   Location: Durham, North Carolina

   Description: A study of pollutants contributed to Third Fork Creek by runoff from a typical urban drainage basin. Characterization of quality of storm water runoff as a function of urban land use.

   Starting Date: 1968 Completion Date: 1971

2. Title: The Effect of Land Development on Stream Water Quality of New Hope Creek

Location: Durham--Orange County, North Carolina

Description: Characterization of stream water quality in New Hope Creek as a function of the present state of basin land development to serve as a basis for detection of changes when further development occurs.

Starting Date: 1968 Completion Date: 1971

Department of Geology

Dr. Orrin H. Pilkey

1. Title: Sedimentation on the North Carolina Continental Rise

Location: Durham and Beaufort, North Carolina

Description: This study involves the study of source areas, methods of transportation and mode deposition of continental rise material. Special emphasis is being placed on the genesis of sand layers and on the question of turbidity current versus contour current sedimentation.

Starting Date: 1967 Completion Date: Continuing

2. Title: Marine Geology of the Atlantic Shelf of the Southeastern United States

Location: Durham and Beaufort, North Carolina

Description: This is an investigation of the major sediment parameters between Cape Hatteras, North Carolina, and Cape Kennedy, Florida. Included in this is an inventory of possible economic mineral resources. Special emphasis is being placed on carbonate sedimentation.

Starting Date: 1965 Completion Date: Continuing

3. Title: Bathymetry on the North Carolina Continental Margin

Location: Durham and Beaufort, North Carolina

Description: Involves compilation of RV eastward soundings obtained on various research cruises and bathymetry of the continental slope and the continental rise is emphasized.

Starting Date: 1967 Completion Date: Continuing

4. Title: Construction of an Oceanographic Atlas of North Carolina

Location: Durham and Beaufort, North Carolina

Description: An atlas of local oceanographic information is being compiled for the purpose of aiding fishermen and also for high school science students. Included in the atlas will be topographic maps, maps of sediment distribution, currents and water temperatures, rock outcrops and wreck locations.

Starting Date: 1968 Completion Date: 1969

5. Title: Carbonate Sedimentation in the Tongue of the Ocean, Bahamas

Location: Durham and Beaufort, North Carolina

Description: This study relates to paleoecology and carbonate mineralogy to sea-level changes on the adjacent Bahama banks. Of particular interest has been the discovery of EOCN sediments in the Northeast Provident Channel.

Starting Date: 1967 Completion Date: 1969

6. Title: Sedimentation on the Eastern Insular Margin Off Barbados

Location: Durham and Beaufort, North Carolina

Description: This study involves detailed investigation of piston cores taken at intermediate depths off Barbados. The basis of this investigation is an unusually detailed bathometric map made by the U.S. Navy.

Starting Date: 1969 Completion Date: Continuing

Department of Zoology and Marine Laboratory

Dr. C. G. Bookhout (Laboratory Director)

1. Title: The Effects of Controlled Environmental Factors on the Development of Estuarine and Oceanic Crustacea

Location: Duke University Marine Laboratory, Beaufort, North Carolina

Description: Objectives: (1) To study, under controlled laboratory conditions, the larval development of crabs and barnacles; (2) to determine how temperature, salinity, light and diet affect molting and survival and (3) to study the distribution of crab larvae in offshore waters of North Carolina.

Starting Date: 1963 Completion Date: Continuing

Dr. John D. Costlow, Jr.

1. Title: The Effects and Controlled Environmental Factors on the Development and Endocrine Mechanisms of Crustacean Development

Location: Beaufort, North Carolina

Description: What endocrine organisms are present in crustacean larvae and what part do they play in development.

Starting Date: 1969 Completion Date: 1971

Dr. Bruce C. Coull

1. Title: Meiobenthos of the Continental Shelf Off North Carolina

Location: Beaufort, North Carolina

Description: Studying the organisms on the shelf, on the slope and in the deep sea from North Carolina to Bermuda.

Starting Date: 1968 Completion Date: 1970

Dr. Wanda S. Hunter

1. Title: Life History and Taxonomic Studies on Parasites of the Beaufort Area

Location: Beaufort, North Carolina

Description: Making a study of the parasites in marine organisms of the Beaufort area and studying the life history of tramatodes.

Starting Date: 1968 Completion Date: Continuing

Dr. Susan A. Huntsman

1. Title: Organic Excretion by Marine Phytoplankton

Location: Beaufort, North Carolina

Description: Measure excretion of organic compounds in natural and cultural environments.

Starting Date: 1967 Completion Date: 1969

Dr. Daniel A. Livingstone

1. Title: Paleohydrology of the Gregory Rift Valley Lakes

Location: Tanzania, Africa

Description: An investigation of changes in the hydrologic basins of Manyara, Eyasi, and Natron during the Pleistocene.

Starting Date: 1968 Completion Date: 1971

2. Title: Chemical Control Planktonic Diatoms

Location: Durham, North Carolina

Description: An investigation of the synamics of silica uptake and role of silicon in the determination of species composition and abundance of planktonic diatoms.

Starting Date: 1968 Completion Date: 1971

3. Title: Dynamics of Aquatic Ecosystems

Location: East Africa

Description: An investigation of the reactions between lakes and their changing environment during Pleistocene time.

