Water Resources Research Institute
Annual Technical Report
FY 2001

Introduction

The FY 2001 Annual Technical Report of the Mississippi Water Resources Research Institute provides a summary of USGS-supported research, education, and information/technology transfer activities. Brief descriptions of three research projects, which completed funding in February 2002 are included in this summary.

Research Program

A Single Technology for Remediating PDAs, Nitro/Nitrate Residues, PCBs, CAHs, Herbicides and Pesticides from Soils and Sludges with Na/Nh3.

Basic Information

Title:	A Single Technology for Remediating PDAs, Nitro/Nitrate Residues, PCBs, CAHs, Herbicides and Pesticides from Soils and Sludges with Na/Nh3.
Project Number:	2001MS1621B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Third
Research Category:	Water Quality
Focus Category:	Toxic Substances, Groundwater, Treatment
Descriptors:	Explosives Wastes, Nitrated Organics, Polynuclear Aromatic Hydrocarbons (PNAs) Demilitarization, Toxic Substances, Surface Drainage Synthetic Organics, Subsurface Drainage, Sludge, Reductions, Soil Remediation, Soil Decontamination, Polychlorinated biphenyls (PCBs), Chlorinated Aliphatic Hydrocarbons (CAHs), Pesticides, Herbicides, Hazardous Waste, Water Quality, Groundwater Quality, Dechlorination
Principal Investigators:	Charles U. Pittman, Jr.

Publication

1. Pittman, Jr., C.U., and J. He, 2001, Dechlorination of PCBs and CAHs Using Na/NH3: Application to Soil Remediation "in" Proceedings of the 31st Mississippi Water Resources Conference, Mississippi Water Resources Research Institute, Mississippi State, Mississippi, 75-84.
2. Pittman, Jr., C.U., and J. He, 2001, Dechlorination of PCBs, CAHs, Herbicides and Pesticides in Soils, Sludges, DNAPLs and Bulk With Na/NH3 at Ambient Temperature, Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, Mississippi, 44 pages.
3. Lipnick, R.L., R.P. Mason, M.L. Phillips, and C.U. Pittman, Jr., 2002, Chemicals in the Environment:

An Overview, Editors R.L. Lipnick, R.P. Mason, M.L. Phillips, and C.U. Pittman, Jr., Chapt. 1 in Chemicals in the Environment: Fate, Impacts and Remediation, ACS Symposium Series, Vol. 806, Washington, DC, Oxford Press, pages 1-24.

4. Pittman, Jr., Charles U., Jinbao He, and Guang Ri Sun, 2002, Solvated Electron (Na/NH) Dechlorination of Model Compounds and Remediation of PCB and CAH Contaminated Wet Soils, Editors R.L. Lipnick, R.P. Mason, M.L. Phillips, and C.U. Pittman, Jr., Chapter 25 in Chemicals in the Environment, ACS, Washington, DC, Oxford Press, pages 419-433.
5. Lipnick, R.L., R.P. Mason, M.L. Phillips, and C.U. Pittman, Jr., 2002, editors of Chemicals in the Environment, ACS Symposium Series 806, ACS, Washington, DC, Oxford Press, pages 1-508.

PROBLEM AND RESEARCH OBJECTIVES:

Polynuclear aromatic hydrocarbons (PNAs) from creasote wood treatment plants and nitrated organic residues from munitions/explosives/propellant manufacturing contaminate soils at over 120 sites, many in the Southeastern US. Polychlorinated biphenyls (PCBs) and other chlorinated compounds are distributed in soils, sludges, estuaries, etc. at over 400 sites in the United States. Chlorinated aliphatic hydrocarbons (CAHs), widely used for degreasing/cleaning engines, auto parts, electronic components and dry cleaning, occur as serious contaminants at 358 major hazardous waste sites in the United States. This demonstrates a national need for a variety of rapid remediation methods. CAHs migrate vertically through soils to form dense nonaqueous phase liquids (DNAPLs) on aquifer bottoms. *Ex-situ* methods of CAH decontamination/destruction are needed for soils, sludges, bulk zones (DNAPLs in the valdose zone) and industrial process wastes. We propose a single reduction technology to destroy PNAs, nitrated organics PCBs, CAHs and other chlorinated pesticides and herbicides using solvated electron chemistry (Na/NH_3) at room temperature applicable to *ex-situ* and some *in-situ* treatments. Since nitro and nitrate compounds are readily reduced, we think Na/NH_3 reduction can decontaminate soils around ammunition and ordinance plants.

