

Louisiana Water Resources Research Institute
Program Evaluation Report
Fiscal Years 1998–2002

Submitted By

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To:

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Preface

The Louisiana Water Resources Research Institute receives an annual Federal matching grant as authorized by section 104 of the Water Resources Research Act of 1984 (Public Law 98-242) as amended by Public Law 101-397, Public Law 104-147, and Public Law 106-374. Section 104 of the Act requires that the Secretary of the Interior "conduct a careful and detailed evaluation of each institute at least once every 5 years to determine that the quality and relevance of its water resources research and its effectiveness as an institution for planning, conducting, and arranging for research warrants its continued support under this section." The U.S. Geological Survey (USGS), Department of the Interior, administers the provisions of the Act. This evaluation report describes, in the format prescribed by the USGS, the research, training, and information transfer activities supported by the section 104 grants and required matching funds during fiscal years 1998 through 2002.

Program Evaluation Report

Introduction

The Water Resource Problems of Louisiana

Louisiana has an abundance of water resources, and while reaping their benefits, also faces complex and crucial water problems. Louisiana's present water resources must be effectively managed, and the quality of these resources must be responsibly protected. A fundamental necessity is to assure continued availability and usability of the state's water supply for future generations. Specifically, Louisiana faces five major issues that threaten the quality of the state's water supply, which are also subsets of the southeastern/island region priorities:

Nonpoint sources of pollution are estimated to account for approximately one-half of Louisiana's pollution. Because of the potential impact of this pollution and the need to mitigate its effects while maintaining the state's extensive agricultural base and coastal zones, continued research is needed in the area of nonpoint issues. Louisiana's regulatory agencies are addressing non-point source problems through the development of waste load allocation models or total maximum daily load (TMDL) calculations. There are serious technical issues that still require resolution to insure that progress is made in solving the non-point source problem.

Louisiana's vast wetlands make up approximately 40% of the nation's wetlands. These areas are composed of very sensitive and often delicately balanced ecosystems which make them particularly vulnerable to contamination or destruction resulting both from human activities and from natural occurrences. Understanding these threats and finding management alternatives for the state's unique wetland resources are priority issues needing attention.

Water resources planning and management are ever-present dilemmas for Louisiana. Severe flooding of urban and residential areas periodically causes economic loss and human suffering, yet solutions to flooding problems can be problems in themselves. Water supply issues have also recently a focus of concern. Despite the abundance of resources, several aquifers have been in perennial overdraft, including the Chicot aquifer. Louisiana passed its first legislation that restricts groundwater use in the past year. Water resources and environmental issues are intricately interconnected; therefore, changes in one aspect produce a corresponding responsive change in another. Further study is needed to understand these relationships.

Water quality protection, particularly of ground water resources, is an area of concern in Louisiana. Researchers are beginning to see contamination in drinking water supplies that was not present in the past. Delineating aquifer recharge areas, understanding the impacts of industrial activities on water resources, evaluating nonpoint sources of pollution, and exploring protection alternatives are issues at the forefront.

Wastewater management has been a long-standing issue in Louisiana. The problem of wastewater management focuses primarily on rural and agricultural wastewater and the high costs for conventional types of wastewater treatment as found in the petrochemical industry.

Louisiana Water Resources Research Institute: An Overview

Established by the 1964 Federal Water Resources Research Act, the Louisiana Water Resources Research Institute (LWRRI) strives to find effective engineering solutions to present and future water resources problems. LWRRI endeavors to meet the water resources research needs of the state and region with research contributing to the water research needs on a national scale. The Institute, located at Louisiana State University (LSU), is one of fifty-four institutes administered through the U.S. Geological Survey.

The Integrated Structure of the Institute

An adequate understanding of LWRRI requires an awareness that the Institute is now integrated with other centers, institutes, and academic departments within the College of Engineering at Louisiana State University in an arrangement that emphasizes and utilizes the strengths of all involved. Because of this integration, it has access to many resources, such as facilities, equipment, and researchers, that it would not have otherwise.

In order to become more effective in obtaining higher levels of federal research funding, the College of Engineering, in summer and fall of 1998, undertook a major reorganization of its research units. Several research units in the College of Engineering were combined into an umbrella structure, the Civil and Environmental Infrastructure Research Center (CEIRC) and placed in the space formally occupied by the Remote Sensing and Image Processing Lab (RSIP). This was done to better utilize space, facilities and personnel due to the expansion in several academic departments in the College. This reorganization also enhanced interaction among research units both in and out of the college and university and streamlined reporting and accounting. In terms of units, they are the Hazardous Waste Research Center (HWRC) which was assimilated by the Hazardous Substance Research Center in 2000, Louisiana Water Resources Research Institute (LWRRI), the Natural Systems Engineering Laboratory (NSEL), RSIP, which was defunct in 2000, and the Institute for Recyclable Materials (IRM) which was also defunct in 2000. Another research unit, the Hazardous Substance Research Center/South & Southwest (HSRC), one of five EPA region-pair centers, is also incorporated via staff and personnel in the research area. Additional program areas formed at this time within the overall cluster were in areas of materials and transportation research. In 2000, the umbrella organization changed its name to ERIC (Engineering Research Incubation Coalition) but the reporting and interaction with LSU administration remained the same. Within ERIC, the LWRRI director coordinates overall research thrusts, manages proposals, obtaining external program funding, and handles overall administration of the Institute. Four major thrust areas are now reflected in the consolidated units under ERIC — Water Resources, Hurricane Research, Hazardous Substance Research, and Civil Infrastructure. From 2000 – present, ERIC the Engineering Research Incubation Coalition consists of the Louisiana Water Resources Research Institute, LSU Hurricane Center, Center for the Study of Public Health Impacts of Hurricanes, Hazardous Substance Research Center S/SW, Advanced Computational Solid Mechanics Program, and the Division of Engineering Services.

LWRRI's cooperation is not limited to LSU, but includes interaction between LWRRI and seven other out-of-state organizations. One of these is the US EPA Gulf Coast Hazardous Substance Research Center (GCHSRC), which is made up of nine universities. In addition to university-based organizations, LWRRI interacts with government agencies such as the U.S. Department of Justice (DOJ) and directly with EPA. In summary, these and other interactions provide LWRRI with both regional and national research opportunities and allow an awareness that prevents any needless duplication of effort. The NSEL, described below, has been one of LWRRI's focal points, for such interactions strengthen our research efforts in water resources and environmental protection.

The Natural Systems Engineering Laboratory

The College of Engineering established within LWRRI the Natural Systems Engineering Laboratory (NSEL) in 1994– 2002 to act as a focal point for developing, evaluating and disseminating technology for the solution of large scale environmental problems and to respond to the opportunities in the emerging field of environmental and civil infrastructure restoration and remediation with a focus on Louisiana. New engineering problems being addressed are coastal wetland restoration and hurricane flood protection. It is estimated that during the next decade, over \$500 million will be spent in Louisiana on coastal wetland restoration projects and innovation is being sought in the areas of data collection, computer simulation of environmental systems and environmental designs for cost effective solutions. The other area of NSEL focus is hurricane flood control and emergency preparedness. Emphasis has been placed on evaluating the role that

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geomorphic features, such as barrier islands and coastal wetlands, play in providing natural protection from hurricane flooding. Furthermore, a real-time hurricane wind and flood prediction system has been established and is being used by Louisiana State Office of Emergency Preparedness and by several coastal parishes.

Support for this research program has been obtained from a variety of state and federal agencies including the Barataria/Terrebonne National Estuary Program, The U. S. Army Corps of Engineers, Lake Pontchartrain Basin Foundation, Louisiana Department of Natural Resources, and the Louisiana Office of Emergency Preparedness. The NSEL research program has also involved work with several departments at Louisiana State University including the Coastal Ecology Institute, the Department of Geology, the Coastal Studies Institute, the Department of Geography and Anthropology, the Louisiana Transportation Research Center (LTRC), the Hazardous Waste Research Center, the Department of Civil and Environmental Engineering, and the Chemical Engineering Department. From 1998–2002, NSEL has obtained over \$1.2 million in grants and contracts, exceeding both the Section 104 and required match funds of the USGS program, to the benefit of LWRRI and the program, which supported initiation of NSEL. The activities of NSEL were closely linked with the previous LWRRI director, Dr. Joseph Suhayda and following his retirement, the functions of NSEL have largely been shifted to the LSU Hurricane Center opened in 2000.

Environmental Engineering Wetlands Research Group

The Environmental Engineering Wetlands Research Group became affiliated with LWRRI when John Pardue was named director in 2002. The Wetlands Research Group investigates the fate and transport of contaminants in wetland environments and the design of wetlands and plant-based remediation systems for treating hazardous wastes. Since 1995, the group has graduated 10 Ph.D. students and numerous Master's students. We have developed an approach for passively treating groundwater contaminated with chlorinated solvents in treatment wetlands. High activities of halo-respiring bacteria have been observed in Phragmites marshes fringing the Aberdeen Proving Ground in Maryland. The activity of these organisms results in rapid attenuation of the chlorinated solvents in the marshes. Based on this natural scenario, we have developed design criteria for treatment wetlands for treating these persistent groundwater contaminants. Our greenhouse systems have dechlorinated chlorinated ethenes and ethanes from mg/L concentrations to below detection over very short (10's of cm) travel distances within the peat soil. Our research has focused on the composition of the organic matter in the commercially available peats and compost materials and their ability to provide H₂ to the halo-respiring populations. Our existing microbial culture, developed from upflow greenhouse experiments using groundwater from a Connecticut Superfund site, is being studied to better understand why such high reductive dechlorination rates can be maintained. Based on the design criteria developed in our laboratory, a number of pilot and full-scale applications of the technology are being planned at sites around the country. Support for this program has been obtained from numerous sources including EPA, NOAA, NSF, DOE, Louisiana DEQ and Louisiana DNR.

An Emphasis on Research

The Institute emphasizes the importance of water resources research. The research projects undertaken are focused on finding cost-effective, environmentally sound solutions to the water problems and issues specifically of Louisiana but also of the region and the nation. Research supported by the Institute is conducted by faculty of Louisiana's universities and colleges and in the Regional Program, faculty in out-of-state institutions in the region. A major strength of the Institute's research program is its ability to encourage multidisciplinary and multiuniversity research toward specific water resources problems. Most of the projects documented in this five-year report are funded in the evaluation report guideline research category of water quality. The category reflects a number of nonpoint source studies, and the collaborative efforts in nonpoint source and other studies in wastewater treatment have been maintained over the long term. By concentrating research into nonpoint pollution, the Institute reflects and responds to the needs of Louisiana and the region where this type of pollution is a problem needing effective solutions.

The Institute's Commitment to Leadership, Information Transfer, and Education

Other priorities of LWRRI include the continued development of the Institute to a position of leadership in the area of water resources within Louisiana and the region. LWRRI is working toward this goal by actively increasing its operational efficiency, by augmenting funds available to faculty researchers, and by implementing an aggressive information transfer program that will bring recognition to the Institute and its researchers while providing valuable information to the public. The program seeks to foster university level research combined with public service and education at both the graduate and undergraduate levels.

The general public, as well as other researchers and institutions are informed of LWRRI activities through various information transfer activities. These efforts will be documented thoroughly later in the report, but examples of the Institute's commitment to service are the continuously updated list of Institute publications and library, an emphasis on acquainting Louisiana's research community with the research funding opportunities through both the U.S. Geological Survey Sections 104 and 105, web sites about the Institute, To help acquaint others with LWRRI, the director gives numerous presentations to organizations, works with state agencies, and performs information exchange at the state, regional, and national levels. Assisting with the information transfer activities are undergraduate students and one part-time coordinator and one part-time research associate. They are trained in information transfer and also in office administration and management. The NSEL program promoted information transfer via its results in coastal protection modeling, flood prediction and hurricane event tracking as an integrated activity in LWRRI until 2002. Similarly, the Environmental Engineering Wetlands Research Group disseminates its research results through publications and presentations to a variety of organizations.

Section 104 Objectives

As can be seen in the brief overview, the Louisiana Water Resources Research Institute strives to focus its operation around the guidelines as stated in the Water Resources Research Act of 1984. In accordance with this Act, the institute uses Section 104 funds to promote five specific goals:

(1) to encourage and support innovative research efforts that will promote understanding, efficient management, and protection of Louisiana's water resources. During the five years covered by this report, Section 104 funds helped support fourteen Institute research projects, With support from funds issued through Section 104, LWRRI also strives to obtain additional funding for these research efforts as evidenced in follow-on funding and externally funded grants and contracts exceeding Section 104 funds and the required match combined.

(2) to encourage graduate and advanced training in water resources and to train students as water resources scientists and engineers capable of finding engineering solutions for present and future water resources problems. Within the period FY 1998 to FY 2002, LWRRI supported a total of 46 students on the undergraduate and graduate level, and six post-docs. Twenty-nine individual principal investigators received support via Section 104 and matching funds.