Starting Date: 1969 Completion Date: 1971

Dr. Ian G. Macintyre

1. Title: Physiographic Features on the Outer Shelf and Upper Slope, Continental Margin, Southeastern United States

Location: Beaufort, North Carolina

Description: Studying the morphology and surface characteristics of these features to determine their origin and their possible relationship to pre-existing sea level.

Starting Date: 1967 Completion Date: 1970

2. Title: Recent Sedimentation in Onslow Bay

Location: Beaufort, North Carolina

Description: Studying the structures and composition of the sediments to understand the sedimentary process taking place in Onslow Bay.

Starting Date: 1968 Completion Date: Continuing

Dr. Unnsteinn Stefansson

1. Title: Seasonal Variations in the Physical and Chemical Properties of the Waters on the Continental Shelf off North Carolina

Location: Duke University Marine Laboratory, Beaufort, North Carolina

Description: Studies of seasonal variations on the continental shelf and in the slope region off North Carolina, between Oregon Inlet north of Cape Hatteras and N. River Inlet, Onslow Bay. The research includes studies of temperature and salinity distribution, dissolved oxygen, nutrients and ocean currents.

Starting Date: July 1965 Completion Date: Continuing

Dr. Richard C. Zingmark

1. Title: Studies on the Cardinal Events of Sexual Reproduction in Dinoflagellates

   Location: Beaufort, North Carolina

   Description: Making bi-monthly collections of phytoplankton off North Carolina with particular reference to dinoflagellates and in the laboratory will culture these and work out their life cycles and taxonomy.

   Starting Date: 1969 Completion Date: 1970

School of Forestry

Dr. Kenneth R. Knoerr

1. Title: Energy Sources for the Evaporation of Intercepted Precipitation

   Location: Duke University, Durham, North Carolina

   Description: Controlled environment and field studies of the energy balance of individual leaves to determine the primary sources of energy for the evaporation of intercepted precipitation.

   Starting Date: 1966 Completion Date: Continuing

2. Title: Application of the Energy Balance Approach to the Interpretation of Watershed Response

   Location: Franklin, North Carolina

   Description: A cooperative study with the U.S. Forest Service, Coweeta Hydrologic Laboratory, Franklin, North Carolina, with Mr. Lloyd W. Swift as principal investigator for the Forest Service. The study will evaluate the relationship between changes in the surface energy balance and changes in watershed yield produced by the removal of forest cover. These energy balance-water yield relationships will be investigated on both north and south facing watersheds to provide the maximum contrast in watershed energy supply.

   Starting Date: 1966 Completion Date: Continuing

Dr. Charles W. Ralston

1. Title: Nutrient Content of Groundwater in Wetland Forest Types

   Location: Santee Exp. Forest, Francis Marion N. F., South Carolina

Description: Study of variations in chemical composition of groundwater as related to wetland vegetation types and seasonal trends.

Starting Date: 1968 Completion Date: 1969

2. Title: Nutrient Balance of Coastal Forest Watersheds

Location: Santee Experimental Forest

Description: Study of nutrient additions and losses for three-gauged watersheds in the lower Coastal Plain in South Carolina.

Starting Date: 1968 Completion Date: 1969

EAST CAROLINA UNIVERSITY

School of Arts and Sciences

Department of Biology

Dr. Francis P. Belcik

1. Title: Comparative Studies of the Female Reproductive System in Parasitic Copepods

   Location: East Carolina University, Greenville, North Carolina

   Description: The internal reproductive system of various female parasitic copepods is being studied as an aid to classification and position.

   Starting Date: 1965 Completion Date: Continuing

Dr. Vincent J. Bellis

1. Title: Nutritional Requirements of Tar River Algae

   Location: East Carolina University, Greenville, North Carolina

   Description: Comparative growth of unialgal isolates on a variety of media containing organic and inorganic nitrogen and carbon sources.

   Starting Date: 1967 Completion Date: Continuing

2. Title: Relation of Estuarine Algae to Water Quality

   Location: Pamlico Estuary

   Description: To describe the spatial and temporal patterns of distribution among algae of the Pamlico River Estuary. Principal objectives will be met through existing computer analysis of existing data.

   Starting Date: 1969 Completion Date: 1970

Dr. Joseph G. Boyette

1. Title: Natural History of Striped Bass in the Tar-Pamlico River

   Location: Tar-Pamlico River System

   Description: This is a long-term study aimed at evaluating the striped bass population of the Tar-Pamlico System and determining factors influencing the population.

   Starting Date: 1965 Completion Date: Continuing

2. Title: Natural History and Ecology of Fishes Inhabiting Small Streams

Location: Eastern North Carolina

Description: Data are being gathered on pirate perch, and minnows, swamp fish, brook lamprey, and others.

Starting Date: 1967 Completion Date: Continuing

Dr. Graham J. Davis

1. Title: Factors Affecting Growth and Floral Initiation in Prosperpinaca palustris (Mermaid Weed)

Location: East Carolina University, Greenville, North Carolina

Description: Current research includes relation of root growth to flowering and effects of chemicals such as malathion, antigibberellins, and abscisic acid on flowering and growth.