The goal of the proposal research is to develop a generalized technology to decontaminate soils (*in-situ* and *ex-situ*) and sludges contaminated with PNAs, Nitrated organics, PCBs, CAHs, chlorinated pesticides and herbicides. We have recently demonstrated that neat PCBs and PCB-contaminated soils and CAH-contaiminated soils (as received clay, loam, sandy soils containing up to 30% water) can be decontaminated in liquid ammonia slurries when treated with either Na/NH_3 or Na/NH_3. PCB-destruction efficiencies >99.9% were achieved in 30 sec. at room temperature. The products were biphenyl and NaCl. We determined water can be present yet acceptable PCB and CAH destruction occured at reasonable Na consumption. Can wet sludges be economically treated? This chemistry destroys carbon tetrachloride, tetrachloroethylene, trichloroethylene, trichloroethane (major CAH-polutants) rapidly in soils in the presence of water. Will this scale up economically ? Demilitarization has emphasized nitro and nitrate compound contamination of nitration factory soils. Can these residues be reduced rapidly by Na/NH_3 or Ca/NH_3 in soils? Several nitroaromatics have been quantitively reduced using Na/NH_3 Na/ethylenediamine in our labs. Polynuclear aromatic hydrocarbons, PNAs, are rapidly reduced in Na/NH_3. Can this be extended to soils and sludges ? The major goal is to develop solvated electron chemistry (e.g. Na/NH_3, Ca/NH_3) as a single, multifunctional, portable technology applicable to both on site *in-situ* and on site *ex-situ* destruction of PCBs, PNAs, CAHs, and ammunition/explosive residues. The major focus is to demonstrate a new remediation technology.

METHODOLOGY:

This research will be largely devoted to studies of principles involved in the solvated electron (Na/NH_3, Ca/NH_3 and related systems) reductions of neat PCBs, CAHs, CFCs, organic nitro/nitrate compounds and the like. These reductions are aimed at dechlorinations and defluorinations of PCBs, CAHs and CFCs and nitro/nitrate group reductions. Most of the work will be carried out in glass laboratory reactors or small metal reactors with analysis by gas chromatography, high pressure liquid chromatography and mass spectrometry. Pure substrates, substrate mixtures will be reacted in liquid NH_3 with Na or Ca (e.g. solvated electrons). The level of accuracy must be on the order of 4% although typical reactions on well defined compounds will be on the order of 2%. No higher accuracy will be required because we will be testing ideas and theories. Since most reactions will be run on high concentrations this level of accuracy will be easy to obtain. However, two classes of experiments will be performed where higher levels of analytical proficiency will be required. These are mentioned below.

Soils which are purposely contaminated with PCBs or CAHs will be prepared at levels of about 2000-700 ppm. These soils will then be treated with Na/NH_3, Ca/NH_3 solutions followed by soil isolation. Analytical determinations will then require detection of only a few parts per million of the PCB or CAH contaminants that remain. These lower levels of contaminants require specific careful analytical methods and acceptance criteria. Such analyses will be conducted in the Mississippi State Chemical Laboratory (MSCL) which operates under strict QA procedures including GLP. The MSCL is a national laboratory for doing soil pesticide screens for the U. S. Department of the Interior, Division of Wildlife and Fisheries. However, even in these cases we will be searching for trends within a series and not highly accurate absolute measurements. For example, starting at 2000 ppm of contaminant treatments A, B and C might give 50, 20 and 5 ppm of residual contaminant. For theory development and process understanding, ±40% accuracy could easily be tolerated. Reproducibility, precision, standardization methodology however will be carried out in accord with MSCL's QA/QC plan for this sort of work.