(3) to make Institute research results and activities available to the public and private sectors through publications and special activities such as conferences, workshops, and training programs. Within the period covered by this report, LWRRI and investigators generated publications, gave over LWRRI presentations, were involved in over other meetings,.

(4) to develop a statewide program and regional involvement dedicated to solving state and regional water and related land problems through close cooperation with other colleges and universities within and outside Louisiana that demonstrate capabilities for research, information transfer, and graduate training. During this reporting period, LWRRI cooperated with LSU, the LSU Agricultural Center, , University of New Orleans,

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and Mississippi State University. Within the state, LWRRI also works with DEQ, the Governors' Office, Office of Emergency Preparedness, etc., and with other state agencies.

(5) to improve and promote regional coordination and effectiveness by working closely with other regional institutes and organizations. In addition to the out-of-state institutions listed in (4) above, LWRRI works with organizations such as regional research centers in the US EPA, the National Institutes for Water Resources (NIWR), the Universities Council on Water Resources (UCOWR), additional southeastern/island region institutes in proposals and projects in the regional program and various other federal agencies.

Section 104 Emphasis

Research is a primary focus of LWRRI, and, therefore, the Institute uses a majority of Section 104 funds to enable needed investigations into the water problems that not only affect Louisiana specifically, but also concern the Southeastern/Island Region and the entire nation as well. While emphasizing nonpoint issues and continuing to address other areas such as wastewater treatment, coastal zone engineering, flooding, and emerging concepts, LWRRI is able to make very efficient use of Section 104 funds by collaborating with other units in the university, state, and region. The Institute's multidisciplinary and multiuniversity approach to research is one of its leading strengths because of the added benefits from facilities, funding, equipment, and investigators that may not physically be a part of LWRRI.

In addition to the Institute's focused research and multidisciplinary and multiuniversity perspective, another important aspect of LWRRI research is the ability to also expand research by obtaining additional funding as recommended in the previous 5 year review. During the five-year period covered by this report, both in kind and external funding have steadily increased. Of the fourteen investigations, two of the fourteen have received follow-on funding. When combined, this follow-on funding totals over \$398,000, exceeding the Section 104 funds these projects received during the report period. Also, when follow-on funding is added to the required match, LWRRI projects are found to generate 3.5 times the Section 104 funds from state and other sources. This level of support and continued funding of projects attests to the high quality and relevance of the Institute's program, the effective use of Section 104 funds, and the outstanding expertise of the investigators. In addition, the NSEL, in LWRRI during this reporting period, has obtained \$ 1,296,586, LSU has provided administrative support of almost \$ 287,863 during the five year period. Totaled, at almost \$2.0 million, these additional funds exceed the Section 104 and required match in themselves. When coupled with the Director's other research activities reported herein, as directed in the evaluation report guidelines, funding approaches \$20 million, the majority of which was received during the review report period, greatly exceeding the Section 104 funds. Thus, the Institute maintains a strong program of research and information transfer with Section 104 and required match funds coupled with a growing effort in the NSEL programs and integrated with other research programs in ERIC, all seeking engineered solutions to environmental and water resources problems.

Dispersion of Section 104 Funds

Of the funding received from the Section 104 grant and required matching funds, as listed in the distribution table below, the percentage cited for information transfer was calculated by factoring information transfer from both the administration funding and the information transfer efforts in individual research projects. The percentage for education was determined as specified in the report guidelines, based on student involvement from project budgets.

Effect of Changes in the State Water Resources Institute Program

During the period of regional competition, the State Institute Advisory Board (IAB) "lost interest" in the program to a degree – obtaining reviews was more difficult. In 1999 reviews, the IAB was much more responsive than in regional years. The competitive level of regional competition may have raised the quality

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of some of the projects, at the cost of small “seed” efforts. Information transfer was enhanced by collaboration and interaction of PI’s and reviews by regional directors of proposals by mail, meetings, and discussion. The Regional Competition ended in 1998.

IN SUMMARY

Examples of projects that have worked to solve water resources problems of LA and the region include: ground-breaking stormwater treatment research which led to the construction of a permanent experimental field station, the New Orleans hurricane research thrust which has led to the funding of a Center dealing with health impacts of a hurricane in the sensitive New Orleans metro area, and the first funded work on the water quality impacts of freshwater diversion of the Mississippi River which are being used to stimulate wetland formation in Louisiana’s coastal area. Within this report, these and other projects are outlined as requested in the evaluation guidelines, including their individual accomplishments. Projects represent a multidisciplinary and multiuniversity approach, as should be found in an Institute. Disciplines range from engineering to agriculture with projects involving up to two institutions and one experimental station.

As illustrated throughout this five-year report, the Louisiana Water Resources Research Institute uses Section 104 and matching funds to accomplish the goals of increased and enhanced water resources research; effective, streamlined administration; and current, serviceable information transfer. During the reporting period, through the use of Section 104 and related funds, excluding the NSEL projects, LWRRRI actively supported innovative water resources research by sponsoring 14 research projects. Twenty-nine individual PIs received support to foster involvement of scientists and engineers into water resources research. Also, the Institute encouraged advanced training in water resources by supporting forty-six individual students and made Institute information known to industry, government and the general public through publications and over 40 presentations and with participation in additional meeting activities, LWRRRI encouraged information exchange as well as interaction and coordination with similar water institutes and colleges and universities in the state, region and nation.

Follow-on funding has been awarded to 14% of the projects, exceeding the amount of Section 104 funds they received. The NSEL, initially partially supported by Section 104 funds through the administrative component of the Institute, has obtained over \$1.2 million in external funding, exceeding the Section 104 and matching funds, including administrative costs, for the evaluation period. Also, when all external funding of Institute staff activity is combined, the total is equal to many times the Section 104 support over the five-year period.

In summary, within the five years of this report, the Institute has seen positive growth and an increase in productivity while meeting Section 104 objectives. It has continued to expand since the last review to an institute integrated with five other research units that allow a many-fold increase in resources. The Institute looks forward to continued growth and greater productivity in research while finding acceptable solutions to water resources problems, exploring new and novel concepts, promoting training and education and the dissemination of results, and fostering the entry of new scientists and engineers into water research.

Allocation of Federal Grant and Matching Funds Among Program Activities (Percent): 1998–2002

Research	80
Information Transfer	3
Education	8

Administration	6
Other (please specify)	3
Total	

Institutional Support and Effectiveness

The effectiveness of the Institute and its staff in ability to obtain other sources of funding is illustrated in detail in the following two tables. Overall, and for the large part during this reporting period, in excess of \$20 million has been obtained directly and by related activities of the staff. LSU provides, in line-item funding, an amount approximately equal to the base grant or administrative component in the discretionary base funding as shown in the table below. Salary of the director from the academic unit provides the balance needed for administrative match and is not listed here.

The second table shows that the NSEL, as a unit supported within LWRRI during the reporting period, has obtained \$ 1,296,586 and thus, has exceeded both the Section 104 funds and required match in external support. Moreover, NSEL has made critical advances in landloss management and flood prediction with these funds, under the LWRRI name and to the benefit of the program.

The director’s other activities with EPA, DOJ in 1998 under Dr. Constant, etc., have greatly increased the reported funding. NSEL and other funding obtained represent in part the Institute’s response to the previous 5–year review evaluation recommending that programs expand to include other areas. This expansion into NSEL’s work on flood forecasting and coastal loss modeling has had a significant impact on total funding as evidenced below. A significant effort was made within the administrative support area for NSEL development and these Section 104 funds of about \$ 287,863 over 5 years has allowed LWRRI through NSEL to obtain \$1,296,586 in research grants and contracts, a multiplier of almost 17. The overall total of nearly \$20 million reflects many times the level of support from Section 104 funds.

Clearly, these data can be compared and analyzed in many ways, such as illustrated above in relation to Section 104 funds. Overall, LWRRI has expanded to build a solid research program in the last five years adding to its ability to plan, conduct, and arrange for research far beyond the basic 104 funding.

Discretionary Base Funding

Appropriated or Other Discretionary Funds Available to the Institute: 1998 – 2002

Source of Discretionary Funds	1998	1999	2000	2001	2002
Louisiana State University	35202	61436	61436	62584	66905
USGS Admin Budget	20000	19303	19954	17822	23475

Total Institute Water Resources Research Funding

Water Resources Grants, Contracts, and Cooperative Agreements in Which the Institute Had a Major Role during the Period of the Evaluation: 1998 – 2002

Title/Topic	Source of Funds	Year Initiated	Amount
HSRC/S– EPA Region Pair Center – LWRRI Director until 1999 is HSRC Asst. Director & Co–Investigator	U.S. Environmental Protection Agency (\$1 to 1.5 million/yr)	1991	10626693
HSRC/S	U.S. Environmental Protection	1997	3000000

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	Agency (\$1 to 1.5 million/yr)		
Evaluation of Remedy and Research into Advanced Technology for Remediation of the PPI site – LWRRI Director until 1999 is Co-PI	U.S. Department of Justice (\$200,000 to 300,000/yr)	1990	2959160
Treatment Testing Research – LWRRI Director until 1999 is PI	U.S. Environmental Protection Agency	1994	75786
Gulf Coast HSRC funds to LSU – LWRRI Director until 1999 is Coordinator	U.S. Environmental Protection Agency (\$100,000 to \$160,000 per year to LSU)	1989	1390000
“Lake Pontchartrain Basin Foundation Study”	Lake Pontchartrain Basin Foundation	1998	39077
“Coastal Modeling Grant”	Louisiana Board of Regents	1998	119983
“Office of Emergency Preparedness Flood Forecasting”	Louisiana Office of Emergency Preparedness	1998	94435
“Mapping the Future Wetlands in the Louisiana Coast – Phase VI”	Louisiana Universities Marine Consortium	1998	9973
“Mapping the Future Wetlands in the Louisiana Coast – Phase VII”	Louisiana Universities Marine Consortium	1998	9953
“Navigation Channel Study”	U.S. Army Corps of Engineers, New Orleans District with CCEER	1998	5000
“Habitat Modeling”	CCEER	1997	11166
“Intergovernmental Personnel Agreement”	U.S. Army Corps of Engineers	1998	29240
“Mapping Future Wetlands in the Louisiana Coast – Phase VIII”	Louisiana Universities Marine Consortium	1999	6500
“Hurricane Shelter Assessment and Flooding Forecasting for St. James Parish, Louisiana”	St. James Parish Office of Emergency Preparedness	1999	9500
“Completion of the Lower Atchafalaya Reevaluation”	U.S. Army Corps of Engineers	1999	102995
“Flood Damage Prevention Using Remotely Sensed Data and a Mesoscale Atmospheric Model”	NASA & University of Alabama, Huntsville	2000	227907
“Development of a Two-Dimensional High Spatial Resolution Storm Surge Simulation Model for Single Processors and Distributed Computing Cluster”	LWRRI	2001	9499
“Technical Assistance for Louisiana Rural Watershed Issues”	Mississippi Water Resources Research Institute	2001	7500
“Technical Assistance for Louisiana Rural Watershed Issues”	Mississippi Water Resources Research Institute	2002	11000
“Coastal Mapping”	Governor’s Office of Coastal Activities	2001	9941
“Hydrodynamic Simulation Modeling Effort to Assist DNR in the Management and Operations of the Davis Pond Diversion Project”	Louisiana Department of Natural Resources	2001	74809
“EPA EPSCoR – Modeling Impacts of Climate Change on Wetland Ecosystems”	EPA	2001	258028
“Project Development Plans and Feasibility Studies for Complex Projects”	Louisiana Universities Marine Consortium	1999	8163

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“NATO Advanced Study Institute, Prague, Czech Republic”	Hazardous Substance Research Center S/SW	2000	9431
“Hurricane Sheltering in Hospitals: Phase I Assessment of Current Survivability and Mitigation Recommendations”	Jefferson Parish Office of Emergency Preparedness, Louisiana	2001	10000
“Integrative Approach to Understanding the Cause of Salt Marsh Dieback: Couple Hydrologic/Ecological Models of Marsh Dieback Processes II.6”	Louisiana Department of Natural Resources	2001	51124
Health Excellence Fund	Louisiana Board of Regents – HEF & LSU Hurricane Center	2002	52466
Task 7. Conceptual Ecological Models for Planning and Evaluating the LA Coastal Area Restoration Plan	University of Louisiana, Lafayette	2002	38896

Research Program

The Institute's primary focus is water resources research directed at finding solutions to water problems. LWRRI uses Section 104 and required matching funds, not including student support, to support the research program. To expand the research opportunities and, thus to increase the probability of solving significant water resource problems in Louisiana and also in the region and nation, LWRRI works to obtain external funding from various federal, state, and private organizations. Through this additional funding, the Institute can continue vital investigations well beyond the time allowed by initial budget allocations while also initiating new projects.