Starting Date: 1960 Completion Date: Continuing

Dr. Takerv Ito

1. Title: Oxidative Phosphorylation in Thiobacillus Ferrooxidans

Location: Greenville, North Carolina

Description: Mechanism of phosphorylation coupled to electron transport in thiobacillus ferrooxidans, which pollutes mine water by large production of acid, is being studied.

Starting Date: 1967 Completion Date: Continuing

Dr. James S. McDaniel

1. Title: Nutrition of Free-swimming Larval Helminths

Location: Greenville, North Carolina (Coastal waters of variable salinity)

Description: An attempt to determine the effect of natural and altered water systems on the invasive stages of helminth life-cycles.

Starting Date: 1969 Completion Date: 1970

Dr. Edward P. Ryan

1. Title: Reproductive Biology of the Blue Crab

Location: Duke Marine Laboratory, Beaufort, North Carolina

Description: NSF Proposal submitted March 1966. Spermatogenesis and fertilization.

Starting Date: 1966 Completion Date: 1969

Department of Geology

Dr. A. Ray Jennings

1. Title: Ground-water Hydrology of North Carolina Coastal Plain

Location: North Carolina Coastal Plain

Description: A continuing study of the water quality and movement through Gretaceous and Tertiary aquifers.

Starting Date: 1968 Completion Date: Continuing

Dr. Michael P. O'Connor and Dr. Stanley R. Riggs

1. Title: Marine and Estuarine Geology of Roanoke Island and Vicinity

Location: Dare County, North Carolina

Description: This study is part of a larger program involving study of the modern estuarine sediments and processes to provide models useful in interpreting the tertiary stratigraphy of eastern North Carolina

Starting Date: 1968 Completion Date: Continuing

2. Title: Estuarine Geology and Ecology of the Pamlico River V and Northern Pamlico Sound.

Location: Beaufort, Pamlico and Hyde Counties, North Carolina

Description: This study is a part of a larger program involving study of the modern estuarine sediments and processes to provide models for interpreting the Tertiary stratigraphy of eastern North Carolina

Starting Date: 1968 Completion Date: Continuing

3. Title: Late Cretaceous and Tertiary Stratigraphy of Eastern North Carolina

Location: Eastern North Carolina

Description: A continuing study involving detailed lithological and stratigraphic investigation of the surface and quarry exposures to clarify the regional stratigraphic framework for eastern North Carolina.

Starting Date: 1968 Completion Date: Continuing

GUILFORD COLLEGE

Department of Biology

Dr. Robert R. Bryden

1. Title: Taxonomy of the Hydras Using Limnological Methods

Location: Several small lakes and ponds in the Piedmont of North Carolina

Description: The taxonomy of this small group of organisms is in very poor condition chiefly related to the fact that it is necessary to study reproducing forms in order to make final classifications. As a result of previous studies, this program attempts to re-examine the taxonomy of the hydras.

Starting Date: 1959 Completion Date: 1970

NORTH CAROLINA CENTRAL UNIVERSITY AT DURHAM

School of Arts and Sciences

Department of Biology

Dr. Nell Hirschberg

1. Title: Study on Leptospirosis

   Location: Durham, North Carolina

   Description: Separation of serum fractions in infected man and animals.

   Starting Date: 1965 Completion Date: 1970

2. Title: Distribution of Leptospires in Pond Waters

   Location: Durham, North Carolina

   Description: Analyze local waters in the Durham area.

   Starting Date: 1968 Completion Date: Continuing

PRIVATE INDUSTRY

PRIVATE INDUSTRY

Cone Mills Corporation

1. Title: Research on Textile Wastes

   Location: Greensboro, North Carolina

   Description: Continuous studies on treatment of textile wastes from finishing and dyeing and effect of change-over to biodegradable compounds on treatment.

   Starting Date: Continuing Completion Date: Continuing

2. Title: Research on Lint-bearing Textile Wastes

   Location: Haw River, North Carolina

   Description: Study of effect of large amounts of short fibers in wastes on treatment.

   Starting Date: Continuing Completion Date: Continuing

Duke Power Company

1. Title: Limnological Studies of Hydroelectric Impoundments

   Location: Catawba River, North and South Carolina

   Description: The effect of operation of reservoirs for hydroelectric purposes is investigated from the viewpoint of chemical water quality. Samples are taken at selected sites from each of twelve reservoirs on a monthly basis from November through April and on a biweekly basis from May through October. These samples are analyzed for dissolved oxygen, temperature, pH, turbidity, total iron, total manganese and biochemical oxygen demand. The results from these analyses are stored in the data bank program of Duke Power Company's electronic computer.

   Starting Date: 1959 Completion Date: Continuing

2. Title: A Study of the Physical and Biological Principles Relating to Power Plant Condenser Cooling Water Discharges

   Location: Lake Norman near Marshall Steam Station

   Description: The distribution and biological effects of cooling water discharged from a thermal power plant will be investigated by obtaining hydrographic, meteorological and biological data. These studies will attach scientific significance to some empirical factors used in predicting the size of heat dissipation areas at both proposed and existing thermal plants under various plant loading and meteorological conditions.

   Starting Date: 1966 Completion Date: Continuing

Ecusta Paper Division - Olin

1. Title: Study of Paper Mill Effluent

   Location: Pisgah Forest, North Carolina

   Description: Study of the effluent from a multi-machine paper mill and the development of means of sedimentation clarification.