The data obtained in this study will be only for our use to establish principles, theories and to compare promising remediation processes employing solvated electrons. Absolutely no regulatory use of this work intended. Furthermore, we do not intend to establish any program to analyze environmentally contaminated sites. Moreover, it is not the intent in this work to establish just how low a residual level the contaminant can be reduced to. Instead we want to study the stoichiometry of Na and Ca use. Thus, as solution or soil concentration of the contaminant is reduced, will the ratio of the moles of toxic substrate destroyed/moles of Na or Ca consumed increase? This can be established in ranges from high starting concentrations to starting concentrations of 50 to 100 ppm. Similar studies will look at the effect of the presence of water on utilization of both Ca and Na. We anticipate these principles can be established without going to highly expensive analytical methodology.

SIGNIFICANCE:

The proposed research will test the hypothesis that PNAs, nitrated organics and virtually all chlorinated organic molecules (PCBs, CAHs and chlorine-containing herbicides and pesticides) can be rapidly and simultaneously remediated at ambient temperature in the presence of water. Furthermore, the proposed work will demonstrate if all of these classes of chlorinated and nitrated organics and PNAs can be economically destroyed while present in soil matrices or as sludge contaminants. At high pollutant dilution (e .g. for example 500 to 10 ppm in soils or sludges) can solvated electron reductions (employing Na/NH_3 or Ca/NH_3) destroy 99.9% of the toxic/hazardous organochlorine, PNA or nitrated pollutants in the presence of large amounts of water, humic acids, clays, etc.? This requires the relative rates of the toxic/pollutant compound reduction to be far faster ($x10^4$ or $x10^5$) than that of water. The reduction rates of organonitro and nitrate compounds will be established in lab solutions and soil decontamination studies to see if either Na or Ca/NH_3 chemistry could be used in demilitarization/environmental restoration. If model PNAs (pyrene, benzo[a]anthracene, chrysene), nitrated organies (TNT, dinitrobenzene, RDX) and CAHs (carbon tetrachloride, tetrachloroethylene and trichloroethane) exhibit rapid reduction kinetics and if soils contaminated with such model pollutants soils are suitably decontaminated, the way will be opened for large scale soil remediation. Furthermore, direct Na or Ca/NH_3 on-site, treatment of excavated soils will be posible. Direct Na or Ca/NH_3 injection into DNAPLs may be a way to *in-situ* treat such dense CAH underground liquid plumes. This would permit CAH remediation prior to more widespread migration and entry of CAHs into groundwaters. Since ammonia is already injected into soils in agricultural practice, injection of Na/NH_3 or Ca/NH_3 solutions directly into certain DNAPLs, appears reasonable. Slurrying soils in liquid NH_3, followed by treatment with Na and removal of NH_3 has been demonstrated for PCBs and CAHs in our lab.[7-10] Trace ammonia retained by the soils as NH_4^+ ions is a fertilizer.

Benefits Expected from Na/NH_3 Decontamination Processes. Several advantages seem obvious based on work that has been performed so far in our laboratory[7-10] and at Commodore Solutions Technology[11,12] (small startup company) on PCB remediation, both neat and in contaminated soils. Extension to PNAs, CAHs and nitrated organics offers these advantages: (1) Solvated electron soil dehalogenations operate at room temperature or lower. (2) Their rate is very rapid. (3) Ammonia solvent breaks down soil into very small easy-to-slurry particles aiding *ex-situ* treatment possibilities. Even difficult-to-manage clay soils are rapidly broken into a fine dispersion in ammonia. (4) Ammonia is easily removed from slurried soil due to its low boiling point and ammonia can be recovered with well know technology. (5) Liquid ammonia can readily penetrate, diffuse and flow through many soil types and strata making it more likely that *in-situ* treatments of contaminated subsurface zones will work as a lower cost remediation technique. This technology may compete then wherever (1) direct ammonia injection is permissible or (2) soil excavation, followed by on-site treatment and return of remediated soil to the excavation, can be practiced.