Of the 14 research projects conducted during the five–year reporting period, the majority of investigations focused on water quality, including nonpoint sources of pollution and mitigation of those sources. This concentration is now and has been supported by the Institute; however, engineering, hydrologic processes and biological sciences remain within the current focus. Each project is awarded funding after external peer review by the Institute Advisory Board, and regional reviews as needed, as discussed in the Administrative Section, and those desiring continued funding must compete with new projects for an equal annual evaluation,. On an average, LWRRI supports three to four Section 104 research projects every year.

In the uploaded version of this report, or provided below in hardcopy, are summaries of each of the projects funded in part by Section 104 monies in the format requested in the evaluation report guidelines. In addition to the usual reporting requirements of the Institute, investigators were contacted by mail and phone starting in October 2003 for updates on publications, follow–on funding, etc. to be complete in these summaries. The majority of investigators were responsive to the Institute requests.

Research Projects

Summary of Research Projects

Number of Research Projects and Percentage of Research Funds, by Research Category: 1998–2002

Research Category	Number	Percent of Funds
Biological Sciences	0	0
Climate and Hydrologic Processes	4	27
Engineering	1	8
Ground–water Flow and Transport	3	23

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Social Sciences	1	4
Water Quality	5	38

Research Projects Receiving Follow–on Funding

The number of projects receiving follow–on funding from another source after completion as a section 104–funded project was: 3.

Dr. Sansalone et al., through the grant from LWRI in FY1999, generated another year of funding (\$ 25,000) by USEPA Office of Water for the research. The LWRI funding was used as match to secure \$20,000 of funding from LTRC for site development. The LWRI funding helped the PI secure \$104,000 of National Sea Grant funding that will continue for the next year. The LWRI funding also helped permit Drs. Sansalone, Cartledge and Singh to submit a \$249,000 USGS proposal in response to a USGS RFP on non–point pollution. This site offers the very real potential to develop into a site for long–term experimentation from which a long–term database in both non–point pollution and effective treatment strategies can be generated. In addition, Dr. Sansalone received a grant from the US EPA Office of Water for \$25,000. Dr. Valsaraj and Dr. Constant, generated \$143,000 in follow–on funding during the period of 2000–2003 for the US EPA Gulf Coast HSRC from their LWRI grant FY1999.

Dr. Vibhas Aravamuthan, through the grant from LWRI in FY2001, generated 3 follow –on funding years: 2002–2004 the Louisiana Board of Regents at \$52,466, the University of Louisiana at Lafayette for the amount of \$38,896 and from 2001–2003 the US EPA EpsCoR at \$258,029. From the same funding year, FY2001, Dr. Sansalone et al. generated \$349,904 which was a grant started in 2003–2005 from the Louisiana Transportation Center, LSU.

Summary of Research Publications

Number of Research Publications, by Category of Publication

Publication Category	Number
Articles in Refereed Journals	20
Book Chapters	13
Theses and Dissertations	0
Water Resources Institute Reports	0
Articles in Conference Proceedings	22
Other Publications	5

Most Significant Research Findings

The Natural Systems Engineering Laboratory has developed a research program exceeding 104 and required match funds in the last five years via LWRI administrative support. Results have a direct impact on Louisiana and coastal areas in restoration and flood predictions during hurricane events in real time simulations and in predictive modeling of coastal loss mitigation including impact of the “Breux Bill” providing significant resources for coastal protection. The following are three highlights of the Section 104 funded projects:

1999. Sansalone and others. *Mitigation Of Urban Storm Water Discharges To City Park Lake Through Integrated Passive Adsorptive–Filtration* and 2001. *Storm Water Transport of Particulate Matter from Elevated Urban Transportation Corridors into Waterways of Louisiana: The Role of Partitioning and Implications for Treatment*. These projects helped develop and sustain a very active field research program on stormwater treatment from the elevated highways common to Louisiana. The continued development of the

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experimental field station and follow-on funding have been stimulated by these awards. Results demonstrated the stochastic nature of stormwater runoff quantity and quality and have demonstrated the robustness of passive adsorptive filtration systems as a treatment approach. Dr. Sansalone has joined the Institute as Associate Director and continues to interact through the LWRRRI program.

2001. Aravamuthan. *Development of a Two-Dimensional High Spatial Resolution Storm Surge Simulation Model for Single Processors and Distributed Computing Cluster*. LWRRRI funding assisted in the development of this high resolution storm surge model to predict surges that would accompany hurricanes entering coastal Louisiana. This model is now widely used in Emergency Preparedness and Planning within the state and as hurricanes approach, Dr. Aravamuthan, director of NSEL is always called upon to project the expected surge across the coastal parishes. This is an excellent example of a project with great impact on the state.

2000. Delaune and others. *Denitrification in Wetlands Receiving Mississippi River Freshwater Diversion: Water Quality Aspects*. Freshwater diversions planned for Louisiana's coastal areas represent one of the largest and most interesting hydrological projects in the world. This study examined how wetlands would assimilate nitrate as an example pollutant, expected in Mississippi River water. The study established expected rates that could be used to scale potential effects. The issue of freshwater diversions is one that involves trade-offs between benefits (land-building) and negative impacts (water quality impairment).

Summary of Awards

LWRRRI staff members have received numerous awards in the form of grants and contracts detailed in the Institutional Support and Effectiveness Section of this report.

FY99

Ongoing projects provided partial support or full time training to a significant number of students (14). The Patrick et al. project developed a reproducible method for extracting methylmercury from freshwater sediments at a minimum concentration of approximately 0.2 parts per billion. The Sansalone et al. experimental site is located in a very visible and public area. Therefore much publicity has been generated for LWRRRI by the research. For example, The Advocate featured a story on the research and sponsors, Louisiana Sea Grant's "Coast and Sea" periodical featured a story on the research, students and sponsors as did Louisiana's Department of Development and Transportation in their monthly periodical. Dr. Valsaraj and Constant's project received a recent award from the U.S. EPA through the Gulf Coast Hazardous Substance Research Center based at Lamar University, TX has been received to continue the study and develop the monolithic reactor for photoadsorbubilization of aromatic compounds. This project is to begin in September 2000.

FY00

The Institute now has a program that has statewide and national impact and recognition. The Institute research and service program in hurricane flooding has been the subject of media coverage by several local newspapers, radio and TV segments. It has been covered by ABC national news (Peter Jennings), CNN – Earth Matters, and in a separate article in Time Magazine. Recent interviews have been held with CNN and with Scientific American. The Institute provides realtime forecasts of hurricane flooding to parish and state emergency managers to assist them in decision making. The Institute program in coastal restoration has produced results that have been used by several state and federal agencies involved with the Coastal Wetland Protection, Planning and Restoration Act program. The Secretary of the Louisiana Department of Natural Resources used Institute projections of future landloss in his presentation to Congress supporting the Conservation and Restoration Act (CARA). The Institute maintains contact with several researchers on the LSU campus and on university campuses statewide to foster cooperation in water resources research. The

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Institute has continued to maintain a strong externally funded research program supported by a variety of funding agencies and institutions. Recent funding has been obtained from the U. S. Army Corps of Engineers, The Louisiana University Marine Consortium, St. James and Jefferson Parishes, the National Aeronautics and Space Administration, the Lake Pontchartrain Basin Foundation, the Governor's Office of Coastal Activities, the Barataria/Terrebonne National Estuaries Program, and the Louisiana Department of Natural Resources.

FY01

The City of New Orleans lies below sea level and is at extreme risk from Hurricanes and other major storm events. LWRRRI under the direction of Joe Suhayda has led an effort to model the magnitude of the storm surge inundating New Orleans and ways of mitigating the effect. This research has been sponsored by many organizations and agencies including the New Orleans Army Corps of Engineers, Jefferson Parish Office of Emergency Preparedness, and the LA Office of Emergency Preparedness. It has been featured in Scientific American, the New York Times, on National Public Radio, CNN, and elsewhere.

FY02

LWRRRI under the direction of Dr. Joe Suhayda led an effort to model the magnitude of the storm surge inundating New Orleans and ways of mitigating the effect. This research effort has been sponsored by many organizations and agencies including the New Orleans Army Corps of Engineers, Jefferson Parish Office of Emergency Preparedness, and the LA Office of Emergency Preparedness. In the current reporting year, Dr. Suhayda reorganized the LWRRRI research program around the New Orleans flooding theme, effectively leveraging LWRRRI funds to create a larger impact. The New Orleans storm surge research has been featured in Scientific American, the New York Times, on National Public Radio, CNN, and elsewhere. Dr. Joe Suhayda received a LSU award commemorating 30 years of service at LSU upon retirement, and a LWRRRI plaque thanking him for his water resources service at the Institute since 1994. LWRRRI-funded students won several awards including: 2nd Place: Oral Paper Competition, 7th Environmental State of State Conference, "Hydrograph Attenuation by a Linearly Extended Partial Exfiltration Reactor", Cristina* and Sansalone, Lafayette, LA, October 2002 (* presenter – graduate student of Sansalone) and 3rd Place in Oral Paper Presentation, 7th Environmental State of State Conference, "Gradation-Based Distribution of Contaminated Sediments", Howerter*, Glenn, Tribouillard, Sansalone, Lafayette, LA, October 2002 (*presenter – part-time graduate student of Sansalone).

Information Transfer Program

Introduction

One of the Institute's objectives is to make research results available to the general public and to interested researchers and institutions through publications and other information transfer activities. Although the information transfer component of the budget of Section 104 funds is relatively small (10%), LWRRRI attempts to meet this goal in many ways which include actively participating in conferences and workshops, distributing summaries and other Institute information to the public and governmental agencies, maintaining internet access and web sites, and maintaining a library of water research materials. The Institute requests that its investigators participate in reporting and information transfer activities such as publications in professional journals, workshops, and seminars. Investigators also take part in Institute activities by contributing to the Institute co-sponsored annual symposium, attending symposia, and participating in other Institute-sponsored information transfer activities. Special information transfer activities include interaction of the Natural Systems Engineering Laboratory with the LA Governor's Office and the Office of Emergency Preparedness during severe storm (hurricane) events to provide real-time prediction of flooding in coastal areas and in the city of New Orleans. Also, the director attends and participates in many other conferences and service

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programs as listed in this section of the report.

The Institute's information transfer program is a subset of its administration program. Assisting with LWRRI's information transfer activities are undergraduate student workers, one program coordinator (part-time LWRRI support), and the associate director, Dr. John J. Sansalone. A research associate is also available to assist in information transfer activities of the Institute.

Further assisting in information transfer, the recent reorganization (2000) of the Institute within the Engineering Research Incubation Coalition (ERIC) has afforded the Institute the opportunity to utilize equipment within ERIC's Remote Sensing and Image Processing (RSIP) Program. The RSIP image processing, GIS, and computing systems provide the Institute and NSEL with the necessary tools to transfer information in visual graphic format, utilize internet resources, and develop state-of-the-art presentations. Because of the Institute's expanding development, more emphasis is being placed on updating the public and other organizations about activities and objectives using electronic media and presentation tools.

Publications

Most of the Institute's publications are in the area of research, as documented in the Research Program section, but LWRRI requires that its researchers participate in information dissemination for public use. Researchers are required to make documentation of their work available for the public, and LWRRI administrators assure that this information is accessible and provided upon request. In addition to research publications and websites, the Institute annually publishes a yearly report. All of LWRRI's annual reports and research project completion reports are sent to the state library and are available for statewide distribution. Often the Institute itself receives requests for copies of previous reports, and these reports, from LWRRI's origin in 1965, are available for distribution at a very low cost.

Information Transfer Projects

Information Transfer Publications

IT Publication Type	IT Publication Citation
Water Resources Research Institute Reports	Suhayda, J. N. (1999) "LA Water Resources Research Institute, Grant No.02673 B-01
Water Resources Research Institute Reports	Suhayda, J. N. (2000) "LA Water Resources Research Institute, Grant No.02673 B-01 FY00 Annual Program Report," Louisiana Water Resources Research B-01 FY00
Water Resources Research Institute Reports	Suhayda, J.N. (2001) "LA Water Resources Research Institute, Grant No. 02673 B-01, Annual Program Report," Louisiana Water Resources Research Institute, Louisiana State University, Baton Rouge, LA, 16 pages.
Water Resources Research Institute Reports	Suhayda, J.N. (2002) LA Water Resources Research Institute Annual Report, Grant No. 02673 B-01," Louisiana Water Resources Research Institute, Louisiana State University, Baton Rouge, LA, 43 pages.
Other Publications	Suhayda, J. N. (1999) Barrier shoreline feasibility study, Phase 1, Steps A-K and Final Report, Louisiana
Other Publications	Suhayda, J. N., M. Alawady, and V. Aravamuthan. (2000) Hydrologic modeling of the Barataria-
Other Publications	Suhayda, J. N. and C. Willson. (2000) Climatological and hydrologic conditions and trends in the upper

Audio–visual Productions

Both the Institute director and associate director have actively incorporated audio–visual productions into presentations given to civic, governmental and professional organizations. These presentations help acquaint audiences with LWRRI's activities and often involve visual aids such as slide shows, transparencies, posters, and similar exhibit materials. Presentations given by the past director, Dr. Joe Suhayda, from NSEL work on coastal management and flood prediction have impacted Louisiana governmental offices and the federal congressional delegation via posters, slide shows and modeling presentations of storm events.

LWRRI

Since FY 1999, when Dr. Suhayda became LWRRI's director, he has continued to make the Institute's activities and progress known to the public and industry by incorporating visual displays, mostly through slide presentations, into Institute and related functions. The slides emphasize important aspects, accomplishments, and goals of the Institute as well as show how these goals and responsibilities are accomplished, as listed below. Also, Dr. Suhayda, gives numerous presentations to inform state, federal, and private agencies about these programs. Because these presentations also include some information and transparencies directly related to LWRRI, the Institute benefits from additional exposure.

Sansalone*, J.J., Cartledge, F.K., Tittlebaum, M.E., “The role of hydrology and partitioning on control of transportation land use storm water”, Symposium of Hydrology, Hydraulics and Water Quality for Transportation Systems, Las Croabas, Puerto Rico, July 2002.

Sansalone*, J.J., “Unit operations and processes applied to stormwater management”, Symposium of Hydrology, Hydraulics and Water Quality for Transportation Systems, Las Croabas, Puerto Rico, July 2002.

Tramonte, J., Sansalone*, J.J., Cartledge, F., Tittlebaum, “Transport of Entrained Particulate Matter and Heavy Metals from Urban and Transportation Infrastructure”, 2nd International Conference on New Trends in Water and Environmental Engineering, Capri, Italy, June 2002.

Voon, E., Sansalone*, J.J., Srinivasan, V, O’Leary, M., “Challenges for Control of Aquatic Nuisance Species in Shipping Ballast Water Discharged to Coastal Ports”, 2nd International Conference on New Trends in Water and Environmental Engineering, Capri, Italy, June 2002.

Hird, J., Cartledge, F.K., Tittlebaum, M.E. and *Sansalone J.J., “Passive Treatment of Elevated Roadway Runoff over Coastal Waterways Using Upflow Clarification Technology”, 4th International Conference on Innovative Technologies in Urban Storm Drainage, GRAIE, Lyon, France, June 2001.

Sansalone, J.J., Glenn, D.W., Cartledge, F.K. and Tittlebaum, M.E., “Adsorption mechanisms for eco–treatment of urban waters influenced by non–equilibrium partitioning of heavy metals”, International Association for Hydraulic Research, Capri, Italy, July 2000.

Peer–Reviewed Conference Proceedings/Presentations (* Presenter)

Glenn*, D.W., Liu, D., Sansalone, J.J., “Influence of chemistry, hydrology and suspended solids on partitioning of heavy metals to particles”, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.

Dean*, C.M., Blazier, A.A., Krielow, E.E., Cartledge, F.K., and Sansalone, J.J., “What you did not know about stormwater chemistry and were afraid to ask”, 9th International Conference on Urban Drainage, Paper

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and Presentation, ASCE/IWA, Portland, Oregon, September 2002.

Hird, J., Cristina, C., Sansalone, J.J., Tramonte, J. and Cartledge, F.K., “Treatment of Elevated Roadway Runoff over Coastal Waters Using Clarification Technology”, WEFTEC2001 Conference Proceedings and Presentation, Water Environment Federation, Atlanta, Georgia, October 2001.

Other Articles

Sansalone, J.J., “Pollution Patrol” in The Advocate (Baton Rouge, Louisiana newspaper), 2 March 2003.

Sansalone, J.J., “Storm Water Washes up Trouble for Cities” in the Arkansas Democrat Gazette (Little Rock, Arkansas newspaper), 4 December 2002.

Sansalone, J.J., “LSU Researcher Examines Storm Water Runoff in Arkansas” in The Advocate (Baton Rouge, Louisiana newspaper), 30 November 2002.

Sansalone, J.J., Television “Newsmaker Interview” story by Channel 2 (WBRZ) on control of rainfall–runoff in Baton Rouge, November 2002.

Sansalone, J.J., Television news story by Channel 2 (WBRZ) on storm water treatment for City Park Lake featuring I–10 experimental site, November 2002.

Presentations/Presenter*

Howerter*, K.M., Glenn, D., Tribouillard, T., and Sansalone, J.J., “Gradation–Based Distribution of Contaminated Sediments”, 7th Annual Environmental State of the State Conference, Lafayette, LA, October 2002.

Dean*, C.M., Blazier, A.A., Krielow, E.E., Sansalone, J.J., Cartledge, F.K., Tittlebaum, M.E, and Pardue, J.H., “The Relationship Between Hydrology and Water Quality for Highly Urbanized Watersheds Impacted by Transportation in South Louisiana”, 7th Annual Environmental State of the State Conference, Lafayette, LA, October 2002.

Cristina, C., Tramonte, J. and Sansalone*, J.J., “A Process Design Selection Methodology for Separation of Particulate Matter in Urban Storm Water”, Conference on Storm Water and Urban System Modeling, Toronto, Canada, February 2001.

NSEL

NSEL has conducted research into diverse issues affecting Louisiana’s coastal environment. The research efforts have primarily involved the use and development of sophisticated computer models to solve a range of environmental problems. These include mathematical models for predicting the impact of hurricane storm surges on coastal Louisiana, and to use these models to plan the location of shelters in the event of a hurricane, flood forecasting for rivers using standard models developed by the US Army Corps of Engineers (USACOE), designing effective coastal restoration projects to restore and reduce the loss of wetland ecosystems, to model the effect of river diversion projects and gauge their long term impacts and usefulness, to name a few. In the course of conducting this research, NSEL has received funding from various state and federal agencies like the Louisiana Department of Natural Resources and the US Army Corps of Engineers. A great deal of interest has been shown by various state and federal agencies in the research efforts as evidenced by the fact that NSEL has received grants in excess of \$1.2 million in the last 5 years, initiated and supported by Section 104 funds from the administrative component (base grant or funds).

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The deliverables for the various research projects undertaken by NSEL include interim and final project reports and various audio/visual products. There has been a concerted effort on the part of NSEL to provide its research output in a graphical manner, which is intuitive and very easy to use and interpret even by lay persons with little or no scientific background. This is proving to be increasingly important as planners and other government officials are using the research results for assessing the potential environmental impact of a particular project. A brief description of the projects and the various audio–visual products developed by NSEL are described below:

Suhayda, J. N., Natural Hazards, National Safety Council, New Orleans, Louisiana, October 19, 1999.

Suhayda, J. N., Community Haven, Southeastern Task Force Leadership Summit, New Orleans, Louisiana, August 20, 2000.

Suhayda, J. N., Community Haven, National Hurricane Conference, Washington, D. C., April 12, 2001.

Suhayda, J. N., National Research Council, Coastal Engineering and Restoration Projects, December 12, 2002, New Orleans, Louisiana.

Suhayda, J. N., Storm Surge Modernization, Post 2002 Hurricane Season Round–Table Discussion, December 17, 2002, Baton Rouge, Louisiana.

Suhayda, J. N., Symposium on Hail, Hurricane and Wildfire Hazards, New Orleans –, Looking a Hurricane Disaster in the Eye, Institute for Business and Home Safety, January 29, 2003, Tampa, Florida.

Media Interviews

Suhayda, J.N., Interviews have been conducted with the Morning Advocate, Times Picayune, NBC/Discovery Channel, USA Today, Time Magazine, ABC National News, Scientific American Magazine, the New York Times, CNN/ Earth Matters, National Public Radio, Bill Moyer’s Now Program, and CBS National News.

Newsletter

The director elected to discontinue distribution of the newsletter due to questions about its effectiveness in reaching the targeted audience of our research. This is being evaluated by the current director.

Conferences

The director annually attends NIWR conferences, the Universities Council on Water Resources (UCOWR), and other professional meetings to discuss LWRRI's activities.

Lead Sponsor

None during this reporting period.

Cosponsor or Supporter

LWRRI Other Conference and Meeting Activities

Constant, W. D., National Institutes for Water Research Annual Meeting, Washington, DC, March 15–17, 1998, Institute Director.

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Suhayda, J. N., National Institutes for Water Research Annual Meeting, March 6–7, 1999, Washington, DC, Institute Director.

Suhayda, J. N., National Institutes for Water Research Annual Meeting, March 19–20, 2000, Washington, DC, Institute Director.

Suhayda, J. N., National Institutes for Water Research Annual Meeting, March 5–6, 2001, Washington, DC, Institute Director.

Pardue, J. H., National Institutes for Water Research Annual Meeting, March 2002, Washington, DC, Institute Director.

Constant, W. D., Universities Council on Water Resources Annual Meeting, 1998, Institute Director.

Suhayda, J. N., Universities Council on Water Resources Annual Meeting, 1999, Institute Director.

Suhayda, J. N., Universities Council on Water Resources Annual Meeting, August 1–4, 2000, New Orleans, LA, Institute Director.

Suhayda, J. N., Universities Council on Water Resources Annual Meeting, 2001, Institute Director.

Pardue, J. H., Universities Council on Water Resources Annual Meeting, 2002, Institute Director.

Suhayda, J. N., Louisiana Emergency Preparedness Association/Louisiana Office of Emergency Preparedness Joint Workshop, June 1–4, 1998, Lafayette, LA, Speaker.

Suhayda, J. N., Governor Foster's Wetlands May Day Celebration, May 1, 1998, Baton Rouge, LA, Speaker.

Suhayda, J. N., National Hurricane Conference, March 29– April 2, 1999, Orlando, FL, Speaker.

Suhayda, J. N., Governor Foster's Wetlands May Day Celebration, May 1, 1999, Baton Rouge, LA, Speaker.

Suhayda, J. N., Extended I–10 Alliance Virtual Natural Disaster Consortium, February 25, 2000, Baton Rouge, LA, Speaker.

Suhayda, J. N., National Hurricane Conference, April 17–21, 2000, New Orleans, LA, Speaker.

Suhayda, J. N., Governor Foster's Wetlands May Day Celebration, May 1, 2000, Baton Rouge, LA, Speaker.

Suhayda, J. N., Coastal Hazards Initiatives, May 5, 2000, New Orleans, LA, Speaker.

Suhayda, J. N., LA 1 Improvements, Port Fourchon – Golden Meadow Preliminary Alignment Review Meeting, May 22, 2000, Baton Rouge, LA, Speaker.

Suhayda, J. N., Management Conference Barataria–Terrebonne National Estuary Program, May 23, 2000, Thibodaux, LA., Speaker.

Suhayda, J. N., University of New Orleans Water Quality Dialogue Series, June 8, 2000, New Orleans, LA, Speaker.

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Suhayda, J. N., Louisiana Office of Emergency Preparedness Hurricane Exercise, July 13, 2000, Speaker and Participant.

Aravamuthan, V., University of Alabama, SEVEER Remote Sensing Proposal Development Workshop, December 4–5, 2000, Huntsville, AL, Speaker and Participant.

Suhayda, J. N., Governor Foster’s Wetlands May Day Celebration, May 1, 2001, Baton Rouge, LA, Speaker.

Korevec, N.D., The New York Times Interview: GIS Assessment of the Vulnerability of a Core Tourist Area in New Orleans to Impacts of Flood Inundation During a Hurricane Event, March 28, 2002, Baton Rouge, LA.

Suhayda, J.N. The New York Times Interview: Community Haven, March 28, 2002. Baton Rouge, LA.

Suhayda, J. N., Governor Foster’s A Call to Action: To Address Coastal Land Loss in Louisiana, May Day Celebration, May 1, 2002, Baton Rouge, LA, Speaker.

Internet Services

LWRRI

The main LWRRI website is an integrated gateway from the Louisiana State University College of Engineering’s Homepage. This page links the Department’s research centers. Students, staff, and faculty utilize the College’s pages to pick up class schedules, find professors’ publications, and links to the various departments and research centers. The purpose of the LWRRI site is information dissemination, mainly acting as a gateway to LWRRI projects and links. This information is being continually updated as new projects and issues arise. Personal contact information is also included, i.e.: telephone number, fax number, and address. There are also direct links for contacting the Director and associated research unit heads via email. This page allows a user to access the Institute’s summary page which includes research projects that are funded with Section 104 and matching funds. For those students, staff, or faculty searching for national water resources problems, links are included to the USGS State Water Resources Research Institute Program and the National Institutes for Water Resources Homepage. Links to associated research units with LWRRI are also included, such as NSEL. The web site is located on the College of Engineering’s main server and is maintained by LWRRI: (<http://www.lwrri.lsu.edu>).

Awards

None related to Section 104 funding.

Most Significant Achievements

In response to the recommendations of the previous report, and within plans noted in the last report, the Institute has expanded its activity into new areas, incorporating other disciplines and personnel. The Natural Systems Engineering Laboratory was the focal point of this expansion into areas of hurricane flood prediction, coastal land loss management, and wetlands protection. This effort has involved new researchers and state agencies, with significant information transfer component as well as research with direct impact on LA. In FY98, the Institute Advisory Board was restructured by the new director, Dr. Joe Suhayda, who formerly directed the NSEL, to reflect this new direction and growth. It is important to note that Section 104 funds within administrative support budgets were essential in implementing NSEL and ensuring its growth to a major research laboratory during its tenure in planning and management of these topics. It provided a significant information transfer and research effort of the Institute in the areas of flood prediction in storm events and coastal zone management. The Natural Systems Engineering Laboratory has received considerable

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exposure in its program through New Orleans television stations, US Congress, and Baton Rouge and New Orleans newspapers. The focus areas of coastal loss, flooding and hurricane evacuation planning are high interest areas for the public and state (Office of Emergency Preparedness) and federal agencies (FEMA). In information transfer activities to our US delegation from LA, the subject of NSEL and benefits becomes apparent in every discussion. With emphasis shifting toward regional programs earlier in this evaluation period, the Institute desired to also maintain the Louisiana focus and thus initiated the Natural Systems Engineering Laboratory with programs aimed at coastal loss, flooding and hurricane events related to public safety of Louisiana citizens. In FY02, LWRRI expanded its activity into new areas, incorporating other disciplines and personnel. With the retirement of Dr. Suhayda, the new Director Dr. John Pardue refocused the institute with new research priorities that will be rotating every two years. The current focus areas are: Characterization of particulates for heavy metals in aquatic systems and Total maximum daily load (TMDL) calculations in Louisiana water bodies.

Specific highlights of the information transfer component of LWRRI, from Section 104 and matching funds are listed below:

- Each year, the Institute places emphasis on acquainting Louisiana's research community with the research funding opportunities available through the U.S. Geological Survey Sections 104 and 105 research programs. LWRRI extensively distributes announcements for both research programs to all Louisiana's colleges, universities, and research organizations including all Historically Black Colleges and Universities. In addition, Institute representatives announce the programs at professional and faculty meetings. Since FY 1990, after the Institute declared a focus on nonpoint issues, the section 104 proposals received have grown in the nonpoint area indicating the faculty response to this viable research area.
- LWRRI and NSEL made a concerted web development effort to provide anyone interested in Water Resources and associated research interests access to up-to-date project information, real person contacts, and easily located e-mail links. This across-the-web accessibility on information gives faculty, staff, and students the ability to work in conjunction with other universities and colleges, as well as the national institutes such as USGS.

Education

As requested in the guidelines, the following tables provide (1) a count, by degree, of the number of students (46 total) and (2) the number of theses and dissertations supported by the Louisiana Water Resources Research Institute Section 104 grant and required matching funds over the five-year evaluation period. This count is reflected in the research project summaries and includes students supported in other activities such as information transfer and administration in the base grant. Also, it should be noted that theses and dissertations tend to lag behind student support in projects and tend to be reported in years following completion of a project. The actual number of graduate student individuals supported was found to be 20, even though it does not correlate with total theses and dissertations (3), several graduate students worked on projects that were not major parts of their thesis or dissertation, and several are still on-going in their work, accounting for the difference between number of graduate students and number of theses/dissertations produced during the reporting period. Six post-docs were also supported in FY 98-02. The following three examples serve to highlight the Institute's commitment to education with very positive results in assessment of graduates and programs:

- Dr. Hassan Shahid Mashriqui completed his PhD on the Hydrodynamic and sediment transport modeling of deltaic sediment processes, a LWRRI project and is now a faculty member, Assistant Professor, in the Environmental Studies program at LSU.

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- Ms. Alyson Hubbs, completed her Masters on Fecal coliform concentration in surface runoff from pastures with applied dairy manure, a LWRRRI project and is now a consultant in an Engineering firm in New Orleans.
- Dr. Donald Glenn completed his PhD on Partitioning and speciation of heavy metals in urban storm water and snow melt. His current position: Gulf Engineering, Baton Rouge.
- Dr. Hong Lin completed his PhD on Coagulation and flocculation in urban storm water. His current position: Chaven Company, New York.
- Mr. Jonathan Hird completed his Masters on Passive treatment of elevated transportation infrastructure rainfall–runoff. His current position: R. F. Weston., Baton Rouge.
- Mr. Chris Dean completed his Masters on Interactions between hydrology and water quality in urban rainfall–runoff. His current position: Geosyntec, San Francisco.

Number of Students Supported

Number of Students Supported, by Degree and Grant Type: 1998–2002

Degree	Base Grants	Regional and National Competitive Grants
Undergraduate	20	0
Masters	14	0
Ph.D.	6	0
Post Doc	6	2

Theses and Dissertations

Number of Theses and Dissertations Resulting from Student Support: 1998–2002

Master's Theses	4
Ph.D. Dissertations	3

Student Grants and Fellowships

No portion of the base grant was used by the Institute to support a student grants–in–aid or summer fellowship program. However, the Institute has a small private LSU Foundation fund for such activity and is able to fund small development efforts or small student projects.

Administration, Coordination, and Cooperation

Introduction

For management purposes, the Institute is segmented into two categories: 1) the research program and 2) administrative operations, which also encompasses information transfer activities. The administrative staff includes the director, associate director, one part–time program coordinator, one research associate for tech transfer, one research associate for research projects, and part–time student workers. The Institute expanded its staff in 1994 to include the associate director and two research associates, without increasing the administrative component of Section 104 funding. The director from 1999 – 2002 directed the Natural Systems Engineering Laboratory (NSEL), initiated in 1994, and through the increased NSEL activities, LWRRRI has obtained significant additional external funding of over \$1.2 million since inception. During the five–year reporting period, LWRRRI partial support from Section 104 funds and LSU match aided NSEL development. This development effort has been rewarded 15–fold relative to Section 104 administrative

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(base) funds with external awards to NSEL which focuses on important Louisiana and regional concerns of coastal engineering, specifically in the areas of coastal loss and management and flood protection in storm events, such as hurricanes impacting the coast of Louisiana and the city of New Orleans.

During the report period, the administration of the Institute was at the level of a regular academic department. As in an academic department, LWRRI reported to the Dean of the College of Engineering who ultimately reports to the LSU Chancellor through the Provost. Through its administrative operations, the Institute supports (1) procedures for promoting cooperation with other institutes and organizations, (2) supervision of Institute activities, and generation of additional funding for the Institute.

In order to accomplish these administrative objectives, the Institute works with the Institute Advisory Board and with other institutions, organizations, and LSU departments. LWRRI realizes that through integration with other centers, institutes, and academic departments, the Institute can best reach its full potential. By cooperating with other units, LWRRI has access to many resources, such as facilities, equipment, and researchers, that it otherwise would not have. To take full advantage of the benefits of collaboration, at the end of FY1997, the director integrated the Institute office and staff with that of the Hazardous Waste Research Center, an EPA "Center of Excellence" now supported by industry and the federal government, the Hazardous Substance Research Center/South an EPA-sponsored consortium of LSU, Rice, and Georgia Tech, and the Remote Sensing and Image Processing Laboratory (RSIP). In the previous 5 year evaluation, the Institute was integrated with the first two centers above, and recently was taken further, incorporating the last two programs. Since the reorganization, Dr. J.N. Suhayda was named LWRRI director, and he directed the institute along with NSEL, both under ERIC. Dr. Suhayda has served as associate director of LWRRI and managed the NSEL since its inception in 1994. LWRRI benefits from this reorganization in funding, support, and administration. Alone, LWRRI is funded annually at approximately \$300,000 including matching funds, but together these institutes, centers and programs are funded annually at over \$2.5 million from state, federal and private agencies. The accounting staff from the Division of Engineering Services also contributes to the operation of ERIC, including accounting for the Institute and NSEL. It should also be noted that the reorganization of research units in the College of Engineering at LSU has actually enhanced the profile of LWRRI, being the only federally recognized institute program in ERIC. Each individual Institute develops their own identity under the ERIC support structure and the organization does not compete with the individual Institutes for credit or name recognition. It essentially functions as a behind the scenes entity to encourage collaboration.

While the above units and programs described and associated with ERIC have individual goals and missions, they benefit from complimentary research areas and operate well beyond "pass-through" type programs by the coordination, focus and synergism they provide to researchers across numerous disciplines and universities. Each unit has research in the water resources area with LWRRI specializing in nonpoint source pollution, , RSIP in mapping, remote sensing and GIS/GPS systems, , and HSRC/Sin management of contaminated sediments. Since this integration, each of the units has profited from increased contacts, combined staff experience, and the elimination of duplicated effort. LWRRI and NSEL have seen substantial gains due to the computing systems and information management afforded by RSIP facilities. Because of this collaborative effort and pooling of resources, LWRRI is now better informed on a variety of water resource issues and better equipped to contribute to regional and national water research projects, as a leader in water resources research. The following sections provide requested information on the regional grant program, expenditures of 104 funds, and cooperation with other institutes and programs.

Regional and National Competitive Grant Programs

In 1998, the Institute submitted four proposals to the lead institute in Mississippi in which none were funded. The proposals that did exist in 1998 were originally funded in 1996 and were reported on in the previous five year report.

Cooperation

The expenditures listed below are for Section 104 and required match funds combined. The LWRRI expenditures at Louisiana State University listed for FY 1998 through FY 2002 include both administrative and information transfer in addition to research project funding.

One of the Institute's distinctive features is the emphasis it places on cooperation with other universities and institutes. In addition to LWRRI's collaboration with in-state institutions, such as DEQ, The Governor's Office, Office of Emergency Preparedness, universities and colleges, and other state agencies, the Institute works with at least seven out-of-state organizations in addition to other institutes as described at the end of this section. Through these collaborations, the Institute shares research and funding information, benefits from cooperative effort and knowledge, and expands concerns toward water resources problems of a national scope. The organizations with which LWRRI cooperates include the following:

- The Gulf Coast Hazardous Substance Research Center (GCHSRC) – The center consists of nine Gulf Coast Universities and is based at Lamar University in Beaumont, Texas. Through this cooperative arrangement, the institutes involved exchange information mainly about research projects and objectives. LSU's LWRRI benefits from participation in the GCHSRC as it gains valuable input from the other universities and participates in ongoing dialogue centering around environmental research. Dr. Constant serves as university contact for LSU in this consortium. (No Section 104 funds are used in this cooperation.)
- The National Institutes for Water Resources (NIWR) – Together, NIWR, LWRRI, and the other institutes work to coordinate their individual, regional and national water research programs. LWRRI also cooperates with NIWR to share information about external funding opportunities and to secure this funding, within USGS and from other federal agencies. Significant effort has been made within NIWR by the LWRRI to maintain and enhance the program funding at the national level.
- The Universities Council on Water Resources (UCOWR) – LWRRI works with this organization in order to coordinate water research efforts and to increase external funding opportunities. The annual meeting provides a forum for presentation of selected research areas.
- The USGS District Chief – LWRRI works with this office to coordinate the Institute's and the state's water research objectives with those of the regional and the national programs. The District Chief also serves as a member of the Institute Advisory Board.
- Rice University and Georgia Institute of Technology – LWRRI's director (1990–1999) during the reporting period also serves as assistant director of HSRC/S which is a three-institution consortium consisting of LSU, Georgia Tech, and Rice University with LSU as the lead. LWRRI benefits from this collaboration as Dr. Constant participates in research and administration of the center and secures relevant information and recognition that is applicable to LWRRI as well as to HSRC. (No Section 104 funds are used for this cooperation.)
- The Great Plains/Rocky Mountain HSRC – LWRRI's director (1990–1999) also serves on the Science Advisory Committee of this EPA HSRC, in his third three-year term. The center is a multiuniversity consortium for EPA regions 7 and 8 located at Kansas State University. The director is currently vice-chairman of this national membership science advisory committee. (No Section 104 funds are used for this cooperation.)
- U.S. Environmental Protection Agency – The director (1990–1999) also serves on several (1–3) national peer review panels each year (1996–present) for US EPA's external research program. (No Section 104 funds are used for this cooperation.)

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Expenditure of Section 104 and Matching Funds, by University or Other Organization, State, and Year: 1998 – 2002

University or Organization	State	Section 104 Federal Grant and Matching Fund Expenditures				
		1998	1999	2000	2001	2002
Louisiana State University	LA	60526	205867	207149	203951	224582
University of New Orleans	LA	0	0	0	0	34546
Tulane	LA	0	0	44165	0	0
Louisiana State University Agricultural Experiment Station	LA	0	0	0	40132	0

Institute Directors over Evaluation Period

Name	Academic Discipline	Term
Dr. W. David Constant	Professor of Civil & Environmental Engineering, BS, MS, PhD in Chemical Engineering, PE, Chemical & Environmental Engineering, LA	1990–1999
Dr. Joseph N. Suhayda	Assoc. Professor of Civil & Environmental Eng., B.S. in Physics, Ph.D. Physical Oceanography	1999–2002
Dr. John H. Pardue	Professor of Civil & Environmental Eng., B.S. in Biology, M.S. in Marine Sciences, Ph.D. in Civil Engineering, PE, Civil & Environmental Engineering, LA	2002–present

Advisory Committees

The members of the Institute Advisory Board (IAB) are listed below. The main task of the IAB, comprised of academics, industry and the public sector water resources professionals is to assist the director with proposal reviews and evaluations of ongoing projects, make recommendations to the director regarding timely projects (appropriate focus areas for the Institute), and provide contacts for external support. The IAB conducts the review by mail or e-mail with the Institute. During the reporting period the IAB has participated in at least one peer review of proposals of the Institute each year. Members are sought by the director and serve individual terms. There has been a mixture of continuity and turnover on the IAB, which has been very positive and relevant to the focus areas and objectives of the program. The IAB plays a most valuable role in the administration and research direction of the Institute. Their efforts are essential in conducting a relevant, peer reviewed competition in the 104 programs.

Institute Advisory Board Members

Mr. Harold Gorman, New Orleans Sewage and Water Board, 1993–1998
 Colonel William Conner, U. S. Army Engineer District, 1998
 Mr. Z. “Bo” Bolourchi, LA Department of Transportation Development, 1993–1999
 Mr. Harry Hawthorne, U.S. Department of Agriculture, 1993–1999
 Mr. Rod Emmer, LA Water Resources, 1993–1999
 Dr. Helen Bostock, AWRA, 1993–2002
 Dr. Brad Hanson, LGS, LSU, 1993–2002
 Dr. Hessein Madgi Selim, Department of Agronomy, LSU, 1993–2000
 Dr. John Day, Coastal Ecology Institute, LSU, 1993–2000
 Dr. Ralph Portier, Institute for Environmental Studies, LSU, 1993–1999
 Mr. J. Dale Givens, Department of Environmental Quality, 1993–1999

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Mr. James P. Antoon, DHH Environmental Consultant, 1994–1999
Dr. Robert Gambrell, Center for Wetland Resources, LSU, 1996–2002
Dr. Charles Demas, USGS District Chief, 1998 – 2002
Mr. Troy Hill, EPA – Ecosystems Protection Branch, Watershed Management, 2000–2002
Mr. Edmond Preau, DOTD, Public Works & Water Resources Division, 2000–2002
Mr. Burnell Thibodeaux, Dept of Army Corps of Engineers, New Orleans District, 2000–2002
Ms. Jan Boydston, LA DEQ Office of Water Research, 1998–2002
Ms. Linda Korn Levy, LA DEQ Office of Water Resources, 2000–2002

Research Proposal Review and Selection Process

The LWRRI proposal review and selection process includes both an independent peer assessment of the scientific merit of proposals and assesses the scientific adequacy and relevance of the proposed work to state and/or regional problems. The core of the review employs the previously listed Institute Advisory Board (IAB) members in technical review of proposals at the state level. Thus an independent peer review is obtained that includes scientific merit and relevance of the proposed work. IAB members are provided with the request for proposals (Example in Attachment), the focus areas of the Institute, and evaluation forms with specific criteria for grading and additional comments about the strengths and weaknesses of each proposal. Emphasis is given at the IAB review stage to state water resources research issues, which are within the Southeastern/Island Region priorities and included over the five years of this report the areas of (1) natural systems for wastewater treatment, (2) mitigation and evaluation of point and nonpoint sources of contaminated water and wastewater, (3) impact on shallow aquifers in Louisiana, and (4) groundwater remediation. The funding recommendation was combined with the overall evaluation and comments, by the Director into a final IAB ranking of the proposals. The top ranking proposals were then submitted to the USGS for funding by the Director, based on the available funds for the state program. The Director fully followed the recommendations of the IAB in ranking and recommending proposals for funding to the USGS in all years reported herein.

In 1998, the regional competition format added additional review to the process described above. After IAB review of proposals as described above, proposals were submitted to external peer review using selected members of the IAB and of the US EPA Hazardous Substance Research Center/South & Southwest Science Advisory Committee. The Director (1998–1999) also serves as Asst. Director of this EPA research center, which afforded him access to this 15 member national committee of experts in research along the same lines as the Institute focus areas. Proposals were reviewed by mail using the regional recommended evaluation format including a rating of 1 to 10 in areas of Technical Merit, Application to Regional Needs, Feasibility, PI ability, Student Training, Technology Transfer, and Special Needs of State/Subregion. Comments were also requested from reviewers for each proposal. The top ranked four proposals were submitted to the regional lead Institute (Mississippi) for regional review. Proposals were then reviewed by the Institute Directors of the Southeastern/Island Region by mail followed by a group meeting and discussion, selecting by vote as needed, proposals for funding from the regional competition. No successful proposals from this multi-tiered process of exhaustive review were funded.

The main function of the LWRRI IAB is to provide technical review with relevance to Institute research areas. This function is the key component in funding projects through the Institute. The IAB members are sought by the director and serve terms as they are able, being replaced when requested, inactive, or replaced in the unit LWRRI wishes to maintain review procedures with, such as the LA Department of Environmental Quality or the US Army Corps of Engineers, both of which, among others, provide invaluable peer review of proposals.

Thus, the Institute maintains a fairly streamlined research proposal review and selection process, always involving the IAB, and other external reviewers as needed. In terms of the mechanics of the process, the following are key points maintained in the review each funding year or program announcement:

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1. Identify research needs, distribute call for proposals (RFP) to over 300 contacts in state including HBCUs, research offices, and academics at LA institutions of higher education with interest in water resources research.
2. RFP contains format, submission deadline, and funding amounts and dates. Director supplies additional information to PIs as requested by phone conversations or e-mail requests to encourage submission of proposals.
3. Compile received proposals and submit to IAB for peer technical and program relevancy review.
4. Compile reviews of proposals from IAB and rank for funding or regional review.
5. If regional (1998), obtain additional external peer review (HSRC SAC and/or select IAB members without conflict of interest) and submit best 4 to region following numerical ratings of the review.
6. Regional Institute Directors review and meet to determine best proposals for recommendation to USGS.
7. If state program only (1999 – 2002), Director follows overall recommendation and ratings of IAB for selection of best proposals for submission to USGS for funding.
8. Once funding is awarded, implementation procedures begin, including establishment of accounting, investigator reporting requirements, and director oversight into research progress or problems.
9. PIs complete requirements of the project with submission of a synopsis, completion report, copies of publications,. Accounting also requires that projects be properly closed-out within budget. These items are included in a Researcher's Manual provided to the PI at the inception of a project, as illustrated in Attachment .
10. All the above points must be accomplished within the funding cycle set by the USGS in order to continue the program.

The institute prefers to obtain preproposals for initial review by the IAB, selecting the best for full proposal submission. However, due to time limitations in the process, which requires a second review, followed by additional external review in FY97, only full proposals were requested in FY1998 from the initiation of the call for proposals. This did not diminish the quality of proposals, but did place the burden on the investigators to prepare full proposals at the inception of the call, as opposed to later in the process if the preproposal is successful in the first IAB review. With the institute now cycling much earlier in the year – February instead of September – and with state, national and regional research programs all underway, future calls for proposals will be a one step process due to the reviews required and the preproposal step was eliminated during the last reporting period.

During the reporting period, the Institute annually distributed over 300 requests for proposals to the institutions of higher education in the state, and received 6 proposals in 98, 11 proposals in 99, 12 in 2000, 8 in 01 and 5 in 02 yielding 4 proposals for each of those years, except none were funded in 1998. This effort resulted in funding of 15 projects during the 5 year period plus administrative support each year including 1998. Thus a strong competitive program exists in the Institute for funding, whether it is regional or statewide in focus.

Peer Review of Institute Publications

Although LWRRI has no formal peer review for its publications, the Institute encourages all investigators to present their work at conferences. At these conferences, the researchers receive feedback on their work from a wide variety of peers including other researchers and water resource institute representatives not only from Louisiana but also from different states, different regions, and even different nations. Researchers also receive peer review as they submit their work to peer review journals as noted in the project summaries. The Institute strongly encourages its investigators to publish their work not only to disseminate important research information and to gain recognition for themselves and for LWRRI, but also for the valuable feedback that comes from journal review boards and from journal subscribers.

Number of Principal Investigators Supported, by Rank and Year

**Principal Investigators on Research Projects Supported
by Section 104 Grants and Matching Funds, by
Academic Rank and Year: 1998 – 2002**

Academic Rank	1998	1999	2000	2001	2002
Assistant Professor and below	0	4	2	6	2
Associate Professor	0	1	0	0	3
Professor	0	5	3	3	2
Total	0	10	5	9	7

Additional Information for the Evaluation Panel

Attachment A: 1999LAGR02673XC–02 Research Project Description

Title Mercury in Louisiana Freshwater Lakes: The effect of anaerobic conditions on methylation and demethylation of mercury

Project Number 1999LAGR02673XC–02

Start Date 3/1/1999

End Date 8/31/2000

Research Category Water Quality

Focus Categories ['Non Point Pollution', 'Sediments', 'Toxic Substances']

Principal Investigators

Name	Rank During Project Period	Affiliation
W. H. Patrick	Boyd Professor	Wetland Biogeochemistry, LSU
R. P. Gambrell	Professor	Wetland Biogeochemistry, LSU
R. D. DeLaune	Professor	Wetland Biogeochemistry, LSU
I. Devai	Assistant Professor	Wetland Biogeochemistry, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY1999	20000	40000	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	1	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

The major achievement was developing a reproducible method for extracting methylmercury from freshwater sediments at a minimum concentration of approximately 0.2 parts per billion.

Attachment A: 1999LAGR02673XC–03 Research Project Description

Title Mitigation of urban storm water discharges to City Park Lake through integrated passive adsorptive–filtration
Project Number 1999LAGR02673XC–03
Start Date 3/1/1999
End Date 8/31/2000
Research Category Engineering

Focus Categories ['Non Point Pollution', 'Toxic Substances', 'Treatment']

Principal Investigators

Name	Rank During Project Period	Affiliation
John J. Sansalone	Assistant Professor	Civil & Environmental Engineering, LSU
Frank K. Cartledge	Alumni Professor	Chemistry, LSU
Kelly Rusch	Associate Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY1999	18375	46769	0	0
2000–2001	0	0	LTRC, LSU	20000
2000–2001	0	0	National Sea Grant	104000
2000–2001	0	0	USEPA Office of Water	25000

This project received follow–on funding after completion as a section 104–funded project (Yes No).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	5	0
Masters	2	0
Ph.D.	0	0
PostDoctoral	1	0

Publications

Publication Type	Publication Citation
Conference Proceedings	Hird, J., Cristina, C., Sansalone, J.J., Tramonte, J. and Cartledge, F.K., “Treatment of Elevated Roadway Runoff over Coastal Waters Using Clarification Technology”, WEFTEC2001 Conference Proceedings and Presentation, Water Environment Federation, Atlanta, Georgia, October 2001.

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Conference Proceedings	Hird, J., Cartledge, F.K., Tittlebaum, M.E. and *Sansalone J.J., 2001. “Passive Treatment of Elevated Roadway Runoff over Coastal Waterways Using Upflow Clarification Technology”, 4th International Conference on Innovative Technologies in Urban Storm Drainage, GRAIE, Lyon, France, June 2001.
Conference Proceedings	Sansalone, J.J., Glenn, D.W., Cartledge, F.K. and Tittlebaum, M.E., 2000. “Adsorption mechanisms for eco-treatment of urban waters influenced by non-equilibrium partitioning of heavy metals”, International Association for Hydraulic Research, Capri, Italy, July 2000.

Awards and Achievements

The experimental site is located in a very visible and public area. Therefore much publicity has been generated for LWRRI at the research. For example, The Advocate featured a story on the research and sponsors, Louisiana Sea Grant’s “Coast and Sea” periodical featured a story on the research, students and sponsors as did Louisiana’s Department of Development and Transportation in their monthly periodical.

Attachment A: 1999LAGR02673XC–04 Research Project Description

Title Photocatalytic/Adsorbilization Semiconducting Monolith Reactor for the Treatment of Dilute Wastewater

Project Number 1999LAGR02673XC–04

Start Date 3/1/1999

End Date 8/31/2000

Research Category Ground–water Flow and Transport

Focus Categories ['Groundwater', 'Treatment', 'Water Quality']

Principal Investigators

Name	Rank During Project Period	Affiliation
K. T. Valsaraj	Ike East Professor	Chemical Engineering, LSU
W. D. Constant	Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY1999	25000	52969	0	0
2000–2003	0	0	U.S. EPA through the Gulf Coast Hazardous Substance Research Center	143000

This project received follow–on funding after completion as a section 104–funded project (Yes No).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	1	0

Publications

Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Yuan, Q.; P. M. Jain and K. T. Valsaraj, 2000. “Reusable Adsorbents For Dilute Solution Separation. 4. Adsorption Of 1,2–Dichlorobenzene And Phenanthrene On A Surfactant–Modified Semiconductor (Titania) Surface,” Separation and Purifications Technology. Vol. 21, 1–2, pp; 9–16

Awards and Achievements

[None]

Attachment A: 2000LAGR02673C–03FY00 Research Project Description

Title Denitrification in Wetlands Receiving Mississippi River Freshwater Diversion: Water Quality Aspects
Project Number 2000LAGR02673C–03FY00
Start Date 3/1/2000
End Date 2/28/2001
Research Category Water Quality
Focus Categories ['Nitrate Contamination', 'Non Point Pollution', 'Water Quality']
Principal Investigators

Name	Rank During Project Period	Affiliation
R. D. DeLaune	Professor	Wetland Biogeochemistry, LSU
C. W. Lindau	Professor	Wetland Biogeochemistry, LSU
A. Jugsujinda	Post Doctoral	Wetland Biogeochemistry, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2000	17800	53720	0	0

This project received follow–on funding after completion as a section 104–funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	1	1
Ph.D.	0	0
PostDoctoral	1	0

Publications

Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Delaune, R.D. A. Jugsujinda, 2003, Denitrification Potential in a Louisiana Wetland Receiving Diverted Mississippi River Water. Chemistry and Ecology, Vol 19(6), December 2003, pp. 411–418.

Awards and Achievements

[None]

Attachment A: 2000LAGR02673C–02FY00 Research Project Description

Title Investigation into the Effect of the Direction, Spatial Coverage and Temporal Distribution of Rainfall on Watershed Flooding

Project Number 2000LAGR02673C–02FY00

Start Date 3/1/2000

End Date 2/28/2001

Research Category Climate and Hydrologic Processes

Focus Categories ['Floods', 'Hydrology', 'Surface Water']

Principal Investigators

Name	Rank During Project Period	Affiliation
V. P. Singh	Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2000	8350	64236	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	2	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Singh, V. P., 2001, Kinematic Wave Modeling in Water Resources: A Historical Perspective. Hydrological Processes, Vol. 15, pp. 671–706.
Articles in Refereed Scientific Journals	Moramarco, T. and V. P. Singh, 2001, A Simple Method for Relating Local Stage and Remote Discharge. Journal of Hydrologic Engineering, ASCE, Vol. 6, No.1, pp.78–81.
Articles in Refereed Scientific Journals	Singh, V. P., 2000, Water Power. The World Book Encyclopedia, pp., Chicago, Illinois.
Articles in Refereed Scientific Journals	Bobba, A. G., V. P. Singh, R. Berndtsson, and L. Bengtsson, 2000, Numerical Simulation of Saltwater Intrusion into Laccadive Island Aquifers due to Climate Change. Indian Journal of Geophysics, Vol.55, pp. 589–612.

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Articles in Refereed Scientific Journals	Westerstrom, G. and V. P. Singh, 2000, An Investigation of Snowmelt Runoff on Experimental Plots in Lulea, Sweden. Hydrological Processes, Vol.14, pp.1869–1885.
Articles in Refereed Scientific Journals	Bobba, A. G., V. P. Singh and L. Bengtsson, 2000, Application of Environmental Models to Different Hydrological Systems. Ecological Modelling, Vol. 125, pp. 15–49.
Articles in Refereed Scientific Journals	Ozkul, S., N. B. Harmancioglu, and V. P. Singh, 2000, Entropy–Based Assessment of Water Quality Monitoring Networks in Space/Time Dimensions. Journal of Hydrologic Engineering, ASCE, Vol. 5, No. 1, pp. 90–100.
Articles in Refereed Scientific Journals	Singh, V. P., 2000, The Entropy Theory as Tool for Modeling and Decision Making in Environmental and Water Resources. Water SA, Vol. 26, No. 1, pp. 1–11.
Articles in Refereed Scientific Journals	Moramarco, T. and V. P. Singh, 2000, A Practical Method for Analysis of River Waves and for Kinematic Wave Routing in Natural Channel Networks. Hydrological Processes, Vol. 14, pp. 51–62.
Articles in Refereed Scientific Journals	Xu, C.–Y. and V. P. Singh, 2000, Evaluation and Generalization of Radiation–Based Methods for calculating evaporation. Hydrological Processes, Vol. 14, No. 2, pp. 339–351.
Book Chapters	Singh, V.P., 2001, Ecological Hydrology. in: Hydrology in Environmental Management, edited by J.S. Rawat, Shree Almora Book Depot, Almora, India.
Book Chapters	Singh, V. P., 2001, The Entropy Theory as a Decision Making Tool in Environmental and Water Resources. in Entropy Measures, maximum Entropy and Emerging Applications, edited by Karmeshu, Springer–Verlag, Bonn, Germany.
Book Chapters	Harmancioglu, N. B. and V. P. Singh, 2001, Data Accuracy and Validation. in Encyclopedia of Life Support Systems, edited by A. Sydom, EOLSS Publishers Co., Ltd., Oxford, U. K.
Book Chapters	Ojha, C. S. P. and V. P. Singh, 2001, Storm Water Drainage and Effluent Disposal. in Encycloedia of Life Support Systems, edited by A. Sydom, EOLSS Publishers Co., Ltd., Oxford, U. K.
Book Chapters	Singh, V. P., 2001, Statistical Analyses Design. In Encycloedia of Life Support Systems, edited by A. Sydom, EOLSS Publishers Co., Ltd., Oxford, U. K.
Book Chapters	Ojha, C. S. P. and V. P. Singh, 2001, ANN Modeling in Watershed Hydrology. Chapter 3 in Mathematical Models of Large Watershed Hydrology, edited by V. P. Singh, D. K. Frevert and S. P. Meyer, Water Resources Publications, Littleton, Colorado.
Book Chapters	Ojha, C. S. P. and V. P. Singh, 2001, Models of Water Balance in a Small Watershed. Chapter 14 in Mathematical Models of Small Watershed Hydrology and Applications, edited by V. P. Singh, D. K. Frevert and S. P. Meyer, Water Resources Publications, Littleton, Colorado.
Book Chapters	Mishra, S. K. and V. P. Singh, 2001, SCS–CN_Based Hydrologic Simulation Package. Chapter 13 in Mathematical Models of Small Watershed Hydrology and Applications, edited by V. P. Singh, D. K. Frevert and S. P. Meyer, Water Resources Publications, Littleton, Colorado.
Book Chapters	Singh, V. P., D. K. Frevert, and S. P. Meyer, 2001, Mathematical Modeling of

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	Watershed Hydrology. Chapter 1 in Mathematical Models of Small Watershed Hydrology and Applications, edited by V. P. Singh, D. K. Frevert and S. P. Meyer, Water Resources Publications, Littleton, Colorado.
Book Chapters	Singh, V. P., D. K. Frevert, and S. P. Meyer, 2001, editors, Mathematical Modeling of Large Watershed Hydrology. Water Resources Publications, Littleton Colorado.
Book Chapters	Singh, V. P., G. T. Wang, and D. D. Adrian, 2000, Flood Routing Based on Diffusion Wave Equation Using Mixing Cell Method. pp. 167–180 in High Resolution Flow Modeling in Hydrology and Geomorphology, edited by P. D. Bates and S. N. Lane, John Wiley & Sons, New York.
Book Chapters	Singh, V. P., L. Bengtsson, and G. Westerstrom, 2000, Kinematic Wave Modelling of Saturated Basal Flow in a Snowpack. pp. 283–294 in “High Resolution Flow Modeling in Hydrology and Geomorphology,” edited by P. D. Bates and S. N. Lane, John Wiley & Sons, New York.
Book Chapters	Singh, P. and V. P. Singh, 2000, Snow and Glacier Hydrology. Kluwer Academic Publishers, pp. 742.
Conference Proceedings	Tommaso, M. and V. P. Singh, 2001, Unsteady Overland Flow: Effects of the Boundary Conditions. Proceedings of the IASTED International Conference on Modeling and Simulation, pp. 1–8, Philadelphia, May 15–17, 2001.
Conference Proceedings	Deng, Z. Q. and V. P. Singh, 2000, Fractal and Chaotic Characteristics of Alluvial Rivers. In Stochastic Hydraulics, edited by Z. Y. Wang and S. X. Hu, Balkema, Rotterdam, pp. 117–123.
Conference Proceedings	Singh, V. P., 2000, Hierarchy of Hydraulic Geometry Relations. Proceedings, Eight International Symposium on Stochastic Hydraulics, Beijing China.
Conference Proceedings	Singh, V. P., D. K. Frevert, M. A. Trevino, S. P. Meyer, and J. D. Rieker, 2000, The Hydrologic Modeling Inventory – A Cooperative Research Effort. Proceedings, ASCE National Symposium on Watershed Management, Fort Collins, Colorado.
Conference Proceedings	Mishra, S. K., S. K. Jain, M. K. Sharma, and V. P. Singh, 1999, Derivation of CN for Existing and Modified SCSW–CN Methods. Proceedings, Regional Seminar on Conflict Management of International River basins, held December 7–8, 1999, in Dhaka, Bangladesh.

Awards and Achievements

[None]

Attachment A: 2000LAGR02673C–04FY00 Research Project Description

Title Quantifying Urban Non–point Sources of Lead for use in TMDL Computations
Project Number 2000LAGR02673C–04FY00
Start Date 3/1/2000
End Date 2/28/2001
Research Category Water Quality
Focus Categories ['Management and Planning', 'Non Point Pollution', 'Water Quality']

Principal Investigators

Name	Rank During Project Period	Affiliation
Laura J. Steinberg	Assistant Professor	Tulane University Department of Civil & Environmental Engineering
Ridgely P. Myers	Graduate Student	Tulane University Department of Civil & Environmental Engineering

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2000	22074	44165	0	0

This project received follow–on funding after completion as a section 104–funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	1	0
Ph.D.	0	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]

Attachment A: 2001LA2541B Research Project Description

Title Determining Uncertainty in Capture Zones and Interference from High Volume Wells
Project Number 2001LA2541B
Start Date 3/1/2001
End Date 2/28/2003
Research Category Ground–water Flow and Transport
Focus Categories ['Groundwater', 'Management and Planning', 'Water Supply']
Principal Investigators

Name	Rank During Project Period	Affiliation
Clinton Willson	Assistant Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2001	16000	41598	0	0

This project received follow–on funding after completion as a section 104–funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	1	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
Other Publications	Hanson, B., R. Milner, A. Rahman, C. Willson, and R. Paulsell, 2001, Evaluation of Aquifer Capacity to Sustain Long Term Ground Water Withdrawal from Point Sources: A Pilot Study, Final Report submitted to the Louisiana Department of Natural Resources.
Other Publications	National Presentations – Rahman, A, Hartano, S. and C.S. Willson, 2003, Incorporating Uncertainty into High–resolution Groundwater Supply Models, accepted abstract for the World Water and Environmental Resources Congress, sponsored by the ASCE Environmental and Water Resources Institute, June 20–23, 2003, Philadelphia, PA
Other Publications	National Presentations – Rahman, A., R. Milner, B. Hanson, and C.S. Willson, 2001, Linking Local– and Aquifer–scale Groundwater Models Using Telescopic Mesh Refinement, presented at the 2001 American Geophysical Union Fall Meeting, December 10–14, 2001.

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Other Publications	Local Presentations – Willson, C.S., 2001, Groundwater Issues in Louisiana, presented to the Baton Rouge Leadership Program, November 13, 2001.
Other Publications	Local Presentations – Willson, C.S., 2001, Groundwater Modeling of the Chicot Aquifer Underlying Acadia Parish, presented to the Baton Rouge Geological Society, November 8, 2001.

Awards and Achievements

[None]

Attachment A: 2001LA2501B Research Project Description

Title Development of a Two Dimensional High Spatial Resolution Storm Surge Simulation Model for Single Processors and Distributed Computing Clusters

Project Number 2001LA2501B

Start Date 3/1/2001

End Date 2/28/2003

Research Category Climate and Hydrologic Processes

Focus Categories ['Floods', 'Hydrology', 'Models']

Principal Investigators

Name	Rank During Project Period	Affiliation
Vibhas Aravamathan	Asst. Professor of Research	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2001	9499	19653	0	0
2002–2004	0	0	Louisiana Board of Regents, Health Excellence Fund	52466
2002–2004	0	0	University of Louisiana, Lafayette	38896
2001–2003	0	0	EPA EpsCoR	258029

This project received follow-on funding after completion as a section 104-funded project (Yes X No ___).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]

Attachment A: 2001LA2621B Research Project Description

Title Fecal Coliform Concentrations in Runoff from Fields with Applied Dairy Manure
Project Number 2001LA2621B
Start Date 3/1/2001
End Date 2/28/2003
Research Category Water Quality
Focus Categories ['Agriculture', 'Non Point Pollution', 'Surface Water']
Principal Investigators

Name	Rank During Project Period	Affiliation
Caye Drapcho	Assistant Professor	Biological & Agricultural Engineering, LSU Agricultural Center
Alyson Hubbs	Research Associate	Biological & Agricultural Engineering, LSU Agricultural Center

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2001	20000	40132	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	1	1
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]

Attachment A: 2001LA2521B Research Project Description

Title Storm Water Transport of Particulate Matter From Elevated Urban Transportation Corridors into Waterways of Louisiana – The Role of Partitioning and Implications For Treatment

Project Number 2001LA2521B

Start Date 3/1/2001

End Date 2/28/2002

Research Category Water Quality

Focus Categories ['Hydrology', 'Non Point Pollution', 'Toxic Substances']

Principal Investigators

Name	Rank During Project Period	Affiliation
John Sansalone	Professor	Civil & Environmental Engineering, LSU
Frank Cartledge	Alumni Professor	Wetland Biogeochemistry, LSU
Marty Tittlebaum	Professor	University of New Orleans, Civil & Environmental Engineering

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2001	12000	29669	0	0
2003 – 2005	0	0	LTRC, LSU	349905

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	2	2
Ph.D.	2	2
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Cristina, C. and J. J. Sansalone, 2002, An Evaluation Of The First Flush, Power Law Model And Process Selection Diagram For Storm Water Runoff, ASCE J. of Environmental Engineering (accepted).
Articles in Refereed Scientific Journals	Dean, C.M., J. J. Sansalone, F. K. Cartledge, and J. H. Pardue, 2004, Influence Of Hydrology On Storm Water Metal Element Speciation At The Upper End Of The Urban Watershed, ASCE J. of Environmental Engineering, (in press) 2004.
Articles in Refereed Scientific Journals	Liu, D., J. J. Sansalone and F. K. Cartledge, 2004, Adsorption Characteristics Of Oxide Coated Polymeric Media ($r_s < 1.0$) For Storm Water Treatment – Part I: Batch Equilibria

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Journals	And Kinetics, ASCE J. of Environmental Engineering, April 2004.
Articles in Refereed Scientific Journals	Liu, D., J. J. Sansalone and F. K. Cartledge, 2004, Adsorption Characteristics Of Oxide Coated Polymeric Media ($rS < 1.0$) For Storm Water Treatment – Part II: Equilibria And Kinetics Models, ASCE J. of Environmental Engineering, April 2004.
Articles in Refereed Scientific Journals	Sansalone, J.J and C. M. Cristina, 2004, First Flush Concepts For Suspended And Dissolved Solids In Small Impervious Watersheds, ASCE J. of Environmental Engineering, (in press) 2004.
Articles in Refereed Scientific Journals	Sansalone, J.J and C. M. Cristina, 2004, Gradation–Based Heavy Metal Mass Prediction Utilizing Granulometry Of Urban Land Use Snowmelt Particulate Residuals, ASCE J. of Environmental Engineering, (in press) 2004.
Conference Proceedings	Cristina, C.M., J. J. Sansalone, and T. Guo, 2003, First–flush Criteria for Solids in Small Urban Watersheds, WEFTEC2003 Conference Proceedings and Presentation, Water Environment Federation, Los Angeles CA, October 2003.
Conference Proceedings	Cristina, C.M. and J. J. Sansalone, 2002, Evaluating the First–flush and Process Selection Methodology for Urban Storm Water Particulate Matter, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Dean, C.M., A. A. Blazier, E. E. Krielow, F. K. Cartledge, and J. J. Sansalone, 2002, What You Did Not Know About Stormwater Chemistry and Were Afraid to Ask, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Glenn, D.W., D. Liu, and J. J. Sansalone, 2002, Influence of Chemistry, Hydrology and Suspended Solids on Partitioning of Heavy Metals to Particles, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Glenn, D. W., J. J. Sansalone, and K. M. Howerter, 2002, Heavy Metal Partitioning to Particles in Snow Exposed to Urban Traffic – Distribution Across the Particulate Gradation, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Hird, J., C. M. Cristina, J. J. Sansalone, J. Tramonte, and F. K. Cartledge, 2001, Treatment of Elevated Roadway Runoff over Coastal Waters Using Clarification Technology, WEFTEC2001 Conference Proceedings and Presentation, Water Environment Federation, Atlanta, Georgia, October 2001.
Conference Proceedings	Lin, H., L. Wall, and J. J. Sansalone., 2002, Aggregation of Stormwater Particles – Suspended Particle Gradations and Settling Column Analysis, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Sansalone, J.J. and C. M. Dean, 2003, Metal Element and Particulate Relationships at the Upper End of an Urban Watershed: Investigations of Disproportionate Delivery and Control, WEFTEC2003 Conference Proceedings and Presentation, Water Environment Federation, Los Angeles CA, October 2003.
Conference Proceedings	Sansalone, J.J, P. Zhou, R. Ferrell, H. Lin, F. K. Cartledge, 2003, Physico–Chemical Characteristics of the Clay–size Fraction Entrained in Urban Rainfall–Runoff: Interactions with Anthropogenic Heavy Metals, 10th European Clay Conference, University of Modena, Italy, June 2003.
Conference Proceedings	Sansalone, J.J., F. K. Cartledge, M. E. Tittlebaum, 2002, The Role of Hydrology and Partitioning on Control of Transportation Land Use Storm Water, Symposium of Hydrology, Hydraulics and Water Quality for Transportation Systems, Las Croabas,

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	Puerto Rico, July 2002.
Conference Proceedings	Sansalone, J.J., 2002, Unit Operations and Processes Applied to Stormwater Management, Symposium of Hydrology, Hydraulics and Water Quality for Transportation Systems, Las Croabas, Puerto Rico, July 2002.
Conference Proceedings	Tramonte, J.C., F. K. Cartledge, M. E. Tittlebaum, and J. J. Sansalone, 2002, Transport and Treatment of Entrained Particulate Matter from Elevated Transportation Infrastructure, 9th International Conference on Urban Drainage, Paper and Presentation, ASCE/IWA, Portland, Oregon, September 2002.
Conference Proceedings	Tramonte, J., J. J. Sansalone, F. K. Cartledge, M. E. Tittlebaum, 2002, Transport of Entrained Particulate Matter and Heavy Metals from Urban and Transportation Infrastructure, 2nd International Conference on New Trends in Water and Environmental Engineering, Capri, Italy, June 2002.
Conference Proceedings	Voon, E., J. J. Sansalone, V. Srinivasan, M. O’Leary, 2002, Challenges for Control of Aquatic Nuisance Species in Shipping Ballast Water Discharged to Coastal Ports, 2nd International Conference on New Trends in Water and Environmental Engineering, Capri, Italy, June 2002.

Awards and Achievements

KEYNOTE LECTURES

1. United States Environmental Protection Agency Coast and the Environment Conference, Emerging Technologies, Tools and Techniques to Manage Our Coast, “Transport, Characterization and Control for Rainfall–runoff in Coastal Areas”, Keynote Lecture, Cocoa Beach, Florida, 30 January 2003.
2. International Association of Hydraulic Research Conference, 2nd International Conference on Water and the Environment, “Advances in Water Quality Modeling in Urban Catchments” Keynote Lecture, Capri, Italy, 27 June 2003.

IN THE NEWS

1. “Pollution Patrol” in The Advocate (Baton Rouge, Louisiana newspaper), 2 March 2003.
2. “Storm Water Washes up Trouble for Cities” in the Arkansas Democrat Gazette (Little Rock, Arkansas newspaper), 4 December 2002.
3. “LSU Researcher Examines Storm Water Runoff in Arkansas” in The Advocate (Baton Rouge, Louisiana newspaper), 30 November 2002.
4. Television “Newsmaker Interview” story by Channel 2 (WBRZ) on control of rainfall–runoff in Baton Rouge, November 2002.
5. Television news story by Channel 2 (WBRZ) on storm water treatment for City Park Lake featuring I–10 experimental site, November 2002.

INVITED TALKS

1. Shell Global Solutions (US) Inc. “The Role of Hydrology and Chemistry on Heavy Metal Control in Storm Water”, Houston, Texas, May 2002.
2. Louisiana Water Environment Federation “The Role of Hydrology and Partitioning on the Transport and Control of Urban Runoff Heavy Metals in South Louisiana, LWEA State Conference, Baton Rouge, Louisiana, April 2002.
3. Lake Tahoe Regional Water Quality Control Board, “The Nature and Treatment of Storm Water, South Lake Tahoe, CA, 05 December 2001.
4. California Water Quality Task Force Meeting, “Physical–Chemical Aspects of Urban Storm Water”, Sacramento, CA, 16 November 2001.
5. Southern California Regional Water Quality Control Board, “Unit Operations and Processes for Urban Storm Water Treatment”, Oakland, CA, 15 November 2001.

Attachment A: 2002LA4B Research Project Description

Title Flood Risk Mapping of the New Orleans Area
Project Number 2002LA4B
Start Date 3/1/2002
End Date 2/28/2003
Research Category Climate and Hydrologic Processes
Focus Categories ['Floods', 'Hydrology', 'Surface Water']
Principal Investigators

Name	Rank During Project Period	Affiliation
Vijay Singh	Professor	Civil & Environmental Engineering, LSU
Donald Adrian	Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2002	19960	43559	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	1	1
Ph.D.	1	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Lan, Z. and V. P. Singh, 2003, Bivariate Flood Frequency Analysis Using The Copula Method, ASCE Journal of Hydrologic Engineering, under review.
Articles in Refereed Scientific Journals	Singh, V.P., S. X. Wang, and Z. Lan, 2003, Frequency Analysis Of Non-Identically Distributed Flood Data, Journal of Hydrology, under review.

Awards and Achievements

Outstanding Faculty Service Award 2003: Outstanding performance in service to the LSU College of Engineering, the engineering profession, and the community.

Attachment A: 2002LA1B Research Project Description

Title Flooding in a New Orleans Watershed Caused by Hurricanes That Do Not Overtop the Levee System
Project Number 2002LA1B
Start Date 3/1/2002
End Date 2/28/2003
Research Category Climate and Hydrologic Processes
Focus Categories ['Floods', 'Surface Water', 'Water Quantity']
Principal Investigators

Name	Rank During Project Period	Affiliation
Donald Barbe	Professor	University of New Orleans
John McCorquodale	Professor	University of New Orleans
Gianna Cothren	Assistant Professor	University of New Orleans

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2002	17000	34546	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]

Attachment A: 2002LA5B Research Project Description

Title Groundwater Contaminant Transport Following Flooding Events: Impacts of Model Size, Resolution, and Complexity
Project Number 2002LA5B
Start Date 3/1/2002
End Date 2/28/2003
Research Category Ground–water Flow and Transport
Focus Categories ['Groundwater', 'Models', 'Water Quality']
Principal Investigators

Name	Rank During Project Period	Affiliation
Clinton Willson	Associate Professor	Civil & Environmental Engineering, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2002	15000	30567	0	0

This project received follow–on funding after completion as a section 104–funded project (Yes ___ No X).
If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	1	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]

Attachment A: 2002LA3B Research Project Description

Title Response to Hurricane Induced Flooding in New Orleans
Project Number 2002LA3B
Start Date 3/1/2002
End Date 2/28/2003
Research Category Social Sciences
Focus Categories ['Floods', 'Law, Institutions, and Policy', 'Management and Planning']

Principal Investigators

Name	Rank During Project Period	Affiliation
Craig Colten	Professor	Geography & Anthropology, LSU

Funding

Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2002	9350	18700	0	0

This project received follow-on funding after completion as a section 104-funded project (Yes ___ No X).
 If yes, please describe the funding period, source and amount in the funding table.

Student Support

Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	1	0
Ph.D.	0	0
PostDoctoral	0	0

Publications

Publication Type	Publication Citation
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Awards and Achievements

[None]