The federal funding of the Center has decreased this year. This and the inflation have left the Center with less and less money available for funding. However, the Center's staff is working hard at submitting new proposals for research. The District of Columbia has present issues that need to be solved. They include Anacostia River pollution, non-point source problems, ground water protection, sludge disposals and institutional management projects. The D.C. Water Resources Research Center is funding 5 projects this year. Most of these projects address the issues mentioned above, specially the Anacostia River.

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**New Funded Research Projects Focus on the Anacostia River**

**1992-1993 New Researches Project Summaries**

*Water Quality Management and Control in the Washington Metropolitan Area.*

*Duration: August 1992 to July 1993*


Water Resources Management in the District of Columbia is very complex. Several agencies and organizations are deeply involved in the water resources management activities of the city and the region. They include federal agencies, state and local organizations, regional and interstate organizations, private and non-profit groups. Furthermore, besides the strong federal involvement in the city, the District agencies are called on to function simultaneously as city, county and state agencies. This study will identify potential problems and barriers that need to be overcome for a more effective management of the water resources in Washington, D.C.

*Biomass and Production of Benthos and Sediments in the Anacostia River*

*Duration: August 1992 to July 1993*

*Investigator: Dr. Victoria C. Guerrero, University of the District of Columbia*

Human activity has changed the concentration of the nutrients above natural levels, accelerating and increasing algal growth and eutrophication. Other activities such as extensive litter and open dumping, as well as accumulation of non-biodegradable trash and litter, also contributed to the change in the river's biotic resources (Guerrero, 1991). These activities combined with natural biochemical and geological processes have created serious problems on the river's load. Sedimentation build-up is found in all locations.

The study will provide essential information on biomass production, quantitative analysis of the distribution and abundance of benthic organisms, as well as provide essential information on the value of restoring the benthic macroinvertebrate community.
A New Method To Predict Volatile Organic Hydrocarbon Migration In The Unsaturated Zone And Its Application To The District of Columbia

Duration: August 1992 to July 1993
Investigators: Dr. Timothy Kao, Dr. Gordon M. Matheson, V. Sreenivas, The Catholic University of America.

Volatile gas flow in the unsaturated zone is an important consideration when dealing with leaking underground tanks storing Volatile Organic Compounds (VOC's). VOC's in the form of petroleum hydrocarbons are the most common products released from underground storage tanks (EPA, 1988a). Technologies to evaluate and remediate releases of VOC's into soils are not well understood or developed, because critical design parameters involving fluid and gas flow remain poorly defined (EPA/530/UST-88).

An understanding of the transport process as related to the fate of VOC's is critical for the assessment of the extent of contamination in the unsaturated zone. A substantial theoretical basis has been developed for multiphase fluid flow through a porous medium. Migration of the fluid and gas phases, however, has not been adequately addressed (Abriola&Pinder 1985). This is largely because the key parameters for evaluating fluid and gas flow are non-linear and difficult to accurately quantify considering the wide variation of naturally occurring materials. This lack of understanding of key parameters is exemplified by the existing technology of Soil Vapor Extraction remediation (SVE). These systems appear simple in design and operation, yet their design currently relies on empirical guidelines that may or may not be applicable to the geologic site conditions in a particular location (EPA/540/1-88/001).

More practical and cost effective methods to delineate VOC contamination under different hydrogeological conditions is required for effective remediation of contamination. No methods are available for predictive analysis of unsaturated soil contamination and current technology requires site soils to be sampled directly to establish the degree and extent of contamination (EPA/540/1-88/001). The proposed research will attempt to define a theoretical and practical basis for the delineation of the extent of gas VOC flow in stratified unsaturated soils.

The results of this research will provide a better methodology for predicting the extent of VOC contamination in unsaturated soils in the District of Columbia. Given the highly complex geologic conditions in the District and the high density of potential VOC contamination sites, specific predictive tools based on local conditions will help both in the definition of the VOC contamination problem and the development of cost effective remediation alternatives. This combination of theoretical studies, laboratory studies, and field research will produce the needed predictive tool for use by industry and regulatory officials.

Chemical Composition and Speciation of Tributyltin Compounds in Estuarine Sediments

Duration: August 1992 to July 1993
Investigators: Dr. Leopold May, The Catholic University of America, and Dr. George Fag, University of the District of Columbia.

Organotin compounds, such as the tributyltin compounds, still are allowed to be used as antifoulants in marine paints on marine craft longer than 25 m contributing to the problem of water quality in the waterways of this area. The information is still limited on the speciation of these toxic compounds in sediments found in the waterways.

A knowledge of the products of such reactions would aid those who are making decisions concerning the future use of tributyltin compounds as antifoulants in marine paints. It also would be of value for those paint companies who are manufacturing marine paints and would assist them in determining which tributyltin compounds to use.

The purpose of the proposed research is to determine the relationship between the reactions of tributyltin compounds in anaerobic and aerobic sediments and the chemical composition of the sediments. The chemical constituents of interest are those that exist in various oxidation states, for example iron. During the grant period, it will be determined which of these constituents are related to the reactions of the tributyltin compounds with different sediments that lead to different products.