Screening of Environmental Contaminants Detected in Mississippi Sediments as Inducers and/or Inhibitors of CYP1B1 Expression in Channel Catfish

Basic Information

Title:	Screening of Environmental Contaminants Detected in Mississippi Sediments as Inducers and/or Inhibitors of CYP1B1 Expression in Channel Catfish
Project Number:	2001MS2381B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Third
Research Category:	Biological Sciences
Focus Category:	Toxic Substances, Sediments, Agriculture
Descriptors:	Bioindicator, Toxic Substances, Pesticides
Principal Investigators:	Kristine L. Willett

Publication

PROBLEM AND RESEARCH OBJECTIVES:

This project is specifically aimed at characterizing the utility of a recently discovered cytochrome, CYP1B1, as a marker of exposure to contaminants that have been reported by the USGS NAWQA and BEST programs in Mississippi sediments and fish samples. Because channel catfish (*Ictalurus punctatus*) are such an abundant and economically significant species in Mississippi, they are being used as the test organism in these studies.

METHODS, PROCEDURES, AND FACILITIES:

We received our funding award on May 8, 2001 so our first quarter results have been somewhat limited. Thus far, however, we have conducted one sampling trip. We collected sediments at the following six locations:

Site 1) Cassidy Bayou, Sumner, MS
Site 2) Sunflower River, Indianola, MS
Site 3) Lake Roebuck, Itta Bena, MS
Site 4) Yazoo River, Greenwood, MS
Site 5) Bee Lake, Thornton, MS
Site 6) Wolf Lake, Yazoo City, MS

These samples are currently being extracted and analyzed for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides including DDTs. Based on the analytical results from these samples, we will narrow our collection sites to the 4-5 most contaminated, and collect catfish at those sites. Our first catfish collection trip is scheduled for June 9, 2001. We will attempt to collect five male fish at each location. Samples will be collected for enzyme and RNA assays and analytical contaminant measurements. The results of the field-collected catfish will be compared to farm-raised catfish (Stuttgart, AR) that we maintain at the University of Mississippi Biological Field Station.

SIGNIFICANCE:

These results aim to characterize utility of CYP1B1 as a biomarker of exposure to environmental contaminants in channel catfish collected from Mississippi lakes and rivers. As mentioned, we will compare the results from laboratory animals to those collected from Mississippi waterways. We are still conducting RACE procedures to clone the entire CYP1B gene from catfish. Future experiments will also screen other environmental contaminants such as PCB or DDT isomers for their effects on CYP1B1. These results have been submitted in abstract form for presentation at both the PRIMO (Pollutant Responses in Marine Organisms) and SETAC (Society of Environmental Toxicology and Chemistry) meetings.

Spatial Pattern in Land Use: Its Role in Determining Surface Water Quality

Basic Information

Title:	Spatial Pattern in Land Use: Its Role in Determining Surface Water Quality
Project Number:	2001MS2601B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Fifth
Research Category:	Water Quality
Focus Category:	Surface Water, Non Point Pollution, Conservation
Descriptors:	Land Use, Nonpoint Source, Water Quality, Surface Water, Forestry, Agriculture, Urban Growth, Landscape Ecology
Principal Investigators:	Glenn Randall Matlack

Publication

PROBLEMS AND RESEARCH OBJECTIVES:

Mississippi streams flood often and destructively. Our goal is to understand factors controlling this phenomenon at the landscape scale. In the hydrological cycle, water runs through the entire landscape, so it is reasonable to expect land alterations anywhere in the landscape to influence the amount and character of surface water runoff. It is unclear, however, to what extent streams actually integrate land use alterations over the whole watershed. There is abundant evidence that stream condition reflects the character of adjacent stream banks. Whole-watershed effects are less-commonly described, but the few empirical studies available suggest collective impacts at the scale of watersheds. We seek to compare local and landscape effects in a variety of stream parameters, both physical and biotic.