   Starting Date: 1966 Completion Date: Continuing

Fiber Industries, Inc.

1. Title: Reuse of Plant Effluent and Cooling Water Blowdown Process Water

   Location: Shelby, North Carolina

   Description: This project involves the treatment of synthetic fiber process wastes and the in-plant reuse of this waste as process water. The treatment processes to be demonstrated include: (1) Plastic media for trickling filters, (2) disc miscrostrainer for algae removal, (3) activated carbon treatment, and (4) chromate removal from cooling water. The project will also include an evaluation of biocides for control of growths in cooling towers.

   Starting Date: 1968 Completion Date: 1970

Gold Kist Poultry Division, Cotton Producers Association (In cooperation with Dr. William M. Crosswhite and Associates, Department of Economics and Department of Food Science, North Carolina State University)

1. Title: Water and Waste Management in Poultry Processing

   Location: Durham, North Carolina

   Description: Demonstration project involving changes in plant equipment and operations for the in-plant control of water use and waste discharges. Includes the installation of equipment, evaluation of effects, determination of economic implications, and formulation of guides for the industry as a whole.

   Starting Date: 1969 Completion Date: 1971

Riegel Paper Corporation

1. Title: Development of Disposal Facilities for Kraft Pulping Sludge

   Location: Riegelwood, North Carolina

   Description: To develop most practical long-range means of disposing of primary clarifier sludge. Present lagoons require frequent cleaning. Among areas of interest are dry-piling, recovery and utilization.

   Starting Date: 1967 Completion Date: Continuing

STATE AGENCIES

STATE AGENCIES

Department of Administration

State Planning Task Force

1. Title: Highway Impact Study on Public Utilities in North Carolina Appalachia

   Location: Western North Carolina

   Description: Engineering evaluation of water resource potential in growth centers of Appalachia and its relationship to economic development in specific areas.

   Starting Date: 1967 Completion Date: Continuing

Department of Conservation and Development

Division of Commercial and Sports Fisheries

1. Title: Oyster Studies 2-6-R

   Location: Morehead City, North Carolina

   Description: To determine the optimum cultch material, spatial arrangements, and submergence-emergence relationship for the commercial production of seed and/or market oysters in North Carolina waters using three dimensional culture methods.

   Starting Date: 1965 Completion Date: 1969

2. Title: A Study of the Quality of Seafood Products 2-76-R

   Location: Raleigh, North Carolina, and Coastal Areas

   Description: To determine the effect of mechanical processing techniques on the quality of oysters, scallops and crabmeat.

   Starting Date: 1965 Completion Date: 1969

3. Title: Shrimp Studies

   Location: Morehead City, North Carolina

   Description: To obtain an understanding of the distribution of shrimp populations; growth, mortality, population-volume relationships and population dynamics in North Carolina and adjacent oceanic waters.

   Starting Date: 1966 Completion Date: 1969

4. Title: Population Estimation of Spawning Striped Bass, Roccus saxtilis, in the Roanoke River, Albemarle Sound, and Tar River AFC-1

Location: Roanoke River, Albemarle Sound, and Tar River, North Carolina

Description: To estimate the abundance of the striped bass in Roanoke River, and to determine the exploitation of this species by sport and commercial fishermen in the area. The population study will be implemented by tag and recapture methods, and the exploitation rates will be determined by creel census procedures.

Starting Date: 1966 Completion Date: 1969

(Contracted to the Department of Zoology, North Carolina State University)

5. Title: Factors Affecting Survival of Immature Striped Bass; AFC-4

Location: Edenton Fish Hatchery and North Carolina State University, Raleigh, North Carolina

Description: To determine the limits of water temperature, pH, and water hardness at which immature striped bass can survive, and to determine food habits of striped bass fry and fingerlings reared in hatchery conditions.

Starting Date: 1968 Completion Date: 1970

6. Title: Exploratory Fishery Program R/V Dan Moore

Location: Continental shelf waters of North Carolina

Description: State program to inventory the faunal components of commercial or potential commercial value off the North Carolina sea coast to determine their availability and suitability to established or new methods of harvesting.

Starting Date: 1968 Completion Date: Continuing

7. Title: Offshore Anadromous Fish Exploratory Program; AFC-5

Location: Continental shelf waters of North Carolina

Description: To acquire knowledge on the seasonal fish in ocean waters, with emphasis on the American shad and striped bass along the North Carolina Coast.

Starting Date: 1968 Completion Date: 1970

Division of Community Planning

1. Title: A Case Study Analysis of Four Sanitary Districts and Six Farmers Home Administration Water Corporations

   Location: Raleigh, North Carolina

   Description: A case study of two methods North Carolina rural and suburban areas have used to obtain water systems. Particular emphasis in the study is given to the relationship between these districts and corporations and existing units of local government in the area.

   Starting Date: 1968 Completion Date: 1969

Wildlife Resources Commission

Division of Game

1. Title: Investigations of Potential Management Areas

   Location: Statewide

   Description: To undertake investigations of wetland areas which are considered suitable for future development as waterfowl management areas.