Lead Concentration Profile and Impact Analysis of Drinking Water in D.C.

Duration: August 1992 to July 1993
Investigator: Dr. Kwamena Ocran, Howard University.

In recent years, the public and the Congress have become highly concerned about the quality and safety of drinking water. The list of substances reported to contaminate water is extensive and includes all classes of chemical materials. Additionally, it includes metals, inorganic and synthetic organic compounds. Metals, such as lead, have the greatest potential for inhibiting the functioning of enzymes, thereby causing adverse
physiological and neurological effects. The Secretary of Health and Human Services, Louis Sullivan, has stated that lead is the most important environmental health problem for American children. Therefore, this study will focus on lead including water fountains in schools.

Information Dissemination / Technology Transfer

*Duration: August 1, 1992 - July 31, 1993*

*Investigators: Mr. Hannaham, D.C. Water Resources Research Center, Prof. O' Connor, Environmental Science Dept., UDC, Mr. Robinson, D.C. Water Resources Research Center, staff.*

The information transfer component will be carried out through a variety of activities including seminars, exhibits, distribution of publications, and the release of the Center's quarterly newsletter "Water Highlights". Many of the Center's activities will be jointly undertaken with other local government agencies, regional organizations, and educational institutions through projects conducted both on and off campus. The Center will publish and distribute several reference documents and brochures of general interest and continue to make water resources information available on request to university faculty, students and the regional public.

The DC-WRRC sponsors a variety of public outreach activities and events, including conferences and seminars, water resources facilities tours and special environmental education programs for DC students.

The DCWRRC also sponsors special awards for outstanding student water research projects presented at the annual DC Science Fair. The Center aims at a multi faceted target audience to disseminate its information. In addition to the University faculty and students and city managers, the District of Columbia, as an urban institution has a special inner city population that needs to be reached to promote an increased awareness of water and other environmental problems.

Information Management Systems

*Duration: August 1992 to July 1993*

*Investigator: Water Resources Research Center Staff*

There is a large number of water organizations involved in water resources management in Washington, DC and its metropolitan region. These are: federal water agencies, state and local water resources-related agencies, regional organizations, and interstate commissions. In addition to these organizations with direct management responsibilities, there are numerous other groups, which are involved. These groups include environmental interest, outdoor recreation, and research, etc. Clearly their interaction has a significant effect on the efficiency of water resources projects and quality control. One of the most important issues of consideration between these agencies is management of the information collected. This information needs to be easily accessible by the agencies.

Adding to its existing inventory of computer hardware and software, the Center has acquired a CD-Drive to increase its capability of handling a large volume of data. The Center will be able to store and manage DC water resources information and to update and/or prepare computerized directories.

The Center is working on gathering a comprehensive information base dealing with the water resources of Washington, D.C. The goal of the Center is to provide initial steps for the development of a centralized system for water management using the computer as a planning tool.

The information that will be maintained in the information system will include but not limited to the following: Basic statistics (Population Income), Water Data, Directory of Expertise, Directory of Organizations, Bibliography, Water Environmental Information Sources, Glossary, Acronyms, Anacostia Brochures, etc.

1992-1993 Continuing Research

**Ground Water Assessment in The District of Columbia**

*Investigators: Dr. Ham6 Watt, Dr. Fred Chang, Prof. James O’Connor, Dr. Clarence Wade, and Ms. Jutta Schneider*

This project funded by the Department of Consumer and Regulatory Affairs is now in its second phase. The main purpose of the project is to collect data of sufficient quality to enable the District to achieve its goal for better protecting and managing the ground water resources of the District.

Remarkable accomplishments have been done in this project, which culminated in selecting sites and drilling a dozen of wells. The wells were drilled at the following sites: - Watts Branch, N.E. - Golf Course, N.W. (near 16th Street) - New York Ave., Delacarlia.
Drilling is now completed and a comprehensive sampling of the ground water has begun. About thirty-five parameters will be screened following stringent EPA requirements.

Urban Storm water Management and Sediment Control Clearinghouse

Investigators: Dr. Ham6 Watt, Dr. Fred Chang and Mr. Mohammed Yusuf

The DC WRRC for the Development and Implementation of Urban Storm water Management and Sediment Control Clearinghouse have received a grant. The funding agency is The Soil Resource Branch, D.C. Department of Consumer and Regulatory Affairs. This grant will be renewed annually, in the amount of $35,000.

The purpose of the Clearinghouse would be to assemble and distribute technical policy information on urban non-point source issues to interested parties and Chesapeake Bay Program agencies to help in the development and successful implementation of erosion and urban runoff control programs. The Clearinghouse would provide among other things: examples of performance standards and construction specifications for urban best management practices (BMPs), including emerging technologies; coordinate related information on Bay area research and monitoring efforts in urban runoff and sediment control; and management support services, including costs. The University has already identified a permanent space to establish the Clearinghouse.

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