The issue is of practical concern because land use may radically alter the rate, volume, and chemical composition of runoff. Paralleling the suburbanization of south-Mississippi communities is an increase in the rate of catastrophic floods in suburban streams and a degradation of biological communities, implying causation by human manipulation of the landscape. We hope to clarify the linkage between specific land use events in a watershed and impacts in the stream that drains the area. Our results will be presented as a model allowing the impacts of a particular land use alteration to be predicted before development. Ultimately, such insight may be used to control flooding and protect aquatic diversity.

METHODOLOGY:

Models will be constructed by regression of physical and biotic parameters on geomorphological and land use parameters weighted in various ways reflecting competing models of watershed function. Land use is determined by supervised classification of aerial images recorded in October 2000, provided to us NASA. Models will be constructed using the buffer function in ARC/INFO and applied to landuse data layers imported from the remote imagery.

Stream parameters will be used as the response variables. These include physical/chemical/hydrological variables such as temperature, dissolved oxygen, conductivity, flood ratio, dissolved nutrients, sediment load, sediment texture, bank erosion, and turbidity, and biotic/habitat variables such as accumulation of woody debris, algal growth, an fish abundance, diversity, and community composition. To lend statistical power to our analysis, we are comparing 26 replicate watersheds in urban/suburban Hattiesburg. Simultaneity of sampling will be accomplished by use of a team of trained field workers.

SIGNIFICANCE:

Because funding began on 1 March, 2001, the project is still in its early stages. However, we have assembled field equipment, established a sampling protocol, and trained a team of field workers. Preliminary data sets show considerable variation among watersheds in several variables, notably temperature range and conductivity. Stream data collection will continue through the summer and fall.

Project Coordination of the MS Delta Management Systems Evaluation Areas Project

Basic Information

Title:	Project Coordination of the MS Delta Management Systems Evaluation Areas Project
Project Number:	2001MS14S
Start Date:	4/25/2001
End Date:	9/30/2002
Funding Source:	Supplemental
Congressional District:	Third
Research Category:	Water Quality
Focus Category:	Water Quality, Non Point Pollution, Surface Water
Descriptors:	Best Management Practices, Watersheds, TMDLs,
Principal Investigators:	Stephen H. Schoenholtz, Jonathan Woodrome Pote

Publication

1. Rebich, Richard, and Scott Knight, 2001, Mississippi Delta Management Systems Evaluation Area Project, 1995-1999, MAFES Information Bulletin 377, Mississippi State University, Mississippi State, MS, 222 pgs.

PROBLEM AND RESEARCH OBJECTIVES

The Mississippi Delta Management Systems Evaluation Areas (MDMSEA) Project began in 1995 with two purposes: 1) to assess how agricultural activities affect water quality; and 2) to evaluate Best Management Practices (BMPs) that mitigate agricultural nonpoint source pollution. The project is located in the northwestern portion of Mississippi, an area of intense agriculture referred to as the Mississippi Delta. The project is administered by a Technical Steering Committee comprised of representatives from the U.S. Geological Survey (USGS), the U.S.D.A. Agricultural Research Service (ARS), Mississippi State University (MSU), Mississippi Department of Environmental Quality (MDEQ), U.S.D.A. Natural Resources Conservation Service (NRCS), U.S.D.A. Farm Service Agency, Mississippi Soil and Water Conservation Service, Yazoo-Mississippi Delta Joint Water Management District, and the Pyrethroid Working Group. The primary research agencies in the MDMSEA project are the USGS, ARS, and MSU.