   Starting Date: 1968 Completion Date: 1969

2. Title: Waterfowl Population Inventories

   Location: Coastal North Carolina

   Description: To determine waterfowl populations, trends, fluctuations and species compositions.

   Starting Date: 1968 Completion Date: 1969

3. Kill and Hunter Data

   Location: Currituck and Lake Mattamuskeet, North Carolina

   Description: To determine numbers and kinds of waterfowl killed, kill per hunter-day, average hunter-kill per season, total kills and crippling loss.

   Starting Date: 1968 Completion Date: 1969

4. Title: Special Investigations

   Location: Statewide

   Description: To investigate conditions which are reported or known to be adversely affecting waterfowl populations; to determine and report the causes or status of these conditions; and to recommend corrective practices when these can be determined.

Starting Date: 1968 Completion Date: 1969

5. Title: Waterfowl Banding

Location: Statewide

Description: To band waterfowl with special emphasis on wood ducks and black ducks.

Starting Date: 1968 Completion Date: 1969

6. Title: Experimental Management of Impounded Salt Marshes

Location: Gull Rock, Goose Creek, Pamlico Point and White Oak River Impoundments

Description: To determine the value of impounded salt marshes for waterfowl. To determine the practicability of this type of impoundment for refuges and public hunting areas in coastal North Carolina.

Starting Date: 1968 Completion Date: 1969

Division of Inland Fisheries

1. Title: The Biology of Forage Fishes of Acid-Water Lakes

Description: To determine the biology and ecological relationships of the forage fishes living in the natural acid lakes of eastern North Carolina and their adaptability for relocation to a comparable habitat currently lacking in forage species.

Starting Date: 1969 Completion Date: 1970

2. Title: Biology of the Roanoke Bass

Description: This study concerns the Roanoke bass in North Carolina with particular reference to its basic biology, habitat requirements and limitations, as well as its adaptability to artificial propagation and its potential as a game fish.

Starting Date: 1968 Completion Date: 1969

3. Title: The Biology of the Threadfin Shad in North Carolina

Description: This study concerns the threadfin shad in North Carolina waters with particular reference to its basic biology, ecological requirements and limitations, and its role as a forage fish particularly in small lakes under intensive fish management.

Starting Date: 1969 Completion Date: 1970

4. Title: The Toxicity and Detoxification of the Rotenone Formulations Used in Fish Management

Description: To determine the relative toxicity, constancy, and susceptibility to detoxification possessed by the various commercial rotenone formulations used in fish management and to determine the effects of temperature, water quality, and other pertinent variables upon these factors.

Starting Date: 1969 Completion Date: 1970

5. Title: Effect of Temperature Changes Upon Developing Striped Bass Eggs and Fry

Description: The objectives of this study are to determine the threshhold points at which various natural environmental physical and chemical factors--both in shock and continuous exposure--adversely affect the development of striped bass eggs and fry.

Starting Date: 1969 Completion Date: 1970

6. Title: Trout Fishery Surveillance

Description: To obtain basic catch data required for the effective and economical management of North Carolina trout fishery.

Starting Date: 1969 Completion Date: 1970

7. Title: Small-Lake Management

Description: To realize the full recreational potential of the fisheries resources of lentic waters open to public fishing in North Carolina through the application of effective fish-management techniques.

Starting Date: 1969 Completion Date: 1970

8. Title: Forage Introductions

Description: To realize the full recreational potential of the fisheries resources of lentic waters open to public fishing in North Carolina through the application of effective fish-management techniques.

Starting Date: 1969 Completion Date: 1970

9. Title: Supplemental Feeding of Warm-Water Fishes

Description: To stimulate the production of warm-water fishes of an acceptable size for the angler by supplemental feeding in an otherwise natural situation.

Starting Date: 1969 Completion Date: 1970

10. Title: Federal Watershed Improvement Projects

Description: To prevent to the degree possible, and otherwise to plan acceptable mitigation measures for, the destruction of game-fish habitat by Federally sponsored Watershed Improvement Projects.

Starting Date: 1969 Completion Date: 1970

11. Title: Effects of Stored Pulp-Mill Waste Releases Upon Chowan River Fishes

Description: (1) To determine migrations of Chowan River resident fishes in relation to the annual releases of stored pulp-mill wastes. (2) To determine the toxic properties of pulp-mill wastes under conditions of prolonged storage and in relation to changes in the chemical and physical properties of these wastes.

Starting Date: 1969 Completion Date: 1970

12. Title: Effects of Thermal Pollution Upon Lake Norman Fishes

Description: To isolate and evaluate the separate effects of the increased temperatures, attraction currents, and seasonally depressed dissolved oxygen concentrations upon Lake Norman fishes as found specifically within the discharge arm from Plant Marshall, and generally within the reservoir proper.

Starting Date: 1969 Completion Date: 1970

13. Title: Effects of Impoundment Upon Upper Yadkin River Fishes

Description: To determine the relative abundance of the principal fishes present in the W. Kerr Scott Reservoir by year-classes, their seasonal habitat and habitat preferences, food habits, growth rates and annual reproductive success. In addition, measures of the fishing success and catch composition will be attempted.

Starting Date: 1969 Completion Date: 1970

FEDERAL AGENCIES

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U.S. Department of Agriculture

Forest Service

Southeastern Forest Experiment Station

1. Title: Wetland Forest Soil Improvement and Hydrologic Effects

   Location: Charleston, South Carolina

   Description: Studies to develop effective and reliable water control and soil management techniques through increased knowledge of the hydrology, soil properties and soil-water-plant relations of wetland forests.

   Starting Date: Continuing Completion Date: Continuing

2. Title: Water Yield Improvement - Southern Appalachians

   Location: Coweeta Hydrologic Laboratory, Franklin, North Carolina

   Description: Basic research in watershed relationship and processes, the mechanics of water behavior as influenced by forest vegetation, soils, atmospheric factors, and stream hydraulics; the development of techniques for management of watershed lands for improved water yield and other purposes.

   Starting Date: Continuing Completion Date: Continuing

Soil Conservation Service

1. Title: Ahoskie Creek Watershed Study

   Location: Hertford, Bertie and Northampton Counties

   Description: A cooperative activity by the SCS, ARS, USGS and North Carolina Department of Water Resources to collect, analyze, interpret and report basic data on rainfall-runoff relationships, hydrograph characteristics, crop distribution and yields, and channel behavior with respect to the rate of aggradation or degradation as these are affected by project works of improvement. The relationships established will be used in planning and evaluating proposed soil and water conservation measures, particularly P.L. 566 watershed projects in the lower Coastal Plain area of the Southeastern United States.

   Starting Date: 1963 Completion Date: 1972

U.S. Department of the Army

Coastal Engineering Research Center, Washington, D. C.

1. Title: Field Study of Ocean Bar Response to Dredging Within the Throat of an Inlet

   Location: Carolina Beach, North Carolina

   Description: A 150,000-cubic yard deposition basin was dredged within the throat of Carolina Beach Inlet for the purpose of trapping bed load material. By trapping this material, the channels across the ocean bar could possibly maintain a deeper depth.

   Starting Date: 1967 Completion Date: Continuing

2. Title: Experimental Study of Dune Building

   Location: Core Banks, North Carolina

   Description: The study consists of the construction of various types of sand fences and the planting of several species of grass to determine their effectiveness in building a dune by trapping windblown sand.

   Starting Date: 1957 Completion Date: Continuing

3. Title: Low-weir Jetty

   Location: Wrightsville Beach, North Carolina

   Description: A jetty, with a 1000-foot weir section of concrete sheet piles, was constructed on the north side of Masonboro Inlet. The weir section allows littoral material to pass over the jetty and be deposited in a deposition basin located between the jetty and the navigation channel. When full, material is dredged by pipeline dredge from the deposition basin to the downdrift beach.

   Starting Date: 1966 Completion Date: Continuing

4. Title: Weight Test on New Bern Shell Limestone

   Location: Fort Macon State Park, North Carolina

   Description: Several stones are subjected to ocean environment and are periodically weighed to determine amount and rate of weight loss.

   Starting Date: 1967 Completion Date: Continuing

Department of the Interior

Fish and Wildlife Service - Bureau of Commercial Fisheries

Biological Laboratory, Beaufort, North Carolina

1. Title: Menhaden Program

   Location: Inshore and Offshore Waters Along Atlantic and Gulf Coasts

   Description: Current and future research to: Determine the chronology, distribution and intensity of menhaden spawning; assess the reproductive potential of Atlantic and Gulf menhadens; resolve the problem of species convergence off Florida; establish criteria for distinguishing menhaden eggs and larvae; test hypotheses of population heterogeneity in Atlantic and Gulf menhaden; determine year-to-year distribution and abundance of young menhaden in Atlantic and Gulf Coast estuaries; describe the role of the estuarine environment in regulating year-class size and development; and assess the influence of changes in the oceanic environment on spawning activity as well as on larval growth and survival.

   Starting Date: 1955 Completion Date: Continuing

2. Title: Menhaden Population Dynamics Program

   Location: Atlantic and Gulf Coasts out of Beaufort, North Carolina

   Description: Activities include: Sampling Atlantic and Gulf menhaden landings for data on resource composition in terms of species, size, age, and sex; collection of catch and fishing effort statistics; reduction and analysis (via ADP) of fishery statistics and biometrical data for reports on resource status, outlook and management.

   Starting Date: 1955 Completion Date: Continuing

3. Title: Menhaden Tagging Program

   Location: Atlantic Coast: Chesapeake Bay and South Atlantic States

   Description: Project that involves application of the mark-recapture technique over a large portion of the Atlantic menhaden fishery. Large numbers of young menhaden are to be marked with internal ferromagnetic tags, whose recovery on magnets in fish reduction plants will provide data on menhaden movements, growth, and mortality.

   Starting Date: 1966 Completion Date: 1978

Radiobiological Laboratory, Beaufort, North Carolina

1. Title: Estuarine Hydrography

   Location: Beaufort, North Carolina

   Description: Studies of flushing rates of estuaries and circulation patterns in estuaries and nearshore waters in the vicinity of Beaufort, North Carolina.

   Starting Date: 1969 Completion Date: 1978

2. Title: Elemental Cycling

   Location: Beaufort, North Carolina

   Description: Measurement of trace metal composition of estuarine organisms, sediment, and water. Turnover rates of trace metals in selected estuarine organisms and rates of exchange of these metals between estuarine sediments and water are measured.

   Starting Date: 1968 Completion Date: Continuing

3. Title: Food Chain Analysis

   Location: Beaufort, North Carolina

   Description: Study of the character of food chains and measurement of the flow of energy and materials in the food chains in estuarine waters near Beaufort, North Carolina. Present studies are concerned chiefly with the rate of plant and herbivore production and with the devleopment of mathematical models of food chains.

   Starting Date: 1968 Completion Date: Continuing

4. Title: Estuarine Field Studies

   Location: Beaufort, North Carolina

   Description: Collect biological field samples for the determination of species distribution and abundance. Maintains field equipment and assists in the conducting of other estuarine field studies.

   Starting Date: 1968 Completion Date: Continuing

5. Title: Energy Transfer

   Location: Beaufort, North Carolina

   Description: Studies of seasonal and structural changes in species composition and biomass, energy transfer routes, and efficiency of transfer in estuaries near Beaufort, North Carolina.

   Starting Date: 1968 Completion Date: Continuing

6. Title: Environmental Interactions

   Location: Beaufort, North Carolina

   Description: Determine the manner in which pollutants such as radioactive wastes, pesticides, or thermal additions change the productivity of the estuarine ecosystem. Describe the interactions of environmental factors--both natural and introduced--on the survival, growth, reproduction, and metabolism of important organisms.

   Starting Date: 1968 Completion Date: Continuing

U.S. Geological Survey

1. Title: Structural Architecture, Geologic Framework, and Permeability Distribution of the Atlantic Coastal Plain: Part I, North Carolina to New York

   Location: Atlantic Coastal Plain - North Carolina to New York

   Description: To determine the external and internal geometry, and the resultant permeability zonation for geologic units in the Atlantic Coastal Plain for the purpose of establishing the flow-distribution and storage characteristics of the area's aquifer systems.

   Starting Date: 1964 Completion Date: 1969

2. Title: Classification of Hydrogeologic Settings

   Location: Raleigh, North Carolina

   Description: To classify and evaluate selected distinctive hydrogeologic conditions and settings. A type of setting that is common in North Carolina and other places of the world is that of the Waccamaw River Basin. Another type being studied is near Harrisburg, North Carolina. The objective is to expedite and clarify evaluation of many hydrologic features.

   Starting Date: 1967 Completion Date: 1970

3. Title: Ground-water Resources of the Cape Hatteras National Seashore Recreational Area

   Location: Outer Banks of North Carolina

   Description: On the basis of ground-water levels and chloride content under static and pumping conditions; observations of height and width of the Banks; and history of storms, potential available water supply will be evaluated.

   Starting Date: 1968 Completion Date: 1972

4. Title: Ground Water in the Piedmont and Blue Ridge Provinces

   Location: Raleigh, North Carolina

   Description: The pattern of occurrence of ground water in the Piedmont and Blue Ridge Provinces is similar in parts of all drainage basins of the region, but the occurrence of ground water locally is difficult to evaluate because of local ranges in degree of permeability. Both local and regional studies are being made.

   Starting Date: 1966 Completion Date: 1971

5. Title: Hydrology of Estuaries in North Carolina

   Location: Coastal Areas of North Carolina

   Description: Available data on tidal flows, chloride content, density currents, dispersion factors, and other pertinent estuarine factors are being studied to develop information needed to plan industrial and municipal development in coastal areas.

   Starting Date: 1967 Completion Date: 1969

6. Title: Flood Plain Inundation and Urbanization Studies

   Location: Charlotte, Durham, Lenoir, Morganton, Winston-Salem

   Description: To evaluate the effects of urban growth and development on flood runoff. The principal emphasis is on evaluating the effects of impervious areas on flood stage and discharge.

   Starting Date: 1964 Completion Date: 1973

7. Title: Temperatures of Surface Water in North Carolina

   Location: Statewide

   Description: Using extensive existing records of air and water temperatures, normal seasonal values of water temperature will be determined for different sizes and types of streams in all areas of North Carolina.

   Starting Date: 1967 Completion Date: 1969

8. Title: Chemical Quality of Surface Water in North Carolina

   Location: Statewide

   Description: The mass of data on the chemical constituents of streams will be studied and meaningful parameters will be extracted. Variation of chemical quality with stage will be generalized and arealized.

   Starting Date: 1968 Completion Date: 1970

9. Title: Water Resources of Great Smoky Mountain National Park

   Location: Great Smoky Mountain National Park

   Description: Using pumping tests, streamflow measurements, and other observations of the physical and hydrologic environment, relationships between ground water and low-flow yields in an Appalachian setting will be studied. An aerial picture of the quality and quantity of water resources will be developed.

   Starting Date: 1966 Completion Date: 1969

10. Title: Evaporation and Thermal Loading Analysis - Roxboro Lake

    Location: Roxboro Lake, Person County

    Description: To evaluate natural lake evaporation utilizing mass-transfer and water-budget techniques, and to assess general reservoir response to thermal loading with special emphasis on delineation of heat patterns (spatial and temporal) and determination of forced evaporation.

    Starting Date: 1964 Completion Date: 1971

11. Title: Thermal Study of Dan River

    Location: Dan River, Rockingham County

    Description: Measure intake and discharge water temperatures at Dan River Steam-electric generating plant and at selected points along Dan River below plant, to determine heat load, degree and distribution of heat in stream, and recovery and heat dissipation rates.

    Starting Date: 1969 Completion Date: 1970

Tennessee Valley Authority

1. Title: Effects of Agriculturally Important Vegetative Covers Upon Runoff from Principal Soils in Western North Carolina

   Location: Waynesville, North Carolina

   Description: Four small agricultural watersheds are used in measuring the effects of types of cover upon soil moisture, evapotranspiration, runoff and ground-water levels. Cooperative with North Carolina State University.

   Starting Date: 1948 Completion Date: 1970

2. Title: Effect of System of Small Dams on Flood Reduction

   Location: Tennessee Valley

Description: This research is on the effect of systems of small dams on flood reduction as well as the combined effect of improvements in watershed management and dams on water yield, erosion, and sedimentation.

Starting Date: Continuing Completion Date: Continuing

3. Title: Investigation of Flood Control Benefit Rates

Location: Tennessee Valley

Description: The investigation of the physical and economic effects of flooding on agriculture with the objective of improving the information used in evaluating flood control projects benefiting agriculture. Emphasis is on improved methods for secondary and enhancement benefits.

Starting Date: Continuing Completion Date: Continuing

4. Title: Upper Bear Creek Experimental Project

Location: Northwestern Alabama

Description: The watershed research project is being conducted to develop numeric procedures (mathematical models) to project and expand basic data from smaller headwater areas downstream, to progressively parts of the same watershed, to provide information which can be transferred from one watershed to an ungaged watershed, and to evaluate alternate watershed programs.

Starting Date: 1962 Completion Date: 1972

5. Title: Thermal Phenomena in Hydrologic Systems

Location: Tennessee Valley

Description: The purpose of the study is to develop means of predicting water temperatures downstream from a source of temperature change as a function of time and distance from the source.

Starting Date: Continuing Completion Date: Continuing

6. Title: Coliform Bacteria From Unpolluted Land Areas

Location: Tennessee Valley

Description: Research conducted on controlled land areas free of known sources of fecal pollution to determine the contribution of fecal and nonfecal sources from various types of soils and types of land cover.

Starting Date: 1965 Completion Date: 1970

7. Title: Determination of Effects of Reservoirs on Water Quality

Location: Tennessee Valley

Description: Identification and quantitative evaluation of changes or effects on water quality brought about by impoundment in reservoirs. Methods are being devised to predict reservoir quality factors, such as stratification.

Starting Date: Continuing Completion Date: Continuing

8. Title: Reaeration Characteristics of Howell-Bunger Valves

Location: Tennessee Valley

Description: The purpose is to determine the efficiency of Howell-Bunger valves for increasing the dissolved oxygen content of oxygen deficient waters discharged from reservoirs.

Starting Date: 1966 Completion Date: Continuing

9. Title: Research in Numerical Flood Routing Procedures

Location: Tennessee Valley

Description: A mathematical model (Simulated Open Channel Hydraulics - SOCH) based upon the basic differential equations of continuity and momentum which describe unsteady, non-uniform open channel flow has been developed. Field measurements of stage and velocity have been successfully reproduced, providing verification for the model and computational scheme. Research is being directed toward broadening the applicability of the model and toward other computational schemes.

Starting Date: Continuing Completion Date: Continuing

10. Title: Effects of Impoundment on Water Quality

Location: Tennessee Valley

Description: Research is being done to develop or improve engineering methods which can be used in planning, designing, and operating river and reservoir control structures associated with multipurpose water resources projects for management of water quality as well as quantities. Supporting studies on eutrophication of streams and reservoirs are being conducted.

Starting Date: Continuing Completion Date: Continuing

11. Title: Factors that Control the Growth of Aquatic Weeds

Location: Tennessee Valley

Description: The role of factors that control rates of growth and total standing crops of both planktonic and benthic plants is being studied in streams, reservoirs, and in the laboratory.

Starting Date: 1967 Completion Date: Continuing

12. Title: Effects of Temperature on Aquatic Life

Location: Tennessee Valley

Description: The effects are being studied of heated waters discharged to streams, lakes, and reservoirs on reproduction and growth of native warmwater fish and their supporting food chain organisms.

Starting Date: 1968 Completion Date: Continuing

13. Title: Coal Strip-mine Watershed Demonstration

Location: Northeastern Alabama

Description: Research to determine the effect of strip-mining and subsequent reclamation practices upon the water resource and aquatic life of a small watershed. The project includes hydrologic observations, water-quality analyses, and ecological studies.

Starting Date: 1968 Completion Date: Continuing

14. Title: Efficiency of Fertilizer Use as Affected by Removal in Runoff and Drainage Water

Location: Western North Carolina

Description: This project will determine the extent to which fertilizer constituents are removed from a watershed in surface runoff and ground-water flow, so that judgments may be made as to the efficiency of fertilizer use and the chemical quality of downstream surface waters.

Starting Date: 1968 Completion Date: 1971

Note: While some of the TVA projects are not located within North Carolina, they were included because of their obvious interest to the State and its water resources program.