

**John H. Rodgers, Jr., Ph.D.**  
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June 28, 2010

Mr. Victor Gregoire  
Partner  
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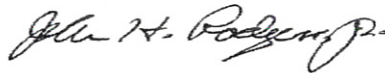
*RE: Vermilion Parish School Board v. Louisiana Land, et al.*  
*Site Assessment and Expert Report*  
*John H. Rodgers Jr., Ph.D.*

Dear Mr. Gregoire:

Per your request, I have provided this expert report on behalf of the Defendants in the above referenced case.

This report documents my opinions regarding the ecological conditions of the canals, adjacent wetlands and former pits on the subject property, and provides 1) a review of background information and available current data on the site pertinent to this case, 2) a review and analysis of plaintiff's experts' reports, and 3) recommendations for a feasible and reasonable (scientifically defensible) course of action based in fundamental principles of environmental toxicology and risk mitigation.

Sincerely,



John H. Rodgers, Jr., Ph.D.

**SITE ASSESSMENT AND EXPERT REPORT**

**in the case of**

**State of Louisiana and the Vermillion Parish School Board**

**versus**

**The Louisiana Land and Exploration Company, et al.;**

**Docket No. 82162**

Report by

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and

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June 28, 2010



## 1. INTRODUCTION

The “Petition for Damages to School Lands” (State of Louisiana and The Vermillion Parish School Board versus The Louisiana Land and Exploration Company, et al.; Docket No. 82162) alleges that the subject property has been contaminated or otherwise damaged by the defendants’ oil and gas exploration and production activities pursuant to oil, gas, and mineral leases. These activities include the operation or construction of various oil and gas facilities, including but not limited to pits, sumps, pipelines, flowlines, tank batteries, wellheads, and measuring facilities. The plaintiff’s have alleged improper disposal of oil field wastes in unlined earthen pits which were constructed by the defendants on or near its property during the course of oil and gas exploration and production activities since the 1930’s. The oilfield wastes allegedly deposited in these pits include (but are not limited to) such substances as naturally occurring radioactive material (“NORM”), produced water, drilling fluids, chlorides, hydrocarbons, and metals. The petition also alleges that leaks, spills, and other discharges of these substances from wells, pipelines, tank batteries, gas plants and other equipment have further polluted plaintiff’s property, resulting in potential effects on wildlife.

The property involved in this case is located in Section 16, Township 15 South, Range 1 East in the Vermillion Parish, Louisiana. This property is about five miles southwest of Forked Island in an area of intermediate and fresh marshes. The subject property in this case, East White Lake Oil Field, is located in Vermilion Parish, Louisiana, on the eastern side of White Lake, south of Schooner Bayou. The specific area is primarily an intermediate marsh system, which is protected by water control structures operated by the United States Army Corps of Engineers. The Louisiana Land and Exploration Company was assigned a lease for exploration and production on the property in 1935, and Unocal was assigned the lease in 1940 as part of a joint operations agreement (50%) with the Louisiana Land and Exploration Company. Approximately 85 wells have been drilled (~10 shut-in productive, 8 active producing, 2 active injection) since the initiation of the lease. The Vermillion Parish School Board (VPSB) has filed suit against the Louisiana Land and Exploration Company et al. for contamination of the property.

Counsel for the Defense requested that I provide a report and expert opinions regarding the status of this property in Vermilion Parish, Louisiana. Of particular interest for this report were the current ecological conditions of the canals, adjacent wetlands and former pits on the property, as well as any potential remediation or remedy that may be indicated by any adverse effects on plants or animals and their habitats and ecosystems.

## 1.1 Background and Report Organization

This report provides 1) a review of background information and available current data on this site pertinent to this case, 2) a review and analysis of the Plaintiff's experts' reports, and 3) recommendations for a feasible and reasonable (scientifically defensible) course of action based in fundamental principles of environmental toxicology and risk mitigation. The approach used in this report is based on ecological risk assessment and fundamental principles of environmental toxicology such as: a demonstrable exposure is required to elicit a dose, response and consequent risk due to that exposure; any remediation proposed should mitigate or alleviate risks or damages (we should not attempt to fix ecosystems that are not damaged or "broken"); and, a remediation strategy should not cause more harm than it mitigates (USEPA, 1992).

## 1.2 Sources of Information

The following information was used as the basis for this report and my opinions.

### *Defendant's experts' report:*

Pisani, M.E. and Angle, D.G. 2010. (dated June 15, 2010). Vermilion Parish School Board v. Louisiana Land, et al, Expert Report. Prepared for Kean Miller Hawthorne D'Armond McCowan & Jarman LLP, Baton Rouge, LA.

### *Plaintiff's experts' reports:*

Barbee, G.C. and G.J. Castille, III. 2010. (dated April 15, 2010). Investigation of Historical Land Use and Environmental Impacts on the Vermilion Parish School Board Property, Section 16, T. 15S. – R. 1 E., Vermilion Parish, Louisiana. Prepared for Talbot, Carmouche & Marcello. 15 pp.

Miller, G. 2010a. (dated March 2010). ICON Report: VPSB v Louisiana Land, et al., East White Lake Field, Vermillion Parish Assessment Report, East White Lake Field, Vermillion Parish, LA. Prepared for Talbot Carmouche & Marcello.

Miller, G. 2010b. (dated April 2010). ICON Report: VPSB v Louisiana Land, et al., Feasibility Study and Remediation Estimate East White Lake Field, Vermilion Parish, La. Prepared for Talbot Carmouche & Marcello.

Grieg, R., J. Battle, W. Wilson and J.T. Arnold. 2010. (dated April 29, 2010). Environmental Investigations of Activities Related to East White Lake Oil Field Operations in Vermillion Parish, Louisiana. Prepared for Talbot, Carmouche, & Marcello, Gonzales, LA by Coastal Environments, Inc., Baton Rouge, LA. CEI no. 2100038.

Norman, C. E. 2010. Engineering and Operations Report On East White Lake Field Operated by LL&E et al, Vermilion Parish, LA Report No. 1. Vermilion Parish School Board (VPSB) vs Louisiana Land & Exploration et al, Vermillion Parish, Louisiana. 16 pp.

Kilpatrick, J.A. 2010. (dated April 15, 2010). The VPSB Property, Vermilion Parish, Louisiana. Greenfield Advisors. Prepared for Talbot, Carmouche & Marcello. 29 pp. + appendices.

Templet, P.H. 2010. An Expert Report by Paul H. Templet, Ph.D. In VPSB v. Louisiana Lnad (sic), et al.; East white Lake Field, Vermilion Parish. 13 pp.

In addition, I reviewed peer reviewed scientific literature (included in Literature Cited appended to this report) and aerial photographs (Pisani and Angle report, 2010). I conducted a site investigation on May 10, 2010, and photographed areas in and adjacent to the site.

### **1.3 Author's Qualifications**

Dr. John H. Rodgers, Jr. is a Professor in the Department of Forestry and Natural Resources and Director of the Ecotoxicology Program at Clemson University. Clemson University is located in Clemson, South Carolina. Immediately prior to coming to Clemson University in January, 1998, Dr. Rodgers was Professor of Biology and Adjunct Professor in the School of Pharmacy at the University of Mississippi, located in Oxford, Mississippi. He conducted research, taught, and directed programs at the University of Mississippi for nine years. Dr. Rodgers was Director of the Biological Field Station of the University of Mississippi and Director of the Center for Water and Wetland Resources.

Dr. Rodgers received a Bachelor of Science degree in Botany/Biology from Clemson University in South Carolina in 1972. He earned a Master of Science degree in Plant Ecology/Aquatic Biology from Clemson University in 1974. In 1977, he obtained a Ph.D. degree in Aquatic Ecology/Ecotoxicology from Virginia Polytechnic Institute and State University in Blacksburg, Virginia, and held a post-doctoral research position at Virginia Polytechnic Institute and State University in 1977.

Dr. Rodgers has conducted research and taught undergraduate and graduate classes in biology, ecology, ecotoxicology, risk assessment, sediment toxicology, wetlands and aquatic toxicology at Clemson University, the University of Mississippi, the University of North Texas, and East Tennessee State University for more than 30 years. For over thirty years, he has been involved with research on a variety of water bodies including rivers, streams, reservoirs, lakes, and marsh areas (wetlands) in various parts of the United States, both east and west of the Mississippi River. Essentially, his research has been focused on the health and well being of the ecosystems within water bodies and the surrounding areas. Dr. Rodgers has studied the impact of both man and nature on plant



and animal life in Mississippi, Alabama, and Louisiana wetlands, rivers, streams, and reservoirs. For example, he has studied the effects of point sources (e.g. effluents, spills, production and refining activities) as well as non-point sources (e.g. cropland runoff) on wetlands, streams and rivers in Mississippi and Louisiana. He has conducted research on materials released to aquatic systems from a variety of processes and facilities. For more than 30 years, he has studied responses of wetlands and other aquatic systems to discharges. Dr. Rodgers has also designed and constructed wetlands for mitigation of contaminants, wildlife habitat and rehabilitation. These studies have resulted in over 100 peer reviewed scientific publications and books. Dr. Rodgers incorporates this information in his undergraduate and graduate classes as well as short courses that are presented for postgraduates.

Dr. Rodgers has served on the Board of Directors of the Society of Environmental Toxicology and Chemistry, as President of that scientific organization and as a Board representative from North America to the SETAC World Council. He has also served in a variety of advisory capacities for government agencies. For example, Dr. Rodgers was on the review panel for the U.S. Environmental Protection Agency's Ecorisk Program as well as the Environmental Biology Panel that makes technical and scientific recommendations regarding prioritizing environmental research. He has also served on the Expert Advisory Panel for the Canadian Network of Toxicology Centres funded by Environment Canada and Health Canada and he chaired that Panel for three years. He has advised the U.S. Environmental Protection Agency regarding water quality criteria and water quality based toxics control. He served on the Society of Environmental Toxicology and Chemistry/U.S. Environmental Protection Agency Expert Advisory Panel on Whole Effluent Toxicity Testing and recently served as a member of the Science Advisory Panel (and was elected to chair that panel) for the California Environmental Protection Agency and U.S. EPA on water borne materials. Dr. Rodgers won an award for research on risk mitigation in wetlands from the U.S. Department of Energy and a Water Resources award for a constructed wetland in Oconee County, SC.

Dr. Rodgers has had extensive experience with organics and inorganics as well as mixtures such as crude oil and produced waters. He has also been involved with development of national water quality criteria and sediment guidelines as a consultant to the U.S. EPA. Dr. Rodgers was an author of the U.S. EPA protocol on Ecological Risk Assessment for field studies. He taught courses for the U.S. Army Corps of Engineers, Waterways Experiment Station in Vicksburg, Mississippi, on wetland construction and remediation. He has also taught short courses at international meetings of the Society of Environmental Toxicology and Chemistry on Constructed Wetlands for remediation and rehabilitation. A copy of his Curriculum Vitae is appended to this report (Appendix A).

## **2. REQUEST FROM COUNSEL FOR THE DEFENSE**

Counsel for the Defense requested that I review Plaintiff's experts' reports, visit the site, review available information for the site involved in this case, and offer recommendations regarding a feasible and reasonable (scientifically defensible) course of

action if needed. I was also requested to provide an expert report regarding the site status in Vermilion Parish, Louisiana. Of particular interest for this report were the current ecological conditions of the canals, adjacent wetlands and former pits on the property, as well as any potential remediation or remedy that may be needed.

### **3. CURRENT STATUS OF THE SITE (PROPERTY, VERMILION PARISH, LOUISIANA)**

The property involved in this case is located in Section 16, Township 15 South, Range 1 East in the Vermilion Parish, Louisiana. This property is about five miles southwest of Forked Island in an area of intermediate marsh (Brupbacher et al. 1973, Visser et al. 2000; Sasser et al. 2007-8). The areas of interest in this case are located along canals and waterways on the Plaintiff's property. A site inspection was conducted on May 10, 2010 (Figure 1; Table 1). Photographs of these areas and associated vegetation are appended to this report (Appendix B).

The site in this case consists of wetlands or intermediate marsh (Brupbacher et al. 1973, Visser et al. 2000; Sasser et al. 2007-8) with herbaceous vegetation and shrubs as well as woody vegetation colonizing limited elevated areas and berms. With an average elevation of about 1-2 feet, the lowlands are dominated by native and nonnative herbaceous wetland vegetation. The soils are typical coastal wetland hydrosols with relatively high organic matter, sand and clay content as well as shell fragments. Vegetation and animals were identified during the site examination (Godfrey and Wooten 1979; Godfrey and Wooten 1981; Merritt and Cummins 1996; Radford et al. 1968; Smith, 2001; Sibley, 2003; Visser et al. 2000).

The vegetation on the plaintiff's property is typical of wetlands in this part of Louisiana that are similarly situated (Visser et al. 2000). The dominant vegetation includes arrowhead (*Sagittaria* spp.), bulrush (*Schoenoplectus* spp.), cattails (*Typha* spp.), cordgrass (*Spartina* spp.), and sawgrass (*Cladium jamaicense*) as well as some invasive species. Some significant invasive wetland plant species were observed (e.g. alligator weed [*Alternanthera philoxeroides*], common reed [*Phragmites australis*], and Chinese tallow [*Triadica sebifera*]). Much of the wetland vegetation is growing vigorously and in an apparent undisturbed status. A summary of wetland plant species observed during my site visit is contained in Table 2. Clearly, this is a diverse, intermediate marsh (Visser et al. 2000; Sasser et al. 2007-8) that is functioning as important habitat for many plant and animal species. There is no evidence of damage from oil and gas exploration and production activities.

Apparent past and current uses of this property have included recreation such as hunting and fishing. There is clear evidence of abundant healthy wildlife and game animals, and there is no evidence of adverse effects on wildlife or fish from past exploration and production activities. Clearly, hunting and fishing are supported on this property. Wildlife observed on this property included deer (fresh tracks), ducks (wood ducks, teal, and 2-3 others), egrets, great blue heron, night heron, osprey, alligators (numerous), nutria, raccoons, fish (*Gambusia*, gar, striped mullet), frogs (bullfrogs, tree frogs), blue



crabs, mollusks, dragonflies, alligator weed flea beetle (*Agasicles hygrophila*), and many other important wetland species. Other animal species observed during my site inspection are listed in Table 3. These sites are clearly serving as important ecological habitat for numerous wetland species.

Based on my review of surface water and sediment data reported by Michael Pisani & Associates (MP&A; collected March to May 2010; Pisaani and Angle, 2010), there is no indication of any need for remediation. Metal concentrations in surface water samples did not exceed LDNR 29-B standards, and polycyclic aromatic hydrocarbons (PAHs) were not detectable. Additionally, metal concentrations in sediment samples were not of concern, and PAHs were largely not detected (Appendix C).

Many of the ICON Environmental Services, Inc. (ICON; Miller, 2010a) soil samples reported by ICON as having exceeded screening standards were collected at depths as much as 12 feet below ground surface (Appendix C). Obviously, exposure of ecological receptors to soils at those depths is extremely unlikely. Typically, in ecological risk assessments, less than a foot or two of soil or sediment below ground surface is considered relevant for potential exposure. In their study, over 300 samples were used by ICON (ICON; Miller, 2010a) for their screening process, when more than half of those were collected at depths greater than four feet. Thus, results from many of the ICON soil and sediment samples are not relevant for characterizing ecological “risk-based” exposure, and consequently, remediation needs are grossly overestimated in the ICON report (ICON; Miller, 2010b).

During my site investigation, I attempted to find the sheens emphasized in the Plaintiff’s experts’ reports (e.g. Greig et al. 2010) and photographs, but was not able to do so. Oil or petroleum sheens are usually comprised of low molecular weight compounds that are readily degradable. If the Plaintiff’s experts observed oil sheens at this site, they were likely a recent spill or introduction to this environment through coring or boring activities (Metcalf & Eddy 2003). They may have also observed bacterial sheens as I did in the marsh (Brown, 2004; Minnesota Pollution Control Agency 2008).

Based upon the analytical data from surface waters, sediments and soils at this site as well as field observations of vegetation and animals, this ecosystem is fully functioning as would be expected. There is no indication of any need for intrusive remediation. To the contrary, there is every reason not to disrupt this functioning ecosystem and destroy its value.

Review of Defendants’ Experts’ Report:

***Pisani, M.E. and Angle, D.G. 2010. (dated June 15, 2010). Vermilion Parish School Board v. Louisiana Land, et al, Expert Report. Prepared for Kean Miller Hawthorne D’Armond McCowan & Jarman LLP, Baton Rouge, LA.***

Pisani and Angle’s report (2010) contains an environmental site assessment of the property in this case. A site evaluation plan was also prepared for submission to the LA

DNR Office of Conservation. As noted in the Pisani and Angle (2010) report, a total of about 85 wells have been drilled on the property since 1940 and approximately 20 are still active (~10 shut-in productive, 8 active producing, 2 active injection; operated by Peak Operating Company). This intermediate marsh has been used for oil and gas exploration and production as well as occasional hunting and fishing. Access to the property is by boat through Schooner Bayou, a dredged waterway. The property is largely an intermediate marsh and is inundated by storm surge greater than 3-4 feet above MSL. The chemical composition of soils and sediments reflects the periodic inundation of the marsh. The aerial photographs appended to the Pisani and Angle report (2010) illustrate the use of this property and changes through time. As stated in this report (Pisani and Angle, 2010), frequent inundation of this property is the defining factor in the composition of surficial soils and sediments. Also, the analyses of alleged contaminants in the surficial soils and sediments (Pisani and Angle, 2010) illustrate that there are no potential exposures indicative of any ecological risks at this site at this time. Thus, the intrusive remediation proposed by the Plaintiff's experts (ICON; Miller, 2010b) is not justifiable or supported by any credible analysis.