METHODOLOGY

The MDMSEA project focused on oxbow lake watersheds, in which, the lakes served as biological endpoints for improvements made in the watershed. Since 1995, findings from ARS and USGS indicated that sediment was the primary pollutant in runoff and in the lakes: sediment limits visibility in the lake water, which in turn, limits primary productivity necessary for sustaining a healthy aquatic habitat. BMP systems were installed in the oxbow lake watersheds to determine whether a watershed could be improved enough to sustain fish production in the lakes. Edge-of-field BMPs (slotted-board risers and inlet pipes, filter strips, etc.) did not improve lake water quality enough to sustain fish populations. However, conservation tillage systems, with winter cover, were shown to improve lake quality and aquatic habitat to the point of sustaining fish populations.

PRINCIPAL FINDINGS

Within the next decade, agricultural communities like the Mississippi Delta could be faced with greater restrictions on farming to reduce nonpoint source pollution from agricultural fields. Total Maximum Daily Loads (TMDLs) are one such tool that regulatory agencies could use to limit the amount of pollutant loads to streams, rivers, and lakes. MDMSEA data and research findings will play a key role in helping both the Delta agricultural community and Mississippi regulatory agencies adapt protective measures that will meet potential TMDL loading restrictions without excessive impacts to overall profitability and productivity.

The future direction of the MDMSEA project will include two primary objectives. The first objective will be for MDMSEA scientists to expand BMP research and to provide more BMP options for farmers – in other words, to provide a "catalogue" of BMPs that a farmer can tailor to specific landscapes. The second objective will be to provide economic analyses such as construction and maintenance costs, crop yields and profit, and environmental benefits for each BMP studied.

As part of the MDMSEA project extension, the ARS and USGS will be the primary agencies to evaluate the catalogue of BMPs. ARS efforts are more research-oriented and include study of BMPs such as agricultural drainage ditches, slotted-board risers with grass hedges, winter cover

crops, constructed wetlands, and conservation tillage practices. ARS will continue to monitor BMP systems in the oxbow lake watersheds but will expand their efforts to include replicated plot studies located at a nearby ARS Field Station. The USGS will also continue monitoring runoff from most of the BMP demonstration fields in the oxbow lake watersheds. However, the USGS proposes to construct new sites in nearby stream watersheds to assess BMPs in watersheds that are more typical of Delta landscapes than were previously studied. The proposed USGS BMP demonstration sites include: 1) a revised slotted-board riser site; 2) an NRCS Wetlands Reserve Program (WRP) landscape; and 3) a conservation tillage site without a planted winter cover. MSU will be the primary agency providing the economic analyses of the BMPs studied. MSU will also provide leadership in generating BMP reports for Delta resource managers.

Information Transfer Program

Information Transfer Program - Conferences

Basic Information

Title:	Information Transfer Program - Conferences
Project Number:	2001MS11B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Third
Research Category:	Not Applicable
Focus Category:	Water Supply, None, None
Descriptors:	Conference
Principal Investigators:	Jeffery A. Ballweber

Publication

1. 2001, Mississippi Water Resources Conference Proceedings, Mississippi Water Resources Research Institute, Mississippi State, MS, 280 pgs.
2. 2001, Mississippi Water Resources Conference Program and Abstracts, Mississippi Water Resources Research Institute, Mississippi State, MS, 41 pgs.

INFORMATION TRANSFER PROGRAM - CONFERENCES

PROBLEM AND RESEARCH OBJECTIVE

Need to provide interactions among water resources researchers and federal, state, and local agencies, policy makers and the interested public. Likewise, there is a need for researchers to present their current and ongoing research to this diverse group.

METHODOLOGY

The Mississippi Water Resources Research Institute is the lead sponsor of an annual Mississippi Water Resources Conference which is co-sponsored by the Mississippi Department of Environmental Quality's Office of Land and Water Resources, the Mississippi District Office of the USGS, and the Mississippi Water Resources Association. The Conference provides a forum for the interaction referenced above.

SIGNIFICANCE

The Conference provides a well-known and respected opportunity for researchers, students, agencies, and the interested public to formally discuss current water resources research and informally critique the applicability of that research to priority water resources research needs in Mississippi, the Southeastern United States, and the Nation. The conference's proceedings, which are distributed to all conference attendees and available for sale to others, are perhaps the preeminent source of current information about the diversity of water and related land resources research in Mississippi.

Information Transfer Program - Newsletter

Basic Information

Title:	Information Transfer Program - Newsletter
Project Number:	2001MS12B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Third
Research Category:	Not Applicable
Focus Category:	None, None, None
Descriptors:	Newsletter
Principal Investigators:	Jeffery A. Ballweber

Publication

1. LORE Newsletter published quarterly (February, May, August, November), Water Resources Research Institute, Mississippi State, MS, 4 pgs.

INFORMATION TRANSFER PROGRAM - NEWSLETTER

PROBLEM AND RESEARCH OBJECTIVE

The need to inform researchers, policy makers, and the interested public about the Institute's activities, the annual conference, and funding opportunities.

METHODOLOGY

The Mississippi Water Resources Research Institute's quarterly newsletters – LORE – include 1) request for proposals for USGS competitive grants, 2) a "call for abstracts" for the annual conference, 3) the conference program and 4) summarizes activities at the conference.

SIGNIFICANCE

The newsletter is one of the Institute's primary mechanisms to inform federal, state, and regional agencies in Mississippi and the interested public about the Institute's activities.

Information Transfer Program - Publications

Basic Information

Title:	Information Transfer Program - Publications
Project Number:	2001MS13B
Start Date:	3/1/2001
End Date:	2/28/2002
Funding Source:	104B
Congressional District:	Third
Research Category:	Not Applicable
Focus Category:	None, None, None
Descriptors:	Publications
Principal Investigators:	Jeffery A. Ballweber

Publication

1. 2001, "In Review" for Fiscal Year 2000-2001, Water Resources Research Institute, Mississippi State, MS, 31 pgs.
2. 2001, "Annual Report: 2000-2001", Water Resources Research Institute, Mississippi State, MS, 27 pgs.

INFORMATION TRANSFER PROGRAM - PUBLICATIONS

PROBLEM AND RESEARCH OBJECTIVE

It is necessary for Mississippi State University, political and administrative decision-makers, and the interested public to have a mechanism to evaluate the Institute's effectiveness.

METHODOLOGY

These mechanisms take two related but separate forms: 1) a Mississippi State University reporting requirement which encompass a variety of other multi-disciplinary water and related land management research funded through the Institute and related information about the extent and sources of the Institute's funding; and 2) a discretionary annual report that includes a summary of these assorted projects, their accomplishments, researchers associated with the Institute, and students supported by these projects.

SIGNIFICANCE

The MSU report is necessary for the University to evaluate the effectiveness of the Institute in meeting its mission and goals. The *In Review* publication is discretionary but has historically provided a timely concise overview of the Institute's activities and associated researchers and students. This discretionary publication is undoubtably the Institute's most widely distributed publication and informs key political and administrative offices about the Institute's direction, goals and accomplishments as reflected by the breadth of researchers, students and projects associated with the Institute.

Student Support

Student Support					
Category	**Section 104 Base Grant**	**Section 104 RCGP Award**	**NIWR-USGS Internship**	**Supplemental Awards**	**Total**
Undergraduate	8	0	0	0	8
Masters	8	0	0	0	8
Ph.D.	4	0	0	0	4
Post-Doc.	0	0	0	0	0
Total	20	0	0	0	20

Notable Awards and Achievements

2001MS2381B - Willett - Platform on "Identification and distribution of a CYP1B-like message in channel catfish and brown bullhead" at the Pollutant Responses in Marine Organisms Meeting in Plymouth, England, July 2001.

2001MS1621B - Pittman - Asked to co-write two book chapters for the book entitled "Chemicals in the Environment", ACS Symposium Series 806. Chapters include: Chapter 1 "Chemicals in the Environment: An Overview" and Chapter 25 "Solvated Electron (Na/NH) Dechlorination of Model Compounds and Remediation of PCB- and CAH- Contaminated Wet Soils".

Publications from Prior Projects

1. Clarkson, J., Y. Liu, D. Wipf, and C. Henry, 2001, A Separations-Based Sensor for Monitoring NPK in Groundwater "in" Mississippi Water Resources Conference Proceedings, Mississippi Water Resources Research Institute, Mississippi State, MS, 52-60.
2. Young, B.W., S.H. Schoenholtz, E.D. Dibble, and A.W. Ezell, 2001, Streamside Management Zones: Are they Effectively Maintaining Water Quality in the Sand-Clay Hills of Northeast Mississippi? "in" Mississippi Water Resources Conference Proceedings, Mississippi Water Resources Research Institute, Mississippi State, MS, 162.
3. Blanche, S. Brooks, David R. Shaw, Mark W. Shankle, William L. Kingery, and Joseph H. Massey, 2001, Environmental Fate of Fluometuron in Soil Influenced by Best Management Practices (BMPs) "in" Mississippi Water Resources Conference Proceedings, Mississippi Water Resources Research Institute, Mississippi State, MS, 220-229.
4. Zappi, Mark, Arun Subramani, and Gaya Ekanayake, 2001, Treating Water Contaminated With Substituted Aromatics Using a Kenaf-Based Biosorptive Process "in" Mississippi Water Resources Conference Proceedings, Mississippi Water Resources Research Institute, Mississippi State, MS, 238-249.
5. Blanche, S.B., D.R. Shaw, J.H. Massey, and M. Boyette, 2002, Tillage Systems and Vegetative Filter Strips Affect Herbicide Losses in Surface Runoff, Weed Sci. In Press.

6. Blanche, S.B., D.R. Shaw, J.H. Massey, M. Boyette, and M.C. Smith, 2002, Fluometuron Adsorption to Vegetative Filter Strip Components, Weed Sci., In Press.
7. Pittman, Jr., C.U., and J.B. He, 2002, Dechlorination of PCBs, CAHs, Herbicides and Pesticides Neat and in Soils at 35C Using Na/NH3, J. Hazardous Materials, Vol. 91 (1) 12 journal pages, accepted.
8. Rankins, Jr., A., D.R. Shaw, and M. Boyette, 2001, Perennial Grass Filter Strips for Reducing Herbicide Losses in Runoff, Weed Sci. 49:647-651.
9. Shankle, M.W., D.R. Shaw, W.L. Kingery, M. Boyette, and R.M. Zablatowicz, 2002, Fluometuron Degradation in Soil as Influences by Best Management Practices (BMPs): Filter Strips and Riparian Zones, Weed Sci. In Press.
10. Shankle, M.W., D.R. Shaw, and M. Boyette, 2001, Confirmation of an Enzyme-Linked Immunosorbent Assay to Detect Fluometuron in Soil, Weed Technol. 15:669-675.
11. Carroll, G.D., 2002, Effectiveness of Silvicultural Streamside Management Zones in Protecting Aquatic Communities in the Sand-Clay Hills Subsection of Mississippi. M.S. Thesis, Department of Forestry, Mississippi State University, Mississippi State, MS.
12. Young, B.W., 2002, Effectiveness of Silvicultural Streamside Management Zones in the Sand-Clay Hills of Mississippi, M.S. Thesis, Department of Forestry, Mississippi State University, Mississippi State, MS.