#### **4. REVIEW OF PLAINTIFF'S EXPERTS' REPORTS**

##### ***4.1 Barbee, G.C. and G.J. Castille, III. 2010 (dated April 15, 2010). Investigation of Historical Land Use and Environmental Impacts on the Vermilion Parish School Board Property, Section 16, T. 15S. – R. 1 E., Vermilion Parish, Louisiana. Prepared for Talbot, Carmouche & Marcello. 15 pp.***

The stated objectives of the report prepared by Drs. Barbee and Castille (2010) were to review historical land use and determine environmental impacts of oil exploration and production activities on this property. The report by Drs. Barbee and Castille accomplishes neither of the stated objectives.

The property is currently used for fossil energy production activities as well as some recreational and commercial fishing and hunting. Contrary to the observation stated in this report, this is clearly an intermediate to freshwater marsh (Visser et al. 2000; Sasser et al. 2007-8). The area is not hydraulically isolated from the Gulf of Mexico (p.3), especially during high tides and intense onshore winds (such as occurred recently during Hurricanes Rita, Humberto, Gustav and Ike [Baras, 2007; Steyer et al. 2007]). It was historically and remains connected to the Gulf contrary to conclusions by Barbee and Castille (2010). In fact, they specifically noted in their report that most of the livestock on or adjacent to the property was drowned during Hurricane Rita.

In this report, the listed wildlife that might be expected (pp. 5-6) was apparently not observed by Barbee and Castille (2010). Although no data were provided, Barbee and Castille (2010) noted observations (p.6) of crabbing (crab traps), shrimping, jug and trotline fishing, hoop net fishing, gill net fishing (one commercial fisherman) and recreational fishing on or nearby the property. They also noted observation of at least three camps for intermittent use by hunters and fishermen. As noted in their report, there



are numerous amphibians, birds and mammals that use the property as temporary (e.g. migratory birds) or permanent habitat.

The Toxicological Evaluation (p.9) portion of this report by Barbee and Castille (2010) is especially troubling. According to the report, this informal evaluation is supported by data in the ICON Report, historic aerial photographs, scientific and regulatory literature and a personal visit to the property on December 22, 2009. There is no formal consideration of contamination or exposure presented in this evaluation by Barbee and Castille (2010). An exceedence of a screening level in a sample for a given contaminant does not necessarily indicate adverse effects at a site. Rather, this report offers cursory observations regarding alleged uptake of alleged contaminants and alleged effects on populations of organisms on the property and adjacent lands. The report further contains allegations of persistent exposure and uptake by crabs, shrimp, fish and other organisms, although no data are provided to support these opinions. The source of contamination alleged in this report is produced water (based largely on a white paper written by Veil et al. [2004] which is a generic review of produced waters throughout the U.S.). With no basis or substantiation, the report also alleges adverse effects on populations (propagation and growth of organisms) as well as carcinogenic effects.

The Conclusions in this report (pp. 11-12; Barbee and Castille, 2010) are largely unsupported by any evidence in the report or available information. The approaches apparently used to arrive at the conclusions in the Barbee and Castille (2010) report are not scientifically standard or sound (USEPA, 1992).

***4.2 Miller, G. 2010a (dated March 2010) ICON Report: VPSB v Louisiana Land, et al., East White Lake Field, Vermillion Parish Assessment Report, East White Lake Field, Vermillion Parish, LA. Prepared for Talbot Carmouche & Marcello.***

The ICON “Vermillion Parish Assessment Report” (Miller, 2010a) contains chemical analysis results from soil, sediment, and groundwater samples collected from 2006 to 2010. Clearly, these are not synoptic samples and some results may have no relation to current conditions due to intervening events and labile constituents. Sediment and groundwater samples collected in 2010 were split with Michael Pisani & Associates (MP&A) for independent laboratory analysis. The ICON report further screens the results or chemical data against various standards derived by Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality (LDEQ), and federal agencies for protection of human health and the environment (ecological receptors). The data screening process was ostensibly used to identify areas at the East White Lake site where chemical results exceeded a given standard, and based on the nature and extent of these perceived exceedances, an extensive remediation plan was developed (Miller, 2010b). While the process of screening environmental data is a common initial step for site assessments, it is important to select appropriate screening standards for the site, taking into account factors such as land use (current and future) and populations (human and ecological) using or expected to inhabit the site. The ICON report utilized screening standards inappropriate for the East White Lake field, and thus



the remediation plan, which is based on the screening results, is fundamentally flawed and severely over-estimates remediation needs.

In addition, many of the ICON soil samples reported as having exceeded screening standards were collected at depths as great as 12 feet below ground surface (Miller, 2010a). Obviously, exposure of soils to humans and ecological receptors at those depths is extremely unlikely. Typically, in ecological risk assessments, less than one to two feet of soil or sediment below ground surface is considered relevant for potential exposure (Suter, 2007). For example, over 300 samples were used in the screening process, when more than half of those were collected at depths greater than four feet. Thus, many of the ICON soil and sediment samples are not relevant for characterizing “risk-based” exposure, and consequently, remediation needs are grossly overestimated.

Issues regarding the quality of the ICON data are also evident. For example, sediment samples were split with MP&A for independent laboratory analysis. In most cases, metals concentrations reported by MP&A are an order of magnitude less than concentrations reported by ICON. Additionally, several ICON soil samples are listed as “Rerun”. Assuming this is a repeat analysis of the same sample, most of the “Rerun” concentrations were several times greater (up to an order of magnitude greater [B2 rerun]) than the original sample concentration, resulting in concentrations that exceeded screening standards that otherwise would not have. These examples call into question the quality of the ICON data, and the inappropriate use of screening standards as described above misguides the extent of remediation needed at the East White Lake site. This report is not reliable for estimation of risks at this site.

The ICON report (Miller, 2010a) utilizes screening values from the LDEQ Risk Evaluation/Corrective Action Plan (RECAP) for non-industrial (residential) sites. These screening values are understandably more stringent than the more appropriate industrial standards that should apply to the East White Lake field. For example, if RECAP soil screening standards (SS<sub>i</sub>) for industrial sites are used, there are no exceedances for cadmium, chromium, lead, mercury, selenium, strontium, and zinc (Table 4). For total petroleum hydrocarbons (TPH) at industrial sites, the diesel-range organics (DRO) SS<sub>i</sub> is 510 mg/kg as opposed to 65 mg/kg for non-industrial (residential) sites; and the oil-range organics (ORO) SS<sub>i</sub> is 2,500 mg/kg as opposed to 180 mg/kg.

As another example from the ICON report (Miller, 2010a), arsenic in sediment samples was screened using ecological Threshold Effects Levels (TELs) from the National Oceanic and Atmospheric Administration’s Screening Quick Reference Tables, or SQiRT (NOAA, 2008). The author of the NOAA SQiRT tables clearly explains that TELs are “lower-threshold effects levels” which indicates that if a concentration of an analyte such as arsenic is below or less than the TEL or screening value, there is a high degree of confidence that the sample is not toxic due to that constituent. However, exceeding the TEL does not necessarily predict toxicity. Comparing to higher toxicity thresholds, for example Probable Effects Levels (PELs), identifies compounds which are more probably present at toxic levels (NOAA, 2008).

**4.3 Miller, G. 2010b. (dated April 2010) ICON Report: VPSB v Louisiana Land, et al, Feasibility Study and Remediation Estimate East White Lake Field, Vermilion Parish, La. Prepared for Talbot Carmouche & Marcello.**

This report (Miller, 2010b) was prepared by ICON for Talbot Carmouche & Marcello Law Firm, Gonzales, LA. Contrary to the statement in the second paragraph of this report, there is no evidence of ecological threats or any adverse impacts of any contamination on this property. Thus the initial premise of the report is flawed.

This report produced a conceptual remedial design based upon no data supporting risk-based clean-up levels of constituents of concern (no identified exposure pathways, no ecological risks identified, etc.). Therefore, no basis is provided for the drastic and extreme remediation proposed. For example, there is no justification for dredging in the canals and disturbing extensive sediments. Other actions such as excavation of wetland soils to depths of 15 feet and destroying existing wetlands are also not justified. Similarly, there are no apparent considerations for the consequences of erecting unnecessary dewatering facilities and transporting large volumes of sediments to a disposal facility. The proposed extreme volumes of dredged materials are not justified (p.2-6). Reasonable decommissioning including the removal of unused equipment and flow lines (p. 2-6) has been proposed by the defendant (Personal communication, Mr. V. Gregoire, June 1, 2010). The approach in this report (Miller, 2010b) for determining the need for remediation is neither reliable nor a scientifically accepted approach for identifying areas in need of dredging. Further, the extreme and poorly documented approach proposed for remediation activities is neither justified nor scientifically defensible.

**4.4 Grieg, R., J. Battle, W. Wilson and J.T. Arnold. 2010 (dated April 29, 2010). Environmental Investigations of Activities Related to East White Lake Oil Field Operations in Vermilion Parish, Louisiana. Prepared for Talbot, Carmouche, & Marcello, Gonzales, LA by Coastal Environments, Inc., Baton Rouge, LA. CEI no. 2100038.**

The stated goal of this report (Grieg et al. 2010) was to determine direct and indirect impacts of alleged contamination on the Vermilion Parish School Board, East White Lake Field lands. This report purported to rely upon scientific literature, available and reliable data, site observations, and data collection.

The report by Grieg et al. (2010) is confused early on; it states that this area is a freshwater marsh and then proceeds to illustrate that the property is essentially an estuarine environment. Actually, both the data (e.g. p. 18) and the extant biota clearly illustrate that this property is largely an intermediate marsh at this time (Visser et al. 2000; Sasser et al. 2007-8).

This report (Grieg et al. 2010) indicates observations of sheens in the shallow sediments and soils along the canals at 3-4 sites (e.g. Sites 10, 11 and 12 in ICON report [Miller, 2010a]). This observation is troubling because sheens are generally formed by low



molecular weight hydrocarbons, surfactants or microbial populations. If these were hydrocarbon sheens as indicated by the reported odor, they must represent a relatively recent spill. One would not expect a hydrocarbon sheen or the molecules capable of causing a sheen to persist for more than a few days. Apparently, the authors did not expend any effort to determine the source(s) of the sheens. The sheens observed by the authors may have arisen from sediment or soil coring or boring activities that can move subsurface materials to the surface. Based on my observations in the field, typical surface sheens that were observed at this site come from operating boat motors and bacterial growths.

The general conclusion of the Grieg et al. (2010) report appears to have basis in the old ecological lament (p.36), "Life, ecological systems and wetlands are complex." According to the report, the alleged contamination may cause or will cause some unidentified adverse effects. Based on the results in the report (Grieg et al. 2010), those adverse effects are not evident. To the contrary, there are numerous vertebrates present at the site and all appear to be normal or flourishing. Similarly, the vegetation at the site is as would be expected for an intermediate or transitional marsh that is found at these elevations (< 3 feet MSL) near the Gulf of Mexico. Contrary to the authors' conclusions, the Grieg et al. (2010) report provides further evidence that the organisms at this site are functioning normally as are their habitats. This report also supports the fact that fishing and hunting, which are normal uses for this property along with oil exploration and production, are supported or functioning as would be expected. Further, the data in this report clearly illustrate that this property and area provide exceptional habitat for wetland species that inhabit this intermediate marsh.

## **5. RECOMMENDATIONS REGARDING REMEDIATION OF SITES ON THE VPSB PROPERTY**

The sediment and soil analyses in the ICON (Miller, 2010a) and Pisani and Angle (2010) reports indicate no parameters that are of concern for aquatic or terrestrial species. The ICON report (Miller, 2010a) contains specific data indicating no risks for biota (animals, plants or microbes) at these locations (Lingle, 2010). Some of the vegetation growing in these areas is relatively sensitive to organics, inorganics and other materials. Based upon the measurements provided and the absence of ecological risks, these sediments and sites pose no risks to biota. The data contained in these reports and other reports from the area provide strong "weight of evidence" that no remediation for these canals or wetland sites is indicated. Especially inadvisable is any invasive remediation that is not ecologically and environmentally defensible.

The ICON Report (Miller, 2010a) provides no data or information inconsistent with these conclusions and observations. The ICON Remediation Report (Miller, 2010b) relies entirely upon the ICON Report (Miller, 2010a) and proposes intrusive and environmentally disastrous approaches for "remediation" of this site. The approaches proposed by ICON (Miller, 2010b) would destroy functioning aquatic systems and existing wetlands through clearing and dredging activities. This site is currently functioning well as exceptional habitat for numerous species. As presented below, these

drastic approaches are not indicated by any risks posed at this site. The “weight of evidence” combined with first order environmental risk assessment are useful for arriving at a scientifically defensible decision regarding these sites and any need for remedial action.

The potential scenario proposed by the Plaintiff’s expert for “remediation” of the waterways and wetlands on the Plaintiff’s property is drastic and intrusive (Miller, 2010b). Any recommendation for remediation should be based upon measurement or demonstration of risk or potential exposure indicating the need for action. The remedy should be proportional to the risk (ecological or human health).

Any proposed remediation strategy should be reasonable. Intrusive, intensive and extensive intervention when it is not indicated would be essentially an environmental disaster. At present, there is no indication of the need for any remediation at these sites. It is inconceivable that the US Army Corps of Engineers, LADEQ and other regulatory authorities that must approve wetland remediation projects would permit any intrusive or drastic intervention at this site. As mentioned above and noted in the Plaintiff’s expert report (Grieg et al. 2010), these sites are currently serving as exceptional habitat for diverse and important wetland species.

The data currently available indicate no remediation is needed at these sites. These data indicate that any contamination from past activities poses no environmental risks. The past and present uses of the sites are currently supported. The unfounded and intrusive proposal for “remediation” of these sites offered by the Plaintiff’s expert (Miller, 2010b) would pose severe risks and consequences for plants and animals using this site for habitat. The risk of any remedy should never exceed potential or actual risks at any site.

## **6. SUMMARY OF OPINIONS**

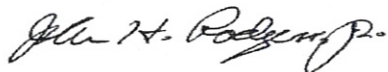
**1. The reported levels, locations and forms of contaminants in water, sediments and surface soils of the VPSB property are not problematic and do not pose significant ecological risks.**

**2. The plaintiff’s experts’ reports arrive at unsubstantiated conclusions regarding ecological risks and a harmful remediation proposal that is not based upon extant risks.**

**3. Intrusive remedial actions or disturbances such as extensive dredging and hauling of sediments or soils would cause considerable harm to this marsh and would not serve to remediate any adverse ecological impacts.**

**4. The available data clearly illustrate that this property and area provide exceptional habitat for wetland species that inhabit intermediate marsh.**

As new data or information become available, I reserve the right to amend, supplement, or revise this report.

A handwritten signature in black ink, appearing to read "John H. Rodgers, Jr.", written in a cursive style.

John H. Rodgers, Jr., Ph.D.

June 28, 2010



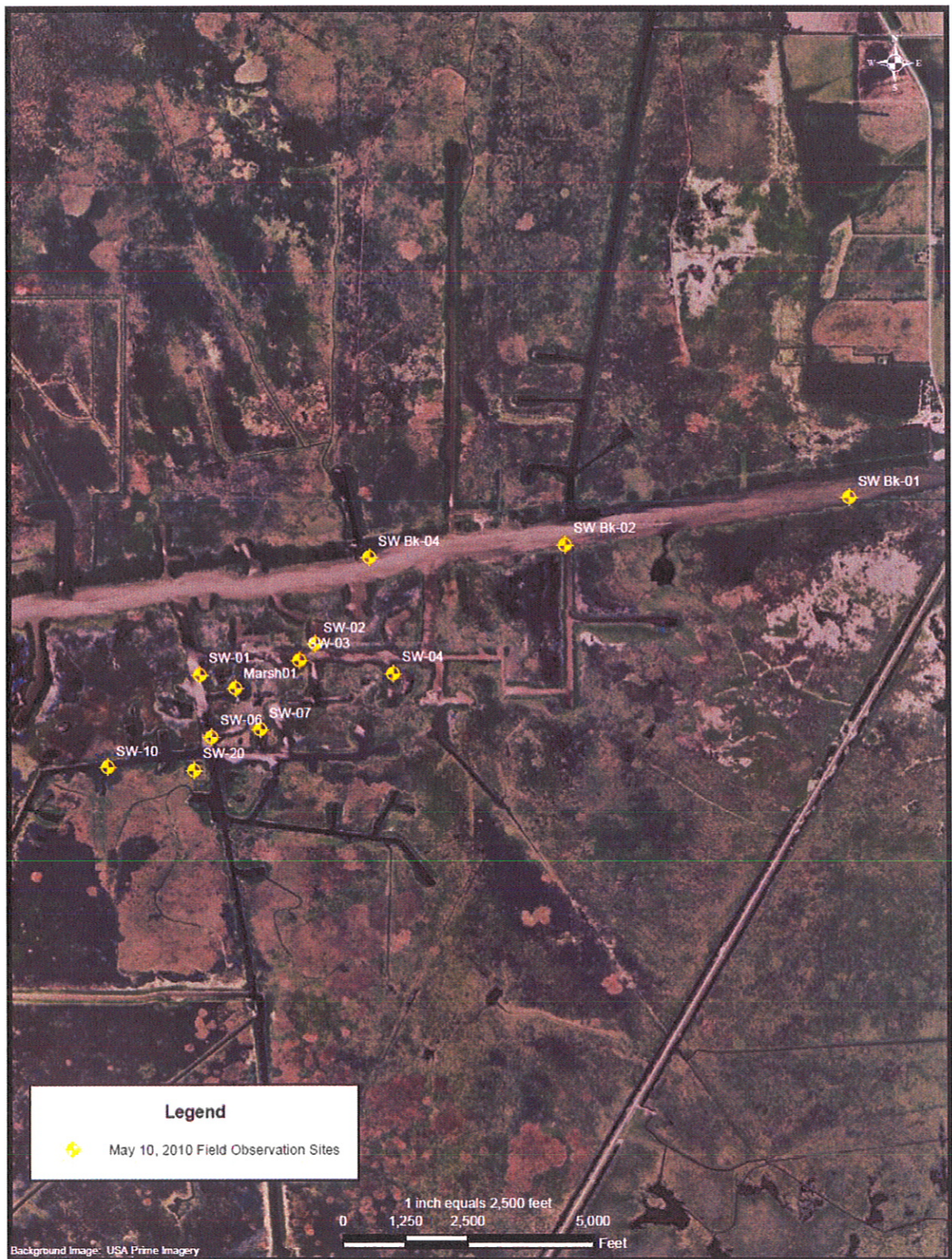


Figure 1. Field observation sites during May 10, 2010 site inspection.

**Table 1.** Coordinates of observation sites on May 10, 2010 at East White Lake field, Vermilion Parish, LA.

Site	Latitude (°N)	Longitude (°W)
	dd°mm'ss.ss"	dd°mm'ss.ss"
SW-01	29 44 02.84	-92 22 11.77
SW-02	29 44 08.91	-92 21 49.10
SW-03	29 44 05.68	-92 21 52.21
SW-04	29 44 03.05	-92 21 33.69
SW-06	29 43 50.52	-92 22 09.47
SW-07	29 43 52.00	-92 21 59.85
SW-10	29 43 44.57	-92 22 29.98
SW-20	29 43 44.01	-92 22 12.93
Marsh01	29 44 00.21	-92 22 04.83
SW Bk-01	29 44 37.73	-92 20 03.89
SW Bk-02	29 44 28.46	-92 20 59.80
SW Bk-04	29 44 25.88	-92 21 38.38



**Table 2.** Vegetation observed at East White Lake site in the vicinity of the designated stations during May 10, 2010 site examination.

Vegetation Observed		Site											
Common Name	Genus species	SW01	SW02	SW03	SW04	SW06	SW07	SW10	SW20	Marsh01	SWBK01	SWBK02	SWBK04
Alligatorweed	<i>Alternanthera philoxeroides</i>	X	X	X					X	X	X	X	
American cupscale	<i>Sacciolepis sirata</i>	X		X			X				X		X
American pokeweed	<i>Phytolacca americana</i>	X	X			X	X		X	X	X	X	
Black willow	<i>Salix nigra</i>				X		X		X	X	X	X	X
Butterweed	<i>Packera glabella</i>		X	X		X						X	
Bulltounge arrowhead	<i>Sagittaria lancifolia</i>	X	X	X	X	X		X		X	X	X	X
Celery leaved buttercup	<i>Ranunculus sceleratus</i>	X		X			X	X		X	X		
Chinese tallow	<i>Triadica sebifera</i>				X						X	X	X
Coastal bristlegrass	<i>Setaria corrugata</i>	X	X		X	X	X		X	X	X	X	X
Coastal waterhyssop	<i>Bacopa monnieri</i>	X		X	X	X		X			X		
Common reed	<i>Phragmites australis</i>		X	X	X	X					X	X	X
Common buttonbush	<i>Cephalanthus occidentalis</i>	X		X	X	X	X	X	X	X		X	X
Common cattail	<i>Typha latifolia</i>	X		X	X		X	X	X	X	X	X	X
Common rush	<i>Juncus effusus</i>	X	X	X	X	X	X	X	X	X		X	X
Common spikerush	<i>Eleocharis palustris</i>	X			X	X	X	X	X	X	X	X	X
Compact dodder	<i>Cuscuta compacta</i>		X			X		X		X		X	
Dwarf spikerush	<i>Eleocharis parvula</i>		X		X				X			X	
Giant Bullrush	<i>Schoenoplectus californicus</i>	X	X	X	X	X	X	X		X	X	X	X
Grassy Arrowhead	<i>Sagittaria graminea</i>		X	X	X		X		X		X		X
Groundsel bush	<i>Baccharis halimifolia</i>	X		X		X			X		X		X
Jesuit's bark	<i>Iva frutescens</i>	X		X		X					X		



Table 2. Continued

Vegetation Observed		Site												
Common Name	Genus species	SW01	SW02	SW03	SW04	SW06	SW07	SW10	SW20	Marsh01	SWBK01	SWBK02	SWBK04	
Maidencane	<i>Panicum hemitomon</i>	X	X	X	X	X	X	X	X	X	X	X	X	
Narrowleaf Cattail	<i>Typha angustifolia</i>	X	X	X	X	X	X	X	X		X	X	X	
Rattlebox	<i>Sesbania drummondii</i>	X		X		X		X	X	X	X	X		
Rigid hornwort	<i>Ceratophyllum demersum</i>		X								X			
Salt-marsh bullrush	<i>Scirpus robustus</i>	X	X		X	X		X		X	X	X	X	
Saltmeadow Cordgrass	<i>Spartina patens</i>	X	X	X	X	X		X			X	X	X	
Saltmarsh morning glory	<i>Ipomea sagittata</i>	X			X					X		X	X	
Seaside goldenrod	<i>Solidago lancifolia</i>	X		X	X			X		X		X	X	
Small dogfennel	<i>Eupatorium capillifolium</i>	X		X		X		X		X		X	X	
Smooth cordgrass	<i>Spartina alterniflora</i>	X			X		X		X	X	X	X		
Southern blue flag	<i>Iris virginica</i>		X					X			X			
Southern cattail	<i>Typha domingensis</i>		X	X	X			X			X	X		
Southern live oak	<i>Quercus virginiana</i>					X					X		X	
Southern waterhemp	<i>Amaranthus australis</i>	X		X		X					X	X		
Stickyweed	<i>Gallium aparine</i>	X		X	X	X			X	X	X		X	
Sturdy bulrush	<i>Schoenoplectus robustus</i>		X			X				X			X	
Swamp lily	<i>Crinum americanum</i>						X				X			
Swamp mallow	<i>Hibiscus moscheutos</i>				X		X							
Swamp maple	<i>Acer rubrum</i>						X			X	X		X	
Swamp rose mallow	<i>Hibiscus moscheutos</i>		X			X			X		X			
Torpedograss	<i>Panicum repens</i>	X		X	X		X	X	X					
Wax myrtle	<i>Morella cerifera</i>	X		X	X	X		X			X	X	X	

**Table 3.** Wildlife and animals observed at East White Lake site in three vicinity of the designated stations during May 10, 2010 site examination.

Common Name	Genus species	Site												
		SW01	SW02	SW03	SW04	SW06	SW07	SW10	SW20	Marsh01	SWBK01	SWBK02	SWBK04	
Catfish	<i>Ictalurus sp.</i>	X	X	X	X	X		X	X			X	X	X
Mullet	<i>Mugil cephalus</i>	X			X		X					X	X	X
Alligator	<i>Alligator mississippiensis</i>	X	X	X		X			X	X	X	X	X	X
Racoons	<i>Procyon lotor</i>							X	X	X				
Blue Crabs	<i>Callinectes sapidus</i>	X		X				X	X		X			
Crayfish	<i>Procambarus sp.</i>	X		X		X			X	X	X	X	X	X
Damselfly	<i>Zygoptera sp.</i>	X	X	X	X	X						X	X	X
Deer fly	<i>Chrysops sp.</i>	X	X	X	X	X				X		X	X	X
Dragonfly	<i>Anisoptera sp.</i>	X	X	X	X	X						X	X	X
Midge	<i>Chironomus sp.</i>	X	X	X	X	X				X	X	X	X	X
Mosquito	<i>Culex sp.</i>	X	X	X	X	X				X	X	X	X	X
Common teal	<i>Anas crecca</i>													X
Egret	<i>Egretta sp.</i>			X	X						X	X	X	X
Ibis	<i>Eudocimus sp.</i>													X
Night heron	<i>Nycticorax nycticorax</i>			X									X	X
Redwing blackbird	<i>Agelaius phoeniceus</i>	X	X	X		X			X		X	X	X	X
Spoonbill	<i>Platalea sp.</i>				X									X
Swallow	<i>Tachycineta sp.</i>												X	X
Mosquitofish	<i>Gambusia affinis</i>	X	X	X	X	X						X	X	
Osprey	<i>Pandion haliaetus</i>		X										X	
Anhinga	<i>Anhinga anhinga</i>	X												X
Double-crested comorant	<i>Phalacrocorax auritus</i>												X	
Common Tern	<i>Sterna hirundo</i>			X										X

**Table 4.** Comparison of ICON (Miller, 2010a) and MP&A (Pisani and Angle, 2010) sediment analytical data to ecological screening standards.

Constituents	Screening Standards (mg/kg)		Maximum (mg/kg) <sup>(c)</sup>		Site/ Date	Depth (ft)	Exceeds Soil <sub>SSI</sub> and 29-B Standards (Y/N)	
	Soil <sub>SSI</sub> <sup>(a)</sup>	29-B <sup>(b)</sup>	ICON (rerun)	MP&A <sup>(d)</sup>			ICON	MP&A
<i>Metals</i>								
Arsenic	12	10	10.6 (130) <sup>†</sup>	NA	B2/ 8-Aug-06	6 - 8	N <sup>†</sup>	-
Barium	14,000	20,000	15,700	NA	SS7/ 26-Apr-06	0 - 1.4	N	-
Cadmium	100	10	3.4	NA	B19/ 10-Aug-06	1 - 2.5	N	-
Chromium	310,000	500	501.0	137	SED15/ 26-Feb-10	0 - 2	N	N
Lead	1,400	500	179.0	60.3	SED15/ 26-Feb-10	0 - 2	N	N
Mercury	61	10	14.3	0.430	SED6/ 25-Feb-10	0 - 2	N	N
Selenium	1,000	10	<15.9	NA	B19/ 10-Aug-06	1 - 2.5	N	-
Strontium	20,000	NA	459.0	NA	AB13/ 13-Nov-06	0 - 3	N	-
Zinc	61,000	500	194.0	NA	SS11/ 27-Apr-06	0 - 2.5	N	-
<i>TPH-GRO (C<sub>6</sub>-C<sub>10</sub>)</i>	510	NA	<177	NA	SS7/ 26-Apr-10	0 - 1.4	N	-
<i>TPH-DRO (C<sub>10</sub><sup>†</sup>-C<sub>28</sub>)</i>	510	NA	57,000	84,600	SED15/ 26-Feb-10	2 - 4	Y	Y
<i>TPH-ORO (C<sub>28</sub><sup>†</sup>-C<sub>33</sub>)</i>	2,500	NA	23,500	8,580	SED15/ 26-Feb-10	2 - 4	Y	Y

NA - Data Not Available

(a) RECAP Screening Option Standard for soil protective of industrial land use, Table 1 of RECAP (2003)

(b) Department of Natural Resources (DNR) regulations of onsite storage of nonhazardous oilfield

waste generated by oilfield production

(c) Maximum concentration of reported in sediment samples provided by ICON (Miller, 2010a; Table 4-1R)

(d) Data provided by Michael Pisani & Associates

(e) Date sample was collected

<sup>†</sup> ICON rerun data inconsistent with original analysis; thus original value (10.6) was used

## Literature Cited

- Baras, J.A. 2007. Land area changes in coastal Louisiana after Hurricanes Katrina and Rita. USGS Report Science and the Storms: the USGS Response to the Hurricanes of 2005. pp.97-112.
- Barbee, G.C. and G.J. Castille, III. 2010. (dated April 15, 2010). Investigation of Historical Land Use and Environmental Impacts on the Vermilion Parish School Board Property, Section 16, T. 15S. – R. 1 E., Vermilion Parish, Louisiana. Prepared for Talbot, Carmouche & Marcello. 15 pp.
- Brown, J.M. 2004. The difference between bacterial film and oil sheen in Milkhouse Creek. [www.southalabama.edu/geography/fearn/.../Brown.htm](http://www.southalabama.edu/geography/fearn/.../Brown.htm)
- Brupbacher, R.H., J.E. Sedberry, Jr. and W.H. Willis. 1973. The Coastal Marshes of Louisiana – Chemical Properties of the Soil Materials. Bulletin No. 672, LSU Agriculture Experiment Station.
- Godfrey, R.K. and J.W. Wooten. 1981. Aquatic and Wetland Plants of Southeastern United States: Dicotyledons. University of Georgia Press. Athens, GA.
- Godfrey, R.K. and J.W. Wooten. 1979. Aquatic and Wetland Plants of Southeastern United States: Monocotyledons. University of Georgia Press. Athens, GA.
- Grieg, R., J. Battle, W. Wilson and J.T. Arnold. 2010. (dated April 29, 2010). Environmental Investigations of Activities Related to East White Lake Oil Field Operations in Vermillion Parish, Louisiana. Prepared for Talbot, Carmouche, & Marcello, Gonzales, LA by Coastal Environments, Inc., Baton Rouge, LA. CEI No. 2100038.
- Kilpatrick, J.A. 2010. (dated April 15, 2010). The VPSB Property, Vermilion Parish, Louisiana. Greenfield Advisors. Prepared for Talbot, Carmouche & Marcello. 29 pp. + appendices.
- Lingle, D. 2010. Screening Level Ecological Risk Assessment, Vermilion Parish School Board. Section 16 T155R01E East White Lake Oil & Gas Field, Vermilion Parish, La. URS Corporation. Houston, Tx.
- Merritt R.W. and K. W. Cummins. 1996. Aquatic Insects of North America. Kendall/Hunt Publishing Company, Dubuque, Iowa. pp. 74 – 97.
- Metcalf & Eddy. 2003. Wastewater Engineering, Treatment and Reuse. 4th ed. New York: McGraw-Hill, 2003. 98.



- Miller, G. 2010a (dated March 2010) ICON Report: VPSB v Louisiana Land, et al., East White Lake Field, Vermillion Parish Assessment Report, East White Lake Field, Vermillion Parish, LA. Prepared for Talbot Carmouche & Marcello.
- Miller, G. 2010b. (dated April 2010) ICON Report: VPSB v Louisiana Land, et al, Feasibility Study and Remediation Estimate East White Lake Field, Vermilion Parish, La. Prepared for Talbot Carmouche & Marcello.
- Minnesota Pollution Control Agency. 2008. Nonpetroleum sheens on water. Clean up Emergency Response. available on the internet
- Norman, C. E. 2010. Engineering and Operations Report On East White Lake Field Operated by LL&E et al, Vermilion Parish, LA Report No. 1. Vermilion Parish School Board (VPSB) vs Louisiana Land & Exploration et al, Vermillion Parish, Louisiana. 16 pp.
- Pisani, M.E. Angle, D.G. 2010. (dated June 15, 2010). Vermilion Parish School Board v. Louisiana Land, et al, Expert Report. Prepared for Kean Miller Hawthorne D'Armond McCowan & Jarman LLP, Baton Rouge, LA.
- Radford, A.E., H.E. Ahles, and C. R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. Chapel Hill, NC. 1183 pp.
- Sasser, C.E., Visser, J.M., Mouton, E., Linnscombe, and Hurley, S.B. 2007-8. Vegetation types in coastal Louisiana in 2007. USGS Ag Center, LSU Ag Center Research and Extension. Open file report 2008-1224.
- Sibley, D. 2003. The Sibley field guide to birds of western North America. New York, New York, 471 pp.
- Smith, D.G. 2001. Pennak's Freshwater Invertebrates of the United States, 4th ed. Douglas Grant Smith. John Wiley & Sons, New York, New York, 638 pp.
- Steyer, G.D. B.C. Perez, S. Piazza and G. Suir. 2007. Potential Consequences of Saltwater Intrusion Associated with Hurricanes Katrina and Rita. USGS Report Science and the Storms: the USGS Response to the Hurricanes of 2005. Pp. 137-146.
- Suter, G.W., 2007. Ecological Risk Assessment. 2<sup>nd</sup> ed. CRC press, Boca Raton, Fl. 680 pp.
- Templet, P.H. 2010. An Expert Report by Paul H. Templet, Ph.D. In VPSB v. Louisiana Land (sic), et al.; East white Lake Field, Vermilion Parish. 13 pp.
- Tiner, R.W. 1993. Field Guide to Coastal Wetland Plants of the Southeastern United States. University of Massachusetts Press. Amherst, MA. 328 pp., illus.

United States Environmental Protection Agency (USEPA) 1992. Framework for Ecological Risk Assessment. EPA/630/R-92/001.

Veil, J.A., M.G. Pruder, D. Elcock and R.J. Redweick, Jr. 2004. A White Paper Describing Produced Water from Production of Crude Oil, Natural Gas and Coal Bed Methane. U.S. DOE Report W-31-109-Eng-38.

Visser, J.M., C.E. Sasser, R.H. Chabreck, and R.G. Linscombe. 2000. Marsh vegetation types of the Chenier Plain, Louisiana, USA. *Estuaries* 23(3): 318- 327.

APPENDIX A

CURRICULUM VITAE FOR  
JOHN H. RODGERS, JR., Ph.D.

4/2010

## CURRICULUM VITAE

### John H. Rodgers, Jr.

BIRTHDATE: February 1, 1950

BIRTHPLACE: Dillon County, South Carolina, U.S.A.

SSN: Available on request

MARITAL DATA: Wife's maiden name - Martha W. Robeson  
Children - Daniel Joseph  
(Born January 16, 1978)  
Frank Clifford  
(Born July 7, 1985)

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PRESENT POSITION: Professor  
Department of Forestry and Natural Resources  
Clemson University

Co-Director  
Clemson Environmental Institute  
Clemson University

Director, Ecotoxicology Program  
Co-Director, Energy and Environment Program  
Department of Forestry and Natural Resources  
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Rodgers-1



EDUCATION:

Virginia Polytechnic Institute and State University, Blacksburg, VA,  
Ph.D. Degree, Botany, Aquatic Ecology, 1977.

Clemson University, Clemson, SC,  
M.S. Degree, Botany, Plant Ecology, 1974.

Clemson University, Clemson, SC,  
B.S. Degree, Botany, 1972.

PROFESSIONAL  
EXPERIENCE:

**Clemson University (1998-present):**

Professor, Department of Forestry and Natural Resources  
Director, Ecotoxicology Program  
2003 – Present.

Director, Clemson Institute of Environmental Toxicology  
Chair, Department of Environmental Toxicology  
Professor, Department of Environmental Toxicology  
Co - Director, Clemson Environmental Institute  
1998 - 2003.

**University of Mississippi:**

(Department of Biology)

Professor, Department of Biology,  
1989 - 1998.

Director, Ecotoxicology Program,  
1995 – 1998.

Adjunct Research Professor, Research Institute for  
Pharmaceutical Sciences,  
1989 - 1998.

Director, Biological Field Station,  
1990 – 1995.

Director, Center for Water and Wetland Resources,  
1993 – 1995.

Associate Director, Biological Field Station,  
1989 - 1990.

**University of North Texas:**

(Division of Environmental Sciences,  
Department of Biological Sciences)

Director, Water Research Field Station,  
1987 - 1989.

Associate Professor, Department of Biological Sciences,  
1985 - 1989.

Associate Director, Institute of Applied Sciences,  
1982 - 1988.

Assistant Professor, Department of Biological Sciences,  
1982 - 1985.

Research Scientist II, Institute of Applied Sciences,  
1979 - 1981.

**East Tennessee State University:**

(Department of Environmental Sciences,  
Aquatic Ecology Section)

Assistant Professor, 1978 - 1979.

**Virginia Polytechnic Institute  
and State University:**

(Biology Department, Center for  
Environmental Studies)

Postdoctoral Research Associate, 1977 - 1978.

Research Assistant- Energy Research and  
Development Administration, 1975 - 1977.

**Clemson University (1972-1974):**

(Botany Department)

Research Assistant - Water Resources Research  
Institute, 1972 - 1974.

Laboratory Teaching Assistant – Plant Physiology,  
Plant Ecology, Biological Oceanology, Botany, 1972 - 1974.

**MILITARY  
SERVICE:**

Distinguished Military Graduate, Clemson University, 1972.

U.S. Air Force Reserve, Second Lieutenant,  
1972 - 1975.

U.S. Air Force Reserve, First Lieutenant,  
1975 - 1978.

U.S. Air Force Reserve, Captain,  
1978 - 1984.

U.S. Air Force (Active Duty),  
June 1 - August 29, 1976.

Rodgers-3

U.S. Air Force, Honorable Discharge, 1984.  
Pilot Certificate - 34 hours, Single engine aircraft.

RESEARCH  
SUPPORT:

**Clemson University (1972-1974):**

Research Assistantship, Water Resources Institute, Project No. B-053-SC (\$42,000), 1972 - 1974. Impact of Thermal Effluent from a Nuclear Power Plant on Reservoir Productivity.

Thesis Parts Award, USAEC, The E.I. DuPont de Nemours & Co., Savannah River Laboratory (Thermal Effects Laboratory), Aiken, S.C., 1973-1975. Effects of Elevated Temperatures on Periphyton Productivity in Lotic Aquatic Ecosystems.

Savannah River Laboratory, Research Assistantship, Research Contract USAEC Funding (\$50,000), 1973-1975. Impacts of Ash from Coal Combustion on Swamp Receiving Systems.

**Virginia Polytechnic Institute and State University:**

Research Assistantship, Research Contract, American Electric Power Corporation Funding (\$93,000), 1974-1975. Thermal Tolerances and Electivities of Fish Adjacent to a Coal-Fired Power Plant.

Research Assistantship, Research Contract, Energy Research and Development Administration Funding (\$112,000), 1975 - 1976. Structural and Functional Responses of Aquatic Communities to Power Generation.

Research Assistantship, Research Contract, Energy Research and Development Administration Funding (\$132,000), 1976 - 1977. Responses of Aquatic Communities to Perturbations Associated with Power Generation.

Co-principal Investigator, Research Contract, Water Resources Research Institute Funding (\$68,000), 1977 - 1979. Environmental Tolerances of *Corbicula fluminea* from the New River, Virginia.

**East Tennessee State University:**

Principal Investigator, Research Contract, ETSU Research Development Committee Funding (\$3,270), 1978 - 1979. Primary Production and Nutrient Dynamics in the Watauga River, Tennessee.

Oak Ridge Associated Universities Travel Contract, 1978 - 1979. Impacts of Power Production on Aquatic Ecosystems of Savannah River Laboratory.

**University of North Texas:**

Co-Principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$80,000), 1979 - 1980. Modeling the Fate of Chemicals in Aquatic Environments.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,000), 1979 - 1980. Biotransformation of Xenobiotics in Aquatic Systems.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$149,530), 1980 - 1981. Impacts of Paper Mill Effluent on Aquatic Ecosystems.

Co-principal Investigator, Research Contract, Victor Equipment Company Funding (\$5,000), 1980. Optimization of Packaged Waste Treatment System for Metal Removal.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$171,830), 1980 - 1981. Investigation of Pre- and Post-Operational Effects of a Paper Mill on Aquatic Systems.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,620), 1980 - 1981. Predicting Bioconcentration of Chemicals by Aquatic Organisms.

Co-principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$30,000), 1981. Validation of Chemical Fate Models for Aquatic Ecosystems.

Co-principal Investigator, Research Contract, U.S. Environmental Protection Agency Funding (\$305,866), 1981 - 1983. Development of a Decision Support System for Integrated Management of Nuisance Aquatic Vegetation.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$3,600), 1981-1982. Fate and Effects of the Herbicide, Endothall, in Aquatic Systems.

Co-principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$59,985), 1981 - 1982. Studies of Fate and Effects of Chemicals in Aquatic Ecosystems.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$113,000), 1982. Effects of Paper Mill Effluent on Aquatic Ecosystems.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1982. Ecosystem Study of Pat Mayse Lake, A Southwestern Reservoir.



Co-principal Investigator, Research Contract, International Paper Company Funding (\$348,926), 1982 - 1985. Further Studies of Effects of Paper Mill Effluent on Aquatic Ecosystems.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$3,500), 1982 - 1983. Proximate Oxygen Demand of Aquatic Plants.

Co-principal Investigator, Research Contract, U.S. Environmental Protection Agency Funding (\$199,500), 1982 - 1983. Validation of Decision Support Systems for Integrated Management of Nuisance Aquatic Vegetation.

Co-principal Investigator, Research Contract, American Petroleum Institute (\$83,809), 1981 - 1982. Bioavailability of Petroleum-Derived Chemicals in Aquatic Ecosystems.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$25,000), 1983. Further Studies: Pat Mayse Lake, A Southwestern Reservoir.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$1,000), 1983. Remote Sensing of Aquatic Vegetation in Pat Mayse Lake.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$17,000), 1983. Impact of Petroleum Compounds on Aquatic Organisms.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,500), 1983 - 1984. Threshold Responses of Aquatic Vegetation to Herbicides.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$29,758), 1984. Inter-Laboratory Comparison of Bioassays Using Freshwater and Marine Organisms.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$20,000), 1984. Water Quality Monitoring and Aquatic Vegetation in Pat Mayse Lake.

Principal Investigator, Research Contract, Pennwalt Corporation Funding (\$11,500), 1984. Comparative Study of Two Aquatic Herbicides.

Principal Investigator, Research Contract, Shell Oil and Chemical Company Funding (\$14,000). Aquatic Toxicology Studies for the Petrochemical Industry.

Principal Investigator, Research Contract, Dallas County Utility and Reclamation District Funding (\$12,000), 1984 - 1985. Eutrophication Potential in an Impoundment Receiving Wastewater.

Co-principal Investigator, Research Contract, Shell Development Company Funding

(\$31,797), 1985. Development of Data on Proper Selection of Bioassay Species.

Co-principal Investigator, Research Contract, Texas Instruments, Inc. Funding (approximately \$12,000, equipment), 1985. Development of Expert Systems for Water Quality Management.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1985. Development of a Water Quality Model and Lake Management Strategy for Pat Mayse Lake.

Co-principal Investigator, Research Foundation Award, Shell Research Foundation (\$15,000), 1985. The Response of Marine and Freshwater Species to Xenobiotics.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$2,700), 1986 - 1987. Experimental Analysis of Bioassay Methods.

Co-principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$168,693), 1986 - 1987. Ecological Analysis of the Lake Ray Roberts Project Site.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding, (\$68,000), 1986 - 1987. Coupling an Environmental Fate and Effects Model for 2, 4-D and Water Hyacinth.

Co-principal Investigator, Research Contract, Shell Research Foundation Funding (\$15,000), 1986. Osmoregulation in Marine Bioassay Species.

Principal Investigator, Research Contract, American Petroleum Institute Funding (\$8,000), 1986. Evaluation of Marine Bioassay Species.

Principal Investigator, Research Contract, American Petroleum Institute and U.S. Environmental Protection Agency Funding (\$10,000), 1986. A Workshop on Culture and Life History of *Mysidopsis* sp.

Co-principal Investigator, Research Contract, Shell Research Foundation Funding (\$20,000), 1987. Sediment Organic Carbon Content in Aquatic Systems of the U.S.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1987 - 1988. Endothall Fate and Effects on *Myriophyllum spicatum* in Pat Mayse Lake, Texas.

Co-principal Investigator, Research Contract Hoechst-Roussel Agri-Vet (Hoechst-Celanese) Co. Funding (\$185,000), 1987 - 1988. Development of Mesocosms and Water Research Field Station.

Co-principal Investigator, Research Contract, City of Dallas Funding (\$319,964), 1987 -

1989. Ecological Survey and Study of the Trinity River, Texas.

Co-principal Investigator, Research Contract, Hoechst-Roussel Agri-Vet (Hoechst-Celanese) Co. Funding (\$325,000), 1988 - 1989. Fate and Effects of Tralomethrin in Mesocosms.

Co-principal Investigator, Research Contract, Hoechst Roussel Agri Vet (Hoechst-Celanese) Co. Funding (\$185,000), 1988 - 1989. Further Development of Mesocosms and Water Research Field Station.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1988 - 1989. Further Development of a Water Quality Model and Lake Management Strategy for Pat Mayse Lake.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,550), 1988 - 1989. Research on SONAR in Pat Mayse Lake.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$107,000), 1988-1989. Water Research Field Station-Coupling a Herbicide Fate and Effects Model.

Principal Investigator, Research Contract, Pennwalt Corporation (\$2,000), 1988-1989. Degradation of Endothall by Chlorine.

Co-principal Investigator, Research Contract, Mobay Corporation (\$852,000), 1988-1990. Fate and Effects of Cyfluthrin in Mesocosms.

Co-principal Investigator, Research Contract, Shell Development Corporation (\$55,000) 1989-1990. Bioavailability of Sediment-sorbed Chemicals to Freshwater Organisms.

#### **University of Mississippi:**

Principal Investigator, Research Contract U.S. Army Corps of Engineers - Tulsa District Funding (\$24,500), 1988-1989. Limnology and Aquatic Botany of Pat Mayse Lake, Texas.

Principal Investigator, Research Contract, Shell Development Company Funding (\$50,000), 1989-1990. Evaluation of Sediment Toxicity Testing Procedures.

Co-principal Investigator, Research Contract Soil Conservation Service Funding (\$50,000), 1990-1991. Wetlands for Interception and Processing of Pesticides in Agricultural Runoff.

Co-principal Investigator, Research Contract Tennessee Valley Authority Funding



(\$171,410), 1990-1991. Analysis of Aquatic Herbicides in Lake Guntersville, Alabama for the Aquatic Plant Management Program.

Principal Investigator, Research Contract, Ciba Giegy Corporation Funding (\$31,000), 1990. Effects of Atrazine on Aquatic Vascular Plants.

Co-principal Investigator, Research Contract, Dow-Elanco Corporation Funding (\$40,000), 1990. Analysis of Fluridone in Florida Aquatic Plant Management Programs.

Principal Investigator, Research Contract, U.S. Environmental Protection Agency - Gulf of Mexico Program (\$17,565) 1990-1991. Assistance with the Citizen's Advisory Group of the Gulf of Mexico Program.

Co-principal Investigator, CHP International, Inc. (U.S. Peace Corps) Funding (\$22,000), 1990. Aquaculture Training Sessions for Volunteers for Africa.

Co-principal Investigator, University of Mississippi Funding (\$1,000), 1989-1990. Water Systems for an Aquatic Toxicology Laboratory.

Principal Investigator, Internal Equipment Funding, University of Mississippi Associates Funding (\$25,000), 1990-1991. Aquisition of an Ion Chromatograph/High Performance Liquid Chromatograph.

Principal Investigator, U.S. Army Corps of Engineers, Waterways Experiment Station Funding (\$250,000), 1990-1993. Development of Controlled Release Herbicides for Aquatic Use.

Principal Investigator, American Petroleum Institute Funding, (\$250,000), 1990 -1992. Reference Toxicants and Reference Sediments for Sediment Toxicity Testing.

Principal Investigator, Research Contract, Tennessee Valley Authority Funding (\$168,000), 1991-1992. Aquatic Herbicides in Guntersville Reservoir, Alabama - National Demonstration Project.

Co-principal Investigator, Research Contract, U.S. Department of the Army, Vicksburg District, Corps of Engineers Funding (\$96,036), 1991-1992. Monitoring Water Quality at Arkabutla, Enid, Grenada, and Sardis Lakes.

Principal Investigator, Research Contract, ABC Laboratories, Inc. and Zoecon Corporation Funding (\$10,000), 1991. Outdoor Microcosm Study of an Insect Growth Regulator.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$192,000), 1991-1993. Development of a Model Stream Facility and Evaluation of the Environmental Safety of a Surfactant.



Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$25,000), 1991-1992. Evaluation of New Herbicide Delivery System for Control of Aquatic Plants.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$64,000), 1992-1993. Evaluation of New Herbicide Delivery Systems for Control of Aquatic Plants.

Principal Investigator, Research Contract, American Petroleum Institute Funding (\$100,000), 1992-1993. New Sediment Bioassays and Reference Sediments. Principal Investigator, Mississippi State Department Of Wildlife, Fisheries, and Parks Funding (\$6,000), 1991-1993. Cooperative Agreement for Assistance with Walleye Culture.

Co-Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$100,848), 1992-1993. Monitoring of Water Quality at Arkabutla, Sardis, Enid, and Grenada Lakes.

Principal Investigator, Mississippi State Department of Wildlife, Fisheries and Parks Funding (\$3,000), 1992-1993. Cooperative Agreement for Assistance with Walleye Culture.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$30,000), 1992-1994. Mobility and Bioavailability of Sediment Associated Contaminants.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$25,000), 1992-1993. Effects of Food Quantity on Fathead Minnow Survival, Growth and Reproduction.

Principal Investigator, Research Contract, Eastman Kodak and the Silver Coalition Funding (\$53,183), 1992-1994. Evaluations of the Bioavailability and Toxicity of Silver in Sediments.

Principal Investigator, Research Contract, Shell Development Company Funding (\$150,000), 1992-1993. Ecological Evaluation of a Non-ionic Surfactant in Model Stream Mesocosms.

Principal Investigator, Research Contract, Shell Development Company Funding (\$30,342), 1993-1994. Assistance with Development and Construction of Constructed Wetlands for Tertiary Treatment of Refinery Effluent.

Principal Investigator, U.S. Department of Agriculture/ Cooperative State Research Service Funding (\$1,377,400), 1994-1995. Center for Water and Wetland Resources (Year 4).

Co-Principal Investigator, Research Contract, International Paper Company Funding (\$99,631), 1994-1995. Extensive Ecological and Toxicological Evaluation of the Arkansas River at Pine Bluff, AR.

Co-Principal Investigator, Research Contract, International Paper Company Funding (\$99,631), 1994-1995. Extensive Ecological and Toxicological Evaluation of the Yazoo River near Vicksburg, MS.

Principal Investigator, Research Contract, Shell Development Company Funding (\$150,000), 1994-1995. Ecological Evaluation of a Homologous Non-ionic Surfactant in Model Stream Mesocosms.

Principal Investigator, Research Contract, Shell Development Company Funding (\$144,242), 1994-1996. Evaluation of Constructed Wetlands for Tertiary Treatment of Refinery Effluent.

Principal Investigator, Research Contract, Texaco, Inc. Funding (\$20,000), 1995-1996. Evaluation of a Constructed Wetland for Removal of Ammonia from a Refinery Effluent.

Principal Investigator, Research Contract, Texaco, Inc. Funding (\$20,000), 1995-1996. Evaluation of a Constructed Wetland for Removal of Trace Metals from a Refinery Effluent.

**Clemson University (1998-present):**

Principal Investigator, Assistance with Design and Construction of a Wetland for Wastewater Treatment Sponsored by Shell Oil Products from 4/1/98 to 4/1/00 (\$10,000).

Principal Investigator, Evaluation of the Tombigbee River. Sponsored by Weyerhaeuser, Inc. 1/98 – 1/02 (\$22,000).

Principal Investigator, Constructed Wetland for Wastewater Treatment at IP's Mansfield, LA Facility, Sponsored by International Paper Company 8/98 – 12/00 (\$18,250).

Principal Investigator, Investigations of Pesticide Toxicity, Sponsored by Applied Biochemists, Inc. 1/00 – 1/01 (\$10,000).

Principal Investigator, Wetlands for Wastewater Treatment at Savannah River Site Sponsored by DOE thru SCUREF (SC Universities Research and Education Foundation) from 1/14/99 to 2/28/00 (\$28,088).

Principal Investigator, A-01 Outfall Constructed Wetlands Sponsored by DOE thru Westinghouse Savannah River thru SCUREF from 7/11/99 to 9/30/00 (\$624,730).

Principal Investigator, Design and Construction of a Wetland for Effluent Treatment. Sponsored by International Paper Company 6/00 – 7/01 (\$25,000).

Principal Investigator, Evaluation of Foam Products. Flexible Products, Inc Funding from 9/99 – 1/01 (\$15,000).

Principal Investigator, US Department of Interior Funding (\$43,106), 2002-2004. Renovating Water for Conservation and Reuse.

Co-Principal investigator, US Department of Agriculture Funding (\$539,677), 2002-2004. Adhesion-Specific Nanoparticles for Removal of *Campylobacter jejuni* from Poultry.

Principal Investigator, Duke Energy Corporation Funding (\$54,473). 2001. Evaluation of the Oconee Nuclear Station Conventional Waste Treatment System.

Principal Investigator, Chevron Texaco Inc. Funding (\$24,000), 2001-present. Evaluation of Best Management Practices for Stormwater and Other Contaminated Waste Streams.

Principal Investigator, US Department of Energy Funding (\$26,024). 2001-2003. A01 Constructed Wetland Treatment Facility Redox Probe Maintenance and Consultation for the Savannah River Site (from WSRC through SCUREF).

Principal Investigator, U.S. Department of Interior Funding (\$43,106). 2002-2003. Renovating Water for Conservation and Reuse.

Principal Investigator, Sustainable Universities Initiative (\$7,000). 2002-2003. A Constructed Wetland Treatment System: A Green and Sustainable Solution to Prevent Water Pollution on Campus.

Principal Investigator, Duke Energy Corporation in Cooperation with Progress Energy Funding (\$187,000). 2003-2004. Treatment of Mercury, Selenium and Other Targeted Constituents in FGD Wastewater: A Constructed Wetland Pilot Study.

Principal Investigator, Chevron Corporation Funding (\$33,600). 2003-2004. Panama Storm Water Treatment Wetland.

Principal Investigator, Griffin Corporation Funding (\$20,000). 2002-2003. Response of Aluminum from Boat Pontoons to Komeen Exposures in Lake Murray, SC Water (with Sediments and *Hydrilla*).

Principal Investigator, Alabama Power Company Funding (\$75,000). 2004-2006. Development of Strategies for Controlling Nuisance Growths of *Lyngbya* in Alabama



## Power Company Reservoirs.

Principal Investigator, Department of Energy Funding (\$125,000) 2004-2005. Designing constructed wetlands to treat gas storage produced waters.

Principal Investigator, Duke Energy Corporation in Cooperation with Progress Energy Funding (\$105,000). 2004-2005. Continuing Studies of Treatment of Mercury, Selenium and Other Targeted Constituents in FGD Wastewater Using a Constructed Wetland Treatment System.

Principal Investigator, U.S. Department of Energy Funding (\$300,000) 2005-2008. Innovative Techniques for Remediation of Nontraditional Waters for Reuse in Coal-Fired Power Plants.

Principal Investigator, Duke Energy Corporation and ENTRIX Funding (\$100,000) 2006-2007. Further Evaluations of Constructed Wetland Treatment Systems for Flue Gas Desulfurization Waters.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) 2006-2007. Evaluation of Boron Biogeochemistry in Constructed Wetlands.

Co-Principal Investigator, Monsanto Company Funding (\$300,000) 2006-2008. Potential Effects of Glyphosate Formulations on Amphibians.

Principal Investigator, Florida Department of Environmental Protection Funding (\$60,000) 2006-2008. Effects of Invasive Algae in Crystal River, FL and Potential Control Strategies to Protect the Florida Manatee.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) 2008. Specifically Designed Constructed Wetland Treatment Systems for Produced Water in Chad.

Principal Investigator, Duke Energy Corporation and ENTRIX Funding (\$30,000) 2007-2008. Additional Evaluations of Constructed Wetland Treatment Systems for Flue Gas Desulfurization Waters.

Co-Principal Investigator, Clemson University Funding (\$50,000) 2006-2008. Evaluation of Constructed Wetland Treatment Systems for Parking Lot Stormwater (with Dr. Rockie English).

Principal Investigator, Applied Biochemists, Inc. Funding (\$36,000) 2008-2009. Approaches for Mitigation of Risks from Harmful Algal Blooms.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) 2008. Specifically Designed Constructed Wetland Treatment Systems for Specific Produced Water (San Ardo, CA).

Co-Principal Investigator, U.S. Department of Energy Funding (\$800,000) 2009. Evaluation of Constructed Wetland Treatment Systems for Produced Waters.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) 2009. Specifically Designed Constructed Wetland Treatment Systems for Produced Water in Chad.

#### HONORS AND AWARDS:

Phi Sigma Doctoral Research Award, April, 1977.

Sigma Xi Doctoral Research Award, May, 1978.

Who's Who in the South and Southwest, 1979.

Personalities of the South, 1981.

International Who's Who, 1981.

Directory of Distinguished Americans, 1981.

Men of Achievement (International Biographical Center), 1981.

Phi Kappa Phi Honor Society, 1982.

Gordon Research Conference Travel Award, 1982.

NTSU President's Award to the Institute of Applied Sciences, 1985.

Mortar Board NTSU "Top Prof" Teaching Award, 1985.

Elected to NTSU Graduate Faculty, 1987.

Co-author - Best Student Paper (Burton Suedel and Phil Clifford), published in 1992 in *Environmental Toxicology and Chemistry*.

Certificate of Appreciation, 1993 Mississippi Region 7 Science and Engineering Fair. 1993.

Designated "Distinguished Southerner" by Editors Of *Southern Living*. Article on Water Watchdogs In April, 1994 edition of *Southern Living*.

Co-author - Best Student Paper (Arthur Dunn), Mid-South Aquatic Plant Management Society. Birmingham, AL. 1994.

Certificate of Appreciation, Environmental Biology Review Panel, U.S. EPA, January, 1995.

President, Oxford Exchange Club – Prevention of Child Abuse, 1996-1998.

Board of Directors, Society of Environmental Toxicology and Chemistry, 1989-1991; 1995-2001. Executive Committee 1997-2000. Vice President 1998-1999. President 1999-2000.

Member, Expert Advisory Committee, Canadian Network of Toxicology Centres. Environment Canada and Health and Welfare, 1992-2000.

Chair, Expert Advisory Committee, Canadian Network of Toxicology Centres, Environment Canada and Health and Welfare, 1996-1999.

Vice President's Award, Savannah River Technology Center. A-01 Outfall Wetland Treatment Confirmation Study, 2000.

Who's Who Among America's Teachers, 7<sup>th</sup> ed. 2002. p. 400.

Certificate of Appreciation for Outstanding Service to the Society of Environmental Toxicology and Chemistry, 2003.

Member, Canadian Foundation for Innovation, Science Review Panel, 2008 - 2009.

Chair, Canadian Foundation for Innovation, Science Review Panel, 2009.

Member of the Year, South Carolina Aquatic Plant Management Society, 2009.

RESEARCH AND  
TEACHING  
INTERESTS:

**Teaching Interests:**

I have taught General Botany, General Biology Environmental Biology, Assessment of Water Quality, Water Quality Management, Environmental Analysis, Aquatic Toxicology, Limnology, Microbial Ecology, Radioisotopes, and Research Techniques, Aquatic Botany, Aquatic Microbiology, Sediment Toxicology, and Analysis of Biological Data, Ecological Risk Assessment, Plant Physiology, and Water Chemistry. My teaching interests also include: Plant Ecology, Wetland Ecology, and Phycology.



**Research Interests:**

Effects of heated effluents and other perturbations on primary productivity of vascular and non-vascular plants in terrestrial and aquatic systems.

*In situ* measurements of assimilatory sulfate reduction by periphytic organisms (algae, bacteria, and fungi), sulfur content and cycling in aquatic systems.

Physical models of aquatic systems as tools for the study of acute and chronic effects of industrial and power plant effluents on structural and functional aspects of aquatic microbial communities with emphasis on photosynthesis and sulfate assimilation.

Production, decomposition and role in nutrient cycling of aquatic macrophytes.

Impact of ash from industrial and power production processes on receiving systems and indigenous biota.

Decomposition and role of autochthonous and allochthonous detritus in aquatic and terrestrial systems with emphasis on the influences of macro-invertebrates, bacteria and fungi.

Invasion rates, population dynamics and elemental accumulation of the Asiatic Clam (*Corbicula fluminea*).

Extracellular products and other organic compounds as regulating factors of structural and functional aspects of aquatic microbial communities.

Benthic metabolism and physical and biological sediment characterization (using SCUBA-implemented techniques) as an index of eutrophication rates.

Electron transport system activity of benthic microflora as a pollution monitoring tool.

Serum enzymes of fish as an indicator of the quality and quantity of mixed effluents and their effects on receiving systems.

Ecosystem responses to stress in aquatic systems; Ecological risk assessment.

Relationships between carbon quantity and quality in ecosystems.

Responses of microbes (algae, bacteria, and fungi) to magnetic fields.

Ecological impacts associated with pulp and paper mills.

Biology and ecology of *Taxodium distichum* (Bald cypress) swamps in the Southwest.

Development of models for integrated control of nuisance aquatic vegetation and aquatic ecosystem management.

Microcosms and mesocosms as tools for ecological and environmental research.

Reservoir limnology and eutrophication.

Secondary aquatic plant products and biocontrol of aquatic plants.

Bioavailability of xenobiotic chemicals (e.g. pesticides) to aquatic organisms.

Sediments as sources and sinks for contaminants in aquatic ecosystems.

Population biology and physiological ecology of aquatic plants.

Artificial Intelligence in ecological problem solving.

Constructed wetlands for rehabilitation and wastewater treatment.

Metal speciation and bioavailability.

#### ORGANIZATIONS:

American Society of Limnology and Oceanography, Ecological Society of America, American Water Resources Association, North American Benthological Society, Water Pollution Control Federation, Phi Sigma Society Alpha Psi (VPI&SU) Chapter, Sigma Xi (VPI&SU) Chapter, American Institute of Biological Sciences, American Association for Advancement of Science, Phi Kappa Phi (NTSU) Chapter, Aquatic Plant Management Society, Society of Environmental Toxicology and Chemistry.

#### OTHER PROFESSIONAL ACTIVITIES:

Consulting Aquatic Ecologist Microbiology Department, Clemson University, 1973-1975.

Investigator on Facilities Use Agreement #15 at Savannah River Laboratory in conjunction with Clemson University and VPI & SU, 1973-1975.

Consulting Aquatic Ecologist to American Electric Power Service Corporation, Canton, Ohio, 1974 - 1975.

Investigator on Facilities Use Agreement #28 at Savannah River Laboratory in

conjunction with University of Texas, School of Public Health and VPI&SU, 1975 - 1979.

Consulting Microbial Ecologist to Bioengineering Research and Development Group, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1977.

Consulting Aquatic Ecologist to Virginia State Water Control Board, Richmond, 1977.

Invited lecturer in Plant Ecology and Environmental Biology, Botany Department, Clemson University, 1977.

Consulting Aquatic Ecologist to Center for Environmental Studies VPI&SU, 1978 - 1979.

Participant in Savannah River National Environmental Research Park meeting on Aquatic Research, Aiken, S.C., 1978.

Grant Proposal Review for the Division of Environmental Biology of the National Science Foundation, 1978 - 1987.

Consulting Aquatic Ecologist to Tennessee Eastman Company, Kingsport, Tennessee, 1978 - 1979.

ETSU Research Development Committee Presidential Appointment 1978 - 1979.

Consulting Aquatic Ecologist to Victor Equipment Company, Denton, Texas, 1980 - 1983.

Review of publications for American Society for Testing and Materials.

Consulting Aquatic Ecologist to Environmental Biology Group, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1980.

Gordon Research Conference Participant (Environmental Sciences - Water), 1980.

Participant in Workshop on the role of aquatic microcosms in evaluating ecosystem effects of chemicals under the Toxic Substances Control Act (USEPA sponsored), 1980.

NTSU representative to Texas Systems of Natural Laboratories. (Presidential Appointment), 1981 - 1986.

Consulting Aquatic Ecologist to Environmental Systems Branch, U.S. Environmental Protection Agency, 1981.

School of Community Service Computing Services Advisory Council (Dean's Appointment), 1981-1986.



NTSU Biosafety Committee (Presidential Appointment), 1980 - 1987.

Peer Review of Research Program for Environmental Systems Branch of the U.S. Environmental Protection Agency (with H.T. Odum), 1981.

Participant in Workshop on Modeling the Fate of Chemicals in the Aquatic Environment (USEPA sponsored), Pellston, MI, 1981.

Co-chaired session on Microcosm Testing in Aquatic Toxicology at the Society of Environmental Toxicology and Chemistry's Annual Meeting, Washington, D.C., 1981.

Elected to Editorial Board of Environmental Toxicology and Chemistry, 1981- 1983.

Research advisor to the Ecosystem Branch of the U.S. Environmental Protection Agency, Las Vegas, 1982.

Gordon Research Conference Participant (Environmental Sciences-Water), 1982.

President, Sigma Xi, NTSU Club, 1982-1983.

Chair, Employment Service Committee of the Society of Environmental Toxicology and Chemistry, 1982 - 1984.

Review of manuscripts for Ecological Society of America, 1981 - present.

College of Arts and Sciences Committee on Interdisciplinary Research (Dean's Appointment), 1983.

Department of Biological Sciences Radiation Safety Officer, 1983 - 1987.

Participant, Workshop on Bioavailability of Chemicals from Dredged Materials (U.S. Army Corps of Engineers sponsored) Vicksburg, Mississippi, 1984.

Consulting Aquatic Ecologist to the City of Reno, Nevada, 1983 - Mitigation of Impacts of Population Growth and Development on Lake Tahoe, Truckee River and Pyramid Lake.

Consulting Aquatic Ecologist to the Las Colinas Development, 1983 - Impacts of Development on the Trinity River and Watershed.

School of Community Services Committee on Resources and Nontraditional Education (Dean's Appointment), 1983 - 1984.

Peer review of research programs of the Naragansett Bay, R.I., U.S. Environmental

Protection Agency Research Laboratory (elected chairman of the review team), 1984.

North Texas State University Committee on Science and Technology (Presidential Appointment), 1984.

President, J.K. G. Silvey Society, North Texas State University, 1983 - 1984.

Invited Attendee, Society of Petroleum Industry Biologists, Annual Meeting, Houston, Texas, 1984.

Chair of the Annual Meeting of the Society of Environmental Toxicology and Chemistry, St. Louis, Missouri, Nov. 10-14, 1985.

Participant - Workshop on the Bioavailability of Sorbed Chemicals (U.S. Environmental Protection Agency and American Petroleum Institute sponsored) Florissant, Colorado, 1984.

Faculty Committee Member, Cooperative Education Program of the Institute of Applied Sciences, 1984.

Faculty Representative for the Sciences, elected to NTSU Faculty Senate, 1986.

Served as Chairman of Placement Committee of Aquatic Plant Management Society, 1987.

Peer review of research programs of the Gulf Breeze, FL., U.S. Environmental Protection Agency Research Laboratory (with H. Bergman and K. Solomon), 1987.

Consulting aquatic ecologist to the City of Dallas (Water Utilities), Algal Workshop, 1987.

Consulting aquatic toxicologist to the American Petroleum Institute, Bioavailability of Chemicals Sorbed to Sediments, 1987.

Consulting aquatic ecologist to the Association of Central Oklahoma Governments, Use Attainability Study of Crutcho Creek and the North Canadian River, 1987.

Chair, Professional Opportunities Committee (Placement) of the Aquatic Plant Management Society, 1987.

Co-chair (with L. Goodman), Workshop on Mysid Culture and Testing, at the Eighth Annual Meeting of the Society of Environmental Toxicology and Chemistry, Pensacola, FL, 1987.

Co-chair, sessions on Perspectives of Water Quality-Based Permitting and Field

Validation of Laboratory Results, at the Eighth Annual Meeting of the Society of Environmental Toxicology and Chemistry, Pensacola, FL, 1987.

Appointed to the South Carolina Aquatic Plant Management Commission, 1987.

Presented short courses on Aquatic Plant Management in Texas, 1987.

Presented seminars at short courses on Aquatic Plant Management in Florida, Ft. Lauderdale and Orlando, FL, 1987.

Advisor on American Petroleum Institute Study of Bioavailability of Sediment Bound Chemicals (with P. Chapman and C. Missimer), 1987 - 1988.

Participated in a Workshop on Mesocosm Research Sponsored by USEPA, Duluth, MN, 1987.

Promotion review team member for P.R. Parrish, Environmental Research Laboratory, Gulf Breeze, FL, 1987.

Chair, session on Sediment Criteria Development and Testing at the South Central Chapter Meeting of the Society of Environmental Toxicology and Chemistry, Houston, TX, 1987.

Scientific Advisory Group, Proctor and Gamble Corporation, Cincinnati, Ohio, 1988,

Scientific Advisory Group, Botanical Research Institute of Texas (BRIT). Fort Worth, TX, 1988.

Adjunct Faculty, University of Guelph. Guelph, Ontario, Canada, 1988-1990.

Invited participant, North American Benthological Society Annual Meeting. Blacksburg, VA, May 22, 1990.

Invited participant, Association of Southeastern Biologists Special Workshop on Teaching the Limnology Laboratory. Baltimore, MD, April 20, 1990.

Invited participant, Aquatic Plant Management Meeting. Mobile, AL, July 16, 1990.

Chair, Education Committee of the Society of Environmental Toxicology and Chemistry, 1989-1991.

Chair, Professional Opportunities Committee of the Aquatic Plant Management Society, 1989-1991.

Chair, Discussion session on Wetlands Toxicology At the Society of Environmental



Toxicology and Chemistry Annual Meeting. Washington, D.C., November 12, 1990.

Member, Aquatic Effects Dialogue Group of the Conservation Foundation, 1989-1991.

Member, Advisory Group to the World Wildlife Fund, 1989-1991.

Consulting Aquatic Ecologist and Toxicologist to Proctor and Gamble Company. Cincinnati, OH, 1989-1991.

Served on a discussion panel on the Future of Aquatic Plant Management with emphasis on regulatory issues regarding herbicides at the 25th Annual Meeting of the Aquatic Plant Control Research Program - U.S. Army Corps of Engineers. Orlando, FL, November 26-30, 1990.

Served on a discussion panel on the Future of Aquatic Plant Management with Emphasis on Simulation Technology and Modeling at the 25th Annual Meeting of the Aquatic Plant Control Research Program - U.S. Army Corps of Engineers. Orlando, FL. November 26-30, 1990.

Consulting Aquatic Toxicologist, U.S. Environmental Protection Agency, Ecorisk Program evaluation. 1990-1991.

Consulting Aquatic Toxicologist, International Paper Company. 1990-1991.

Consulting Aquatic Toxicologist, State of Mississippi. 1990-1991.

Consulting Aquatic Toxicologist, Environment Canada, Health and Welfare Canada - Canadian Network of Toxicology Centers, Expert Advisory Committee. 1991- 2001.

Consulting Aquatic Toxicologist, Ecorisk Forum on the Rocky Mountain Arsenal Refuge Technical Expert Advisory Panel. 1991-1992.

Consulting Biologist and Ecotoxicologist, Arkansas Department of Higher Education and Arkansas State University Ph.D. Program Development. 1991- 1998.

Invited participant, Tiered Testing Issues for Freshwater and Marine Sediments, sponsored by U.S. EPA Office of Water and Office of Research and Development. Washington, D.C., September 16-18, 1992.

Invited speaker, Workshop on the Bioavailability and Toxicity of Copper, sponsored by the University of Florida, Center for Aquatic Plants. Gainesville, FL, September 2-3, 1992.

Peer reviewer for U.S. EPA, Framework for Ecological Assessment, Risk Assessment Forum. Washington, D.C., 1992 (EPA/130/R-92/001 - February 1992).

Invited speaker, 4th Annual Meeting of the Soil and Water Conservation Society. Baltimore, MD, August 9-12, 1992.

Participant, U.S. EPA Workshop on Bioaccumulation of Hydrophobic Chemicals. Washington, D.C., June, 1992.

Invited lecturer and participant, Young Scholars Program, NSF funded. Oxford, MS, 1992.

Counselor for summer interns with the Minorities Science Program, University of Mississippi funded. Oxford, MS, 1992.

Peer Review, Biology Peer Review Panel, U.S. EPA. Knoxville, TN, January, 1993.

Conference Co-organizer, First International Conference on Transport, Fate, and Effects of Silver in the Environment. University of Wisconsin, Madison, WI, August 8-10, 1993.

Chair, Exhibits Committee, 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Houston, TX, November, 1993.

Consulting Aquatic Ecologist and Toxicologist to Weyerhaeuser Corporation. Columbus, MS, 1994 – 1999.

Member, Student Scholarship Committee, Mid-South Aquatic Plant Management Society. 1994 – 1997.

OSHA Safety Course. Norco, LA, 1994. Joint Agency Task Force Member, Guntersville Project. Guntersville, AL, April, 1994.

Featured speaker, Seminar on Pollution Prevention for Silver Imaging Systems. Lake Buena Vista, FL. May, 1994.

Conference Organizer, Second International Conference on Transport, Fate and Effects of Silver in the Environment. University of Wisconsin, Madison, WI, September 11-14, 1994.

Chair - Subcommittee, National Institute of Environmental Health Sciences (NIEHS) - Superfund Hazardous Substances Basic Research Program. Research Triangle Park, NC, October 16-19, 1994.

Discussion Panel Participant, 2nd International Conference on Environmental Fate and Effects Of Bleached Pulp Mill Effluents. Vancouver, B.C., Canada, November, 1994.

Genetic Toxicology Course (Audit). Oxford, MS, 1995.

Board of Directors, Society of Environmental Toxicology and Chemistry (elected), 1995.

Participant, U.S. EPA Environmental Biology Review Panel. Fort Worth, TX, January, 1995.

Participant, Society of Environmental Toxicology and Chemistry Workshop on Wetlands. Butte, MT, August, 1995.

Conference Organizer, Third International Conference on Transport, Fate and Effects of Silver in the Environment. Washington, D.C., August, 1995.

Featured Speaker, 1995 Scholars Conference, University of Mississippi. Oxford, MS, October, 1995.

Participant, Society of Environmental Toxicology and Chemistry Workshop on Whole-Effluent Toxicology. Pellston, MI, October, 1995.

Invited Participant, Round Table Discussion of Surfactant Toxicity in Aquatic Systems. Thornton, England, May, 1996.

Keynote Speaker, Mid-South Society of Environmental Toxicology and Chemistry (inaugural meeting). Memphis, TN, May, 1996.

Invited Speaker on Endocrine Disruption, Seminar on Emerging Water Issues, International Paper Company. Memphis, TN, June, 1996.

Instructor, Short Course on Constructed Wetlands, U.S. Army Waterways Experiment Station. Berkeley, CA. July, 1996.

Short Course on Constructed Wetland Design and Monitoring. Houston, TX, July, 1996.

Conference Organizer, Fourth International Conference on Transport, Fate and Effects of Silver in the Environment. Madison, WI, August, 1996.

Friends of Lake Keowee (FOLKS), Board of Directors (elected) and Member of the Technical Committee, 2003-present.

Bob C. Campbell Geology Museum, Clemson University, Board of Directors Member, 2003-present.

Associate Editor, Journal of Toxicology and Environmental Health Part B : Critical Reviews. 1999-2006.



Chair, Science Advisory Panel for the California Environmental Protection Agency – Aquatic Pesticides Committee, 2002-present.

Member, Science Advisory Panel, USDA Jimmy Carter Plant Materials Center, Americus, GA. 2003-present.

Member, Science Advisory Panel for the USEPA/ SETAC Whole Effluent Toxicity Testing Committee, 1998-2004.

Member, Science Advisory Panel for Proposal and Research Review, Water Environment Federation, 2001-present.

Member, Science Advisory Panel for the National Council for Air and Stream Improvement – Long Term Receiving Water Studies, 1999-present.

Member, Board of Directors – Aquatic Plant Management Society, (elected) 2003-2006.

Co-editor (with Dr. J.W. Castle), Special Issue of Environmental Geoscience on Constructed Wetland Treatment Systems, 2009.

Review of WET testing protocols, US EPA, 2009.

Member, Board of Directors – South Carolina Aquatic Plant Management Society, (elected) 2007-2009.

Vice-President and Annual Meeting Program Chair – South Carolina Aquatic Plant Management Society, (elected) 2008-2009.

Chair, ad hoc Committee on NPDES Permitting, South Carolina Aquatic Plant Management Society, 2008-2009.

Chair, Peer Review Panel, Canadian Foundation for Innovation, 2009.

Chair, Strategic Planning Committee, Aquatic Plant Management Society, 2008-2009.

#### BOOKS, BOOK CHAPTERS, AND MONOGRAPHS

M.Sc. Thesis: Rodgers, J.H., Jr. 1974. Thermal Effects on Primary Productivity of Phytoplankton, Periphyton, and Macrophytes in Lake Keowee, S.C. Botany

Department, Clemson University. 88 pp.

Bi-weekly in situ determinations of Carbon-14 assimilation rates were made using SCUBA and chambers in a reservoir receiving thermal effluent from a nuclear power plant. Emphasis was placed upon relative contributions of each group of plants to the overall lake productivity and statistical correlations of productivity with water temperatures (1972-1974).

Ph.D. Dissertation: Rodgers, J.H., Jr. 1977. Aufwuchs Communities of Lotic Systems: Nontaxonomic Structure and Function. Biology Department and Center for Environmental Studies, VPI&SU. 336 pp.

Six model streams were constructed to assess effects of typical industrial and municipal effluents on primary productivity, assimilatory sulfate reduction and structural aspects of assemblages of attached microorganisms. Net microbial productivity of aufwuchs and primary productivity were estimated by assimilatory (S35) sulfate reduction and carbon-14 fixation, respectively, with heterotrophic productivity being the difference. Concurrent laboratory studies verified the efficacy of these procedures. The ability of methods to discern perturbations was tested. Direct correlations between structural measurements and functions were ascertained by regression analysis. Field investigations of aufwuchs communities were inconclusive due to variability and the heterogeneous distribution of aufwuchs communities (1974 - 1977).

Guthrie, R.K., D.S. Cherry, and J.H. Rodgers, Jr. 1974. The Impact of Ash Basin Effluent on Biota in the Drainage System. *Proc. Seventh Mid-Atlantic Industrial Waste Conference*: pp. 17-43. Drexel University, Philadelphia, Pa.

Dickson, K.L., J. Cairns, Jr., J.R. Clark and J.H. Rodgers, Jr. 1978. Evaluating Pollution Stress on Ecosystems. In: K.C. Flynn and W.T. Mason (eds.) *The Freshwater Potomac - Aquatic Communities and Environmental Stress*. The Interstate Commission on the Potomac River Basin, Rockville, Maryland. pp. 80 - 83.

Rodgers, J.H., Jr., D.S. Cherry, K.L. Dickson, and J. Cairns, Jr. 1979. Invasion, Population Dynamics and Elemental Accumulation of *Corbicula fluminea* in the New River at Glen Lyn, Virginia. In: *Proc. First International Corbicula Symposium* J.C. Britton (ed.). Texas Christian University Research Foundation Publishers, Fort Worth, TX, pp. 99-110.

Rodgers, J.H., Jr., K.L. Dickson, and J. Cairns, Jr. 1979. A Review and Analysis of Some Methods Used to Measure Functional Aspects of Periphyton. In: R.L. Weitzel (ed.) *Methods and Measurements of Periphyton Communities: Review*. American Society for Testing and Materials, Philadelphia, Pennsylvania (ASTM STP 690), pp. 142-167.

Rodgers, J.H., Jr., D.S. Cherry, R.L. Graney, K.L. Dickson, and J. Cairns, Jr. 1980.

Comparison of Heavy Metal Interactions in Acute and Artificial Stream Bioassay Techniques for the Asiatic Clam (*Corbicula fluminea*). In: J.G. Eaton, P.R. Parish, and A.C. Hendricks (eds.) *Aquatic Toxicology*. American Society for Testing and Materials, Philadelphia, PA. (ASTM STP 707), pp. 266-280.

Cherry, D.S., J.H. Rodgers, Jr., R.L. Graney, and J. Cairns, Jr. 1980. *Dynamics and Control of the Asiatic Clam in the New River, Virginia*. Bulletin 123, Virginia Water Resources Research Center. Virginia Polytechnic Institute and State University, Blacksburg, VA. 72 pp.

Dillon, C.R. and J.H. Rodgers, Jr. 1980. *Thermal Effects on Primary Productivity of Phytoplankton, Periphyton, and Macrophytes in Lake Keowee*. S.C. Technical Report No. 81, Clemson University Water Resources Research Institute, Clemson, S.C. 115 pp.

Rodgers, J.H., Jr., J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1980. Nontaxonomic analyses of structure and function of aufwuchs communities in lotic microcosms. In: J.P. Geisy, Jr. (ed.). *Microcosms in Ecological Research*. USDOE (CONF-781101) pp. 625-643.

Lee, C.M., H. Bergman, W. Wood, and J.H. Rodgers, Jr. 1982. Workshop Summary and Conclusions. In: K.L. Dickson, A.W. Maki and J. Cairns, Jr. (eds.) *Modeling the Fate of Chemicals in the Aquatic Environment*, Ann Arbor: Ann Arbor Science Publ. pp. 397-407.

Cairns, J., Jr., A.L. Buikema, Jr., D.S. Cherry, E.E. Herricks, R.A. Matthews, B.R. Neiderlahner, J.H. Rodgers, Jr. and W.H. Van der Schalie. 1982. *Biological Monitoring in Water Pollution*. Pergamon Press: New York. 116 pp.

Rodgers, J.H., Jr., M.E. McKeivitt, D.O. Hammerland, K.L. Dickson and J. Cairns, Jr. 1983. Primary production and decomposition of submergent and emergent aquatic plants of two Appalachian rivers. In: T.D. Fontaine III and S.M. Bartell (eds.) *Dynamics of Lotic Ecosystems*. Ann Arbor Science Publ. pp. 298-301.

Staples, C.A., K.L. Dickson, F.Y. Saleh, and J.H. Rodgers, Jr. 1983. A microcosm study of lindane and naphthalene partitioning for model validation. In: W. Bishop, R.D. Caldwell, and B.B. Heidolph (eds.) *Aquatic Toxicology and Hazard Assessment*. STP 802 ASTM Publications, Philadelphia, PA. pp. 26-41.

Rodgers, J.H., Jr. K.L. Dickson, and M.J. Defoer. 1983. Bioconcentration of lindane and naphthalene in bluegills (*Lepomis macrochirus*). In: W. Bishop, R.D. Cardwell, and B.B. Heidolph (eds.) *Aquatic Toxicology and Hazard Assessment*. STP 802. ASTM Publications, Philadelphia, PA. pp. 300-311.

Saleh, F.Y., K.L. Dickson, and J.H. Rodgers, Jr. 1984. Transport Processes of



Naphthalene in the Aquatic Environment. In: L. Pawlowski, A.J. Verdier, and W.J. Lacy (eds.) *Chemistry for Environmental Protection*. Elsevier Publisher. pp. 119-131.

Vance, B.D. and J.H. Rodgers, Jr. 1984. *General Botany*, 2nd Ed. Hunter Textbooks, Inc., Winston - Salem, NC. 93 pp.

Staples, C.A., K.L. Dickson, J.H. Rodgers, Jr., and F.Y. Saleh. 1985. A Model for Predicting the Influence of Suspended Sediments on Bioavailability of Neutral Organics in the Water Compartment. In: R.D. Cardwell, R.C. Bahner and R.E. Purdy (eds.) *Aquatic Toxicology and Hazard Assessment*. ASTM STP 845, ASTM Philadelphia, PA. pp. 417-428.

Dickson, K.L. and J.H. Rodgers, Jr. 1985. Assessing the Hazards of Effluents in the Aquatic Environment. In: H. Bergman, A. Maki and R. Kimerle (eds.) *Assessing the Hazards of Effluents to Aquatic Life*. Pergamon Press.

Rodgers, J.H., Jr., K.L. Dickson, F.Y. Saleh, and C.A. Staples. 1987. Bioavailability of Sediment-bound Chemicals to Aquatic Organisms; Some Theory, Evidence and Research Needs. In: K.L. Dickson, A.W. Maki and W.A. Brungs (eds.) *Fate and Effects of Sediment-Bound Chemicals in Aquatic Systems*. Pergamon: Elmsford, N.Y. pp. 245-266.

Anderson, J., W. Birge, J. Gentile, J. Lake, J.H. Rodgers, Jr. and R. Swartz. 1987. Biological Effects, Bioaccumulation, and Ecotoxicology of Sediment-associated Chemicals. In: K.L. Dickson, A.W. Maki, and W.A. Brungs (eds.) *Fate and Effects of Sediment-Bound Chemicals in Aquatic Systems*. Pergamon: Elmsford, N.Y. pp. 267-296.

Rodgers, J.H. Jr., P.A. Clifford and R.M. Stewart. 1991. Enhancement of HERBICIDE, the Aquatic Herbicide Fate and Effects Model. In: *Proceedings, 25th Annual Meeting, Aquatic Plant Control Research Program*. Misc. Paper A-91-3. pp. 279-282. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Rodgers, J.H. Jr. 1991. Herbicide Registration for Aquatic Use: A Look to the Future. In: *Proceedings, 25th Annual Meeting, Aquatic Plant Control Research Program*. Misc. Paper A-91-3. pp. 245-248. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Graney, R.L., J.H. Kennedy and J.H. Rodgers, Jr. (eds.). 1993. *Aquatic Mesocosm Studies in Ecological Risk Assessment*. Lewis Publishers, Boca Raton, FL. 723 pp.

Rodgers, J.H., Jr., A.W. Dunn and A.B. Jones. 1993. Triclopyr Concentrations in Eurasian Watermilfoil: Uptake Under Differing Exposure Scenarios. In: *Proceedings, 28th Annual Meeting, Aquatic Plant Control Research Program*. Misc. Paper A-94-2. pp. 249-259. U.S. Army Waterways Experiment Station, Baltimore, MD. November 15-18,

1993.

Rodgers, J.H., Jr. and A.W. Dunn. 1994. TVA - Guntersville Reservoir Herbicide Monitoring Survey 1991-1992. A Report to the Tennessee Valley Authority and U.S. Army Corps of Engineers Joint Agency Program. 116 p.

Solomon, K., D. Bright, P. Hodson, K.-J. Lehtinen, B. McKague and J. Rodgers, Jr. 1999. Evaluation of ecological risks associated with the use of chlorine dioxide for the bleaching of pulp. Report prepared for the Alliance for Environmental Technology. 86 pp.

Rodgers, J.H., Jr. and J.F. Thomas. 2004. Evaluations of the Fate and Effects of Pulp and Paper Mill Effluents from a Watershed Multistressor Perspective: Progress to Date and Future Opportunities. In: Pulp and Paper Mill Effluent Environmental Fate and Effects. D. L. Borton, T. J. Hall, R.P. Fisher, and J.F. Thomas (eds.). DEStech Publications, Lancaster, PA. pp.135-146.

#### PAPERS AND PUBLICATIONS:

Rodgers, J.H., Jr., G.L. Powell, and J.F. Geldard. 1973. Triple-label Liquid Scintillation Radioassay: Possible or Impossible? Seventh Annual Regional Meeting (Oct . 5) Wilmington, N.C. 43 pp.

Rodgers, J.H., Jr. and R.S. Harvey. 1976. The Effect of Current on Periphyton Productivity Determined Using Carbon-14. *Water Res. Bull.* 12(6): 1109-1118.

Cherry, D.S., R.K. Guthrie, J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1976. Responses of Mosquito Fish (*Gambusia affinis*) to Ash Effluent and Thermal Stress. *Trans. Am. Fish Soc.* 105(6):686-694.

Rodgers, J.H., Jr., D.S. Cherry, J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1977. The Invasion of Asiatic Clam, *Corbicula manilensis* (Philippi), in the New River, Virginia. *The Nautilus* 91(2):43-46.

Rodgers, J.H., Jr., D.S. Cherry, and R.K. Guthrie. 1978. Cycling of Elements in Duckweed (*Lemna perpusilla* Torrey) of an Ash Settling Basin and Swamp Drainage System. *Water Research* 12:765-770.

Rodgers, J.H., Jr., K.L. Dickson, and J. Cairns, Jr. 1978. A Chamber for *In Situ* Measurement of Primary Productivity and Other Functional Processes of Periphyton in Lotic Systems. *Arch. Hydrobiol.* 84(3):389-398.

Clark, J.R., J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1980. Using Artificial Streams to Evaluate Perturbation Effects on Aufwuchs Structure and Function. *Water Res. Bull.* 16(1):100-104.

Graney, R.L., D.S. Cherry, J.H. Rodgers, Jr., and J. Cairns. 1982. The Influence of Thermal Discharges and Substrate Composition on the Population Structure and Distribution of the Asiatic Clam, *Corbicula fluminea*, in the New River, Virginia. *The Nautilus* 94(4):130-135.

Matthews, R.A., A.L. Buikema, J. Cairns, Jr. and J.H. Rodgers, Jr. 1982. Biological Monitoring Part IIA Receiving System Functional Methods, Relationships and Indices. *Water Res.* 16:129-139.

Saleh, F.Y., K.L. Dickson, and J.H. Rodgers, Jr. 1982. Fate of Lindane in the Aquatic Environment: Rate Constants of Physical and Chemical Processes. *Environ. Toxicol. Chem.* 1:289-297.

Dickson, K.L. and J.H. Rodgers, Jr. 1982. Assessing the Hazards of Effluents in the Aquatic Environment. In: H.L. Bergman, R.A. Kimerle and A.W. Maki (eds.) *Environmental Hazard Assessment of Effluents*. New York: Pergamon Press.

Rodgers, J.H., Jr., K.L. Dickson, F.Y. Saleh, and C.A. Staples. 1983. Use of Microcosms to Study Transport, Transformation and Fate of Organics in Aquatic Systems. *Environ. Toxicol. Chem.* 2:155-167.

Reinert, K.H. and J.H. Rodgers, Jr. 1984. Influence of Sediment Types on the Sorption of Endothall. *Bulletin of Environmental Contamination and Toxicology.* 32:557-564.

Rodgers, J.H., Jr., K.H. Reinert, and M.L. Hinman. 1984. Water Quality Monitoring in Conjunction with the Pat Mayse Lake Aquatic Plant Management Program. In: *Proceedings, 18th Annual Meeting, Aquatic Plant Control Research Program*. November 14-17, 1983. Raleigh, NC. U.S. Army Corps of Engineers. Misc. Paper A-84-4. pp.17-24.

Reinert, K.H., S. Stewart, M.L. Hinman, J.H. Rodgers, Jr., and T.J. Leslie. 1985. Release of Endothall from AQUATHOL GRANULAR AQUATIC HERBICIDE. *Water Research* 19:805-808.

Reinert, K.H., J.H. Rodgers, Jr., M.L. Hinman, and T.J. Leslie. 1985. Compartmentalization and Persistence of Endothall in Experimental Pools. *Ecotoxicology and Environmental Safety* 10:86-96.

Reinert, K.H., J.H. Rodgers, Jr., T.J. Leslie, and M.L. Hinman. 1986. Static Shake-Flask Biotransformation of Endothall. *Water Research.* 20:255-258.



- Reinert, K.H. and J.H. Rodgers, Jr. 1984. Validation Trial of Predictive Fate Models Using and Aquatic Herbicide (Endothall). *Environmental Toxicology and Chemistry* 5:449-461.
- Saleh, F.Y., K.L. Dickson, J.H. Rodgers, Jr. and C.A. Staples. 1985. Fate of Naphthalene in the Aquatic Environment. *Environmental Toxicology and Chemistry* 6: 449-461.
- Jop, K.M., J.H. Rodgers, Jr., P.B. Dorn and K.L. Dickson. 1985. Use of Hexavalent Chromium as a Reference Toxicant in Aquatic Toxicity Tests. In Tim Poston and R. Purdy (eds.) *Aquatic Toxicology and Environmental Fate* ASTM STP 921, American Society for Testing and Materials, pp. 390-403.
- Dorn, P.B., J.H. Rodgers, Jr., K.M. Jop, J.C. Raia and K.L. Dickson. 1987. Hexavalent Chromium as a Reference Toxicant in Effluent Toxicity Tests. *Environmental Toxicology and Chemistry* 6:435-444.
- Reinert, K.H., P.M. Rocchio, and J.H. Rodgers, Jr. 1986. Parameterization of Predictive Fate Models: A Case Study. *Environmental Toxicology and Chemistry* 6:99-104.
- Jop, K.M., J.H. Rodgers, Jr. E.E. Price, and K.L. Dickson. 1986. Renewal Device for Test Solutions in Daphnia Toxicity Tests. *Bull. Environ. Contam. Toxicol.* 36: 95-100.
- Hall, W.S., K.L. Dickson, F.Y. Saleh, J.H. Rodgers, Jr., D. Wilcox and A. Entazami. 1986. Effects of Suspended Solids on the Acute Toxicity of Zinc to *Daphnia magna* and *Pimephales promelas*. *Water Res. Bull.* 22(6):913-920.
- Jop, K.M., T.F. Parkerton, J.H. Rodgers, Jr., K.L. Dickson, and P.B. Dorn. 1987. Comparative Toxicity and Speciation of Two Hexavalent Chromium Salts in Acute Toxicity Tests. *Environ. Toxicol. and Chem.* 6:697-703.
- Hall, W.S., K.L. Dickson, F.Y. Saleh and J.H. Rodgers, Jr. 1986. Effects of Suspended Solids on the Bioavailability of Chlordane To *Daphnia magna*. *Arch. Environ. Contam. Toxicol.* 15:529-534.
- Fisher, F.M., K.L. Dickson, J.H. Rodgers, Jr., K. Anderson and J. Slocomb. 1988. A Statistical Approach to Assess Factors Affecting Water Chemistry Using Monitoring Data. *Wat. Res. Bull.* 24:1017-1026.
- Dorn, P.B. and J.H. Rodgers, Jr., 1990. Variability associated with identification of toxics in NPDES effluent toxicity tests. *Environ. Toxicol. and Chem.* 8: 893-902.
- Reinert, K.H. and J.H. Rodgers, Jr. 1987. Fate and persistence of aquatic herbicides. *Reviews of Environmental Contamination and Toxicology* 98:61-98.

Reinert, K.H., M.L. Hinman, and J. H. Rodgers, Jr. 1988. Fate of Endothall During the Pat Mayse Lake (Texas) Aquatic Plant Management Program. Archives of Environmental Contamination and Toxicology 17:195-199.

Davis, T.M., B.D. Vance, and J.H. Rodgers, Jr. 1988. Productivity Responses of Periphyton and Phytoplankton to Bleach-kraft Mill Effluent. Aquatic Toxicology 12:83-106.

Rodgers, J.H., Jr., P.A. Clifford, and R. M. Stewart. 1988. Development of A Coupled Herbicide Fate and Target Plant Species Effects Model (FATE). Proceedings, 22nd Annual Meeting, Aquatic Plant Control Research Program.

Parkerton, T.F., S.M. Stewart, K.L. Dickson, J.H. Rodgers, Jr., and F.Y. Saleh. 1988. Evaluation of the Indicator Species Procedure for Deriving Site-Specific Water Quality Criteria for Zinc. Aquatic Toxicol and Hazard Assess.:10th Vol, ASTM STP 971. Philadelphia. pp. 423-435.

Cassidy, K. and J.H. Rodgers, Jr. 1988. Response of Hydrilla (*Hydrilla verticillata* (L.f.) Royle) to Diquat and a Model of Uptake Under Nonequilibrium Conditions. Environ. Toxicol. Chem. 8:133-140.

Price, E.E., M.J. Donahue, K.L. Dickson and J.H. Rodgers, Jr. 1990. Effects of Elevated Calcium Concentration on Na-K-ATPase Activity in Two Euryhaline Species, *Cyprinodon variegatus* and *Mysidopsis bahia*. Bull. Environ. Contam. Toxicol. 44:121-128.

Rodgers, J.H., Jr. and A.W. Dunn. 1992. Developing Design Guidelines for Constructed Wetlands to Remove Pesticides from Agricultural Runoff. Ecol. Engineering 1:83-95.

Suedel, B.C. and J.H. Rodgers, Jr. 1991. Variability of Bottom Sediment Characteristics of the Continental United States. Water Res. Bull. 27:101-109.

Suedel, B.C., J.H. Rodgers, Jr. and P.A. Clifford. 1993. Bioavailability of Fluoranthene in Freshwater Sediment Toxicity Tests. Environ. Toxicol. Chem. 12:155-165.

Meyer, C.L., B.C. Suedel, J.H. Rodgers, Jr. and P.B. Dorn. 1993. Bioavailability of Sediment-sorbed Chlorinated Ethers. Environ. Toxicol. Chem. 12:493-505.

Suedel, B.C. and J.H. Rodgers, Jr. 1994. Development of Formulated Reference Sediments for Freshwater and Estuarine Sediment Testing. Environ. Toxicol. Chem. 13(7):1163-1175.

Suedel, B.C. and J.H. Rodgers, Jr. 1994. Responses of *Hyalella azteca* and *Chironomus tentans* to Particle Size Distribution and Organic Matter Content of

Formulated and Natural Freshwater Sediments. Environ. Toxicol. Chem. 13(10):1639-1648.

Suedel, B.C., E. Deaver and J.H. Rodgers, Jr. 1995. Experimental Factors That May Affect Toxicity of Aqueous and Sediment-Bound Copper to Freshwater Organisms. Arch. Environ. Contam. Toxicol. 30(1):40-46.

Suedel, B.C., E. Deaver and J.H. Rodgers, Jr. 1995. Formulated Sediment as a Reference and Dilution Sediment in Definitive Toxicity Tests. Arch. Environ. Contam. Toxicol. 30(1):47-52.

Kline, E.R., R.A. Figueroa, J.H. Rodgers, Jr. and P.B. Dorn. 1996. Effects of a Nonionic Surfactant (C<sub>14-15</sub> AE-7) on Fish Survival, Growth and Reproduction in the Laboratory and in Outdoor Stream Mesocosms. Environ. Toxicol. Chem. 15(6):997-1002.

Rodgers, J.H., Jr., N.O. Crossland, E.R. Kline, W.B. Gillespie, Jr., R.A. Figueroa and P.B. Dorn. 1996. Design and Construction of Model Stream Ecosystems. Ecotoxicol. and Environ. Safety 33:30-37.

Suedel, B.C., E. Deaver and J.H. Rodgers, Jr. 1996. Environmental Factors That May Affect Toxicity of Aqueous and Sediment-Bound Copper to Freshwater Organisms. Arch. Environ. Contam. and Toxicol. 30:40-46.

Suedel, B.C. and J.H. Rodgers, Jr. 1996. Toxicity of Fluoranthene to *Daphnia magna*, *Hyalella azteca*, *Chironomus tentans* and *Stylaria lacustris* in Water-Only and Whole Sediment Exposures. Bull. Environ. Contam. Toxicol. 57:132-138.

Rodgers, J.H., Jr., E. Deaver, B.C. Suedel and P.L. Rogers. 1997. Comparative Aqueous Toxicity of Silver Compounds: Laboratory Studies With Freshwater Species. Bull. Environ. Contam. and Toxicol. 58 (6): 851-858.

Hawkins, W.B., J.H. Rodgers, Jr., W.B. Gillespie, Jr., A.W. Dunn, P.B. Dorn and M.L. Cano. 1997. Design and Construction of Wetlands for Aqueous Transfers and Transformations of Selected Metals. Ecotoxicol. And Environ. Safety 36: 238-248.

Gillespie, W.B., Jr., J.H. Rodgers, Jr., and N.O. Crossland. 1996. Effects of a Nonionic Surfactant (C<sub>14-15</sub> AE-7) on Aquatic Invertebrates in Outdoor Stream Mesocosms. Environ. Toxicol. Chem. 15(8): 1412-1422.

Gillespie, W.B., Jr., J.H. Rodgers, Jr., and P.B. Dorn. 1997. Responses of Aquatic Invertebrates to a C<sub>9-11</sub> Linear Alcohol Ethoxylate Surfactant in Outdoor Stream Mesocosms. Aquatic Toxicol. 37: 221-236.

Gillespie, W.B., Jr., J.H. Rodgers, Jr. and P.B. Dorn. 1996. Responses of Aquatic Invertebrates to a Linear Alcohol Ethoxylate Surfactant in Stream Mesocosms.



Ecotoxicol. 41: 215-221.

Dorn, P.B., J.H. Rodgers, Jr., W.B. Gillespie, Jr., R.E. Lizotte, Jr. and A. W. Dunn. 1997. The effects of a C12-13 linear alcohol ethoxylate surfactant on periphyton, macrophytes, invertebrates and fish in stream mesocosms. *Environmental Toxicology and Chemistry* 16(8): 1634-1645.

Harrelson, R.A., J.H. Rodgers, Jr., W.B. Gillespie, Jr., A.W. Dunn, P.B. Dorn and M.L. Cano. 1997. Responses of fish exposed to a C9-11 linear alcohol ethoxylate nonionic surfactant in stream mesocosms. *Ecotoxicology* 6: 321-333.

Hawkins, W.B., J.H. Rodgers, Jr., W.B. Gillespie, Jr., A.W. Dunn, P.B. Dorn and M.L. Cano. 1997. Design and construction of wetlands for aqueous transfers and transformations of selected metals. *Ecotoxicology and Environmental Safety* 36: 238-248.

Rodgers, J.H., Jr., E. Deaver, B.C. Suedel and P.L. Rogers. 1997. Comparative aqueous toxicity of silver compounds: Laboratory studies with freshwater species. *Bulletin of Environmental Contamination and Toxicology* 58(6) 851-858.

Chapman, P.M., B. Anderson, S. Carr, V. Engles, R. Green, J. Hameedi, M. Harmon, P. Haverland, J. Hyland, C. Ingersoll, E. Long, J. Rodgers, Jr., M. Salazar, P.K. Sibley, P.J. Smith, R.C. Smith, B. Thompson and H. Windom. 1997. General guidelines for using the Sediment Quality Triad. *Marine Pollution Bulletin* 34(6): 368-372.

Moore, M.T., D.B. Huggett, W.B. Gillespie, Jr., J.H. Rodgers, Jr., and C.M. Cooper. 1998. Comparative toxicology of chlordane, chlorpyrifos, and aldicarb to four aquatic testing organisms. *Archives of Environmental Contamination and Toxicology* 34: 152-157.

Gillespie, W.B., Jr., J.H. Rodgers, Jr. and P.B. Dorn. 1998. Responses of aquatic invertebrates to linear alcohol ethoxylate surfactant in stream mesocosms. *Ecotoxicology and Environmental Safety* 41: 215-221.

Solomon, K., D. Bright, P. Hudson, K.-J Lehtinen, B. McKague and J. H. Rodgers. 1999. Evaluation of ecological risks associated with the use of chlorine dioxide for the bleaching of pulp. Report prepared for the Alliance for Environmental Technology. 86pp.

Rodgers, J.H., Jr. 1999. Editorial-Opportunities and challenges for SETAC in the next century. *Environmental Toxicology and Chemistry* 18(11): 2401-2402.

Moore, M.T., D.B. Huggett, G.M. Huddleston III, J.H. Rodgers, Jr. and C.M. Cooper. 1999. Herbicide effects on *Typha latifolia* (Linnaeus) germination and root and shoot development. *Chemosphere*. 38 (15): 3637-3647.

Lizotte, R.W., Jr., D.C.L. Wong, P.B. Dorn, and J.H. Rodgers, Jr. 1999. Effects of a homologous series of linear alcohol ethoxylate surfactants on fathead minnow early life stages. *Archives of Environmental Contamination and Toxicology* 37: 536-541.

Huggett, D.B., Gillespie, Jr. and J. H. Rodgers, Jr. 1999. Copper bioavailability in Steilacoom Lake sediments. *Archives of Environmental Contamination and Toxicology* 36: 120-123.

Gillespie, W.B., Jr. W.B. Hawkins, J.H. Rodgers, Jr., M.L. Cano and P.B. Dorn. 1999. Transfers and transformations of zinc in flow-through wetland microcosms. *Ecotoxicology and Environmental Safety* 43: 126-132.

Goodfellow, W.L., L.W. Ausley, D.T. Burton, D.L. Denton, P.B. Dorn, D.R. Grothe, M.A. Heber, T.J. Norberg-King and J. H. Rodgers, Jr. 2000. Major ion toxicity in effluents: A review with permitting recommendations. *Environmental Toxicology and Chemistry* 19(1): 175-182.

Gillespie, W.B., Jr., W.B. Hawkins, J.H. Rodgers, Jr., M.L. Cano, and P.B. Dorn. 2000. Transfers and transformations of zinc in constructed wetlands: Mitigation of a refinery effluent. *Ecological Engineering* 14: 279-292.

Mastin, B.J. and J.H. Rodgers, Jr. 2000. Toxicity and bioavailability of copper herbicides (Clearigate, Cutrine-Plus, and copper sulfate) to freshwater animals. *Arch. Environ. Contam. Toxicol.* 39: 445-451.

D'Surney, S.J., L.P. Eddy, D.P. Felder, J.H. Rodgers, Jr., and T.L. Deardorff. 2000. Assessment of the Impact of a Bleached Kraft Mill Effluent on a South-Central USA River. *Environmental Toxicology* 15(1): 28-39.

Huddleston, III, G.M., W.B. Gillespie, Jr., and J.H. Rodgers, Jr. 2000. Using Constructed Wetlands to Treat Biochemical Oxygen Demand and Ammonia Associated with a Refinery Effluent. *Ecotoxicology and Environmental Safety* 45: 188-193.

Moore, M.T., J.H. Rodgers, Jr., C.M. Cooper and S. Smith, Jr. 2000. Constructed wetland for mitigation of atrazine-associated agricultural runoff. *Environmental Pollution* 110: 393 – 399.

Lehman, R. and J.H. Rodgers, Jr. 2000. It's not that easy being green. *Water, Environment and Technology* (March, 2000) 54-59.

Moore, M.T., J.H. Rodgers, Jr., S. Smith, Jr. and C.M. Cooper. 2001. Mitigation of metolachlor-associated agricultural runoff using constructed wetlands in Mississippi, USA. *Agriculture, Ecosystems and Environment* 84: 169 – 176.

Mastin, B.J., R. M. Sherrard, J.H. Rodgers, Jr. and Y.T. Shah. 2001. Hybrid cavitation/

constructed wetland reactors for treatment of chlorinated and non-chlorinated organics. *Chemical Engineering Tech* 24(8): 97A-105A.

Winfield, L.E., D'Surney, S.J., and Rodgers, J.H., Jr. 2001. The response of terrestrial plants to short-term hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) exposure. In Proceedings, Conference on Sustainability of Wetlands and Water Resources. Center for Water and Wetland Resources at the Univ. of MS Biology Field Station. University, MS.

Mastin, B.J., J.H. Rodgers, Jr. and T.L. Deardorff. 2002. Risk evaluation of cyanobacteria-dominated algal blooms in a North Louisiana reservoir. *J Aquat Ecosyst Stress Recov.* 9: 103-114.

Sherrard, R.M. C.L. Murray-Gulde, J.H. Rodgers, Jr. and Y.T. Shah. 2002. Comparative toxicity of chlorothalonil and chlorpyrifos: *Ceriodaphnia dubia* and *Pimephales promelas*. *Environ. Toxicol.* 17(6): 503-512.

Lizotte, R., P. Dorn, R.W. Steireide, D.C.L. Wong, and J.H. Rodgers, Jr. 2002. Ecological effects of an anionic C12-15 alkylethoxy sulfate surfactant in outdoor stream mesocosms. *Environ. Toxicol. Chem.* 21(12): 2742-2751.

Moore, M.T., R. Schulz, C.M. Cooper, S. Smith, Jr. and J.H. Rodgers, Jr. 2002. Mitigation of chlorpyrifos runoff using constructed wetlands. *Chemosphere* 46: 827-835.

Murray-Gulde, C.L., J.E. Heatley, A.L. Schwartzman and J.H. Rodgers, Jr. 2002. Algicidal effectiveness of Clearigate, Cutrine-Plus and copper sulfate and margins of safety associated with their use. *Arch Environ Contam Toxicol* 43(1): 19-27.

Murray-Gulde, C.L., J.E. Heatley, T. Karanfil and J.H. Rodgers, Jr. 2003. Performance of a hybrid reverse osmosis – constructed wetland treatment system for brackish produced water. *Water Research* 37: 705-713.

Sherrard, R.M., C.L. Murray-Gulde, J.H. Rodgers, Jr. and Y.T. Shah. 2003. Comparative toxicology of Chlorothalonil: *Ceriodaphnia dubia* and *Pimephales promelas*. *Ecotoxicology and Environmental Safety* 56: 327-333.

Winfield, L.E., Rodgers, J.H., Jr., and D'Surney, S.J. 2004. The responses of terrestrial plants to short (<12 days) and long term (2,4, and 6 weeks) hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) exposure: Part I: Growth and development effects. *Ecotoxicology* 13: 335-347.

Sherrard, R.M., J.S. Berr, C.L. Murray-Gulde, J.H. Rodgers, Jr. and Y.T. Shah. 2004. Feasibility of Constructed Wetlands for Removing Chlorothalonil and Chlorpyrifos from Aqueous Mixtures. *Environmental Pollution* 127: 385-394.



Huddleston, G.M., J.H. Rodgers, Jr., C.L. Murray-Gulde and F. D. Mooney. 2005. Designing constructed wetlands for mitigating risks from flue gas desulfurization wastewater. Proceedings of the Georgia Water Resources Conference, April 25-27. Univ. of Georgia, K.J. Hatcher (ed.) Institute of Ecology, The University of Georgia, Athens, GA.

Murray-Gulde, C. L., Berr, J. and Rodgers, Jr., J.H. 2005. Evaluation of a constructed wetland designed to decrease copper concentrations in a wastestream. *Ecotoxicology and Environmental Safety* 61:60-73.

Murray-Gulde, G.M. Huddleston III, K.V. Garber and J.H. Rodgers, Jr. 2005. Contributions of *Schoenoplectus californicus* in a constructed wetland system receiving copper contaminated wastewater. *Water, Air and Soil Pollution* 163: 355-378.

J.H. Rodgers, Jr., G.M. Huddleston III, C.L. Murray-Gulde and F. D. Mooney. 2005. Designing constructed wetlands for mitigating risks from flue gas desulfurization wastewater. *Proceedings of the International Water Conference*, October, 2005. Orlando, FL. 7pp.

Castle, J. W., Evan H. Cross, L. E. Kanagy, J. H. Rodgers, and B. M. Johnson. 2006. Management of produced waters from underground gas storage. *GasTIPS*. 12(4):11-13.

Kanagy, L.E., B.M. Johnson, J.W. Castle, and J.H. Rodgers Jr. 2008. Design and performance of a pilot-scale constructed wetland treatment system for natural gas storage produced water. *Bioresource Technology* 99:1877-1885.

Castle, J.W. and J.H. Rodgers, Jr. 2008. Constructed wetlands treatment systems: Renovation of impaired waters for beneficial reuse. (Introduction: Special Issue 1) *Environmental Geosciences* 15(1): iv.

Rodgers, J.H., Jr. and J.W. Castle. 2008. Constructed wetland systems for efficient and effective treatment of contaminated waters for reuse. *Environmental Geosciences* 15 (1): 1-8.

Huddleston, G.M., and J.H. Rodgers, Jr. 2008. Design of a constructed wetland system for treatment of copper-contaminated wastewater. *Environmental Geosciences* 15(1): 9-19.

Murray- Gulde, C., William Bridges and J.H. Rodgers, Jr. 2008. Evaluating performance of a constructed wetland treatment system designed to decrease bioavailable copper in a waste stream. *Environmental Geosciences* 15 (1): 21-38.

Tedrow, O.R., B. M. Duke, W. Chao, L. Jolley, W. Frazier, and J H. Rodgers, Jr. (In review) Laboratory and field responses of *Lyngbya* sp. following exposures to copper-

containing algaecides. *Journal of Aquatic Plant Management*.

Castle, J.W. and J.H. Rodgers, Jr. 2008. Constructed wetland treatment systems: Renovation of impaired waters for beneficial reuse. (Introduction: Special Issue II) *Environmental Geosciences* 15(3): iv.

Eggert, D.A, J. H. Rodgers, Jr., G. M. Huddleston, and C. E. Hensman. 2008. Performance of Pilot-Scale Constructed Wetland Treatment Systems for Flue Gas Desulfurization (FGD) Waters. *Environmental Geosciences* 15(3): 115-129.

Johnson, B M., M.M. Chao, O.R. Tedrow, A.D. McQueen, and J.H. Rodgers, Jr. 2008. Responses of *Lepomis macrochirus*, *Pimephales promelas*, *Hyalella azteca*, *Ceriodaphnia dubia*, and *Daphnia magna* to Exposures of Algimycin<sup>®</sup> PWF and Copper Sulfate Pentahydrate. *Journal of Aquatic Plant Management* 46: 176-183.

Johnson, B. M., L. E. Kanagy, J. H. Rodgers Jr., J. W. Castle. 2008. Feasibility of a pilot-scale hybrid constructed wetland treatment system for simulated natural gas storage produced waters. *Environmental Geosciences* 15 (3): 91-104.

Rodgers, J. H., and B. M. Johnson. 2007. Technical Fact Sheet on Lyngbya (Blue-Green Alga) US Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

Kenagy, L.E., B.M. Johnson, J.W. Castle and J. H. Rodgers, Jr. 2008. Pilot scale constructed wetland treatment systems for simulated natural gas storage produced waters: comparison of hydrosoil conditions and performance. *Environmental Geosciences* 15 (3): 105-113.

Jones, R.P., S.M. Hassan and John H. Rodgers, Jr. 2008. Influence of contact duration on sediment-associated copper fractionation and bioavailability. *Ecotoxicology and Environmental Safety* 71: 104-116.

Rodgers, John H., Jr. 2008. Algal toxins in pond aquaculture. Southern Regional Aquaculture Center pp. 1-8 (SRAC Publications).

Hall, T.J., R.P. Fisher, J.H. Rodgers, Jr., G.W. Minshall, W.G. Landis, T.G. Kovacs, B.K. Firth, M.G. Dubé, T.L. Deardorff and D.L. Borton. 2009. A long-term, multi-trophic level study to assess pulp and paper mill effluent effects on aquatic communities in four US receiving waters: Background and status. *Integrated Environmental Assessment* 5(2): 189-198.

Flinders, C.A., G.W. Minshall, T.J. Hall and J.H. Rodgers, Jr. 2009. Spatial and temporal patterns of periphyton chlorophyll a related to pulp and paper mill discharges in four US receiving streams. *Integrated Environmental Assessment* 5(2): 259 – 269.

Hall, T.J., R.P. Fisher, J.H. Rodgers, Jr., G.W. Minshall, W.G. Landis, T.G. Kovacs, B.K. Firth, M.G. Dubé, C.A. Flinders, T.L. Deardorff and D.L. Borton. 2009. A long-term, multi-trophic level study to assess pulp and paper mill effluent effects on aquatic communities in four US receiving waters: Lessons learned. *Integrated Environmental Assessment* 5(2): 283-290.

Dorman, L., J.W. Castle and J.H. Rodgers, Jr. 2009. Performance of a pilot-scale constructed wetland system for treating simulated ash basin water. *Chemosphere* 75: 939-947.

Castle, J.W. and J.H. Rodgers, Jr. 2009. Hypothesis for the role of toxin-producing algae in Phanerozoic mass extinctions based on evidence from the geologic record and modern environments. *Environmental Geosciences* 16(1): 1-23.

Iannacone, M.M., J.W. Castle and J.H. Rodgers, Jr. 2009. Characterization of flue gas desulfurization particulates in equalization basins. *Fuel* 88: 1580-1587.

Dorman, L. J.H. Rodgers, Jr. and J.W. Castle. 2009. Characterization of ash basin waters from a risk-based perspective. *Water, Air, & Soil Pollution*. 206:175-185.

Iannacone, M.M., J.W. Castle and J.H. Rodgers, Jr. 2009. Role of equalization basins in constructed wetland systems for treatment of particulate-associated elements in flue gas desulfurization waters. *Water, Air, & Soil Pollution* 203: 123-137.

PUBLISHED  
ABSTRACTS AND  
PRESENTATIONS:

Rodgers, J.H., Jr., and C.R. Dillon. 1974. A Comparative Study of the Primary Productivity of Limnetic Phytoplankton, Periphyton, and Benthic Macrophytes in Lake Keowee, S.C. S.C. Academy of Science (March 28-30) Coker College. Hartsville, S.C.

Rodgers, J.H., Jr., C.R. Dillon, and R.S. Harvey 1974. A Preliminary report on the Effects of Temperature Elevation and Current on Periphyton Production in Natural and Artificial Streams. S.C. Academy of Science (March 29-30) Coker College. Hartsville, S.C.



Rodgers, J.H., Jr. and C.R. Dillon. 1974. Thermal Effects on Primary Productivity of Limnetic Phytoplankton, Periphyton, and Benthic Macrophytes. Assoc. Southeastern Biol. Bull. 21:78.

Rodgers, J.H., Jr., C.R. Dillon, and R.S. Harvey. 1974. Effects of Current and Temperature Elevation on Periphyton Production in Natural and Artificial Streams. Assoc. Southeastern Biol. Bull. 21:79.

Rodgers, J.H., Jr., D.S. Cherry, and R.K. Guthrie. 1975. Ash Basin Effluent Impact on the Aquatic Flora of a Stream and Swamp Drainage System. Assoc. Southeastern Biol. Bull. 22:76.

Kuhn, D.L., J.H. Rodgers, Jr. and W.H. Yongue, Jr. 1975. The Production and Effects of Extracellular Products on Freshwater Microbial Communities. Assoc. Southeastern Biol. Bull. 22:61.

Rodgers, J.H., Jr., K.L. Dickson and J. Cairns, Jr. 1976. Laboratory and Field Studies of Sulfur-35 Sulfate Assimilation by Periphytic Organisms. Assoc. Southeastern Biol. Bull. 25:30.

Clark, J.R. and J.H. Rodgers, Jr. 1976. Laboratory studies of *Peltoperla maria* Nymph Feeding Rates and Efficiency. (Peltoperla: Peltoperlidae). Assoc. Southeastern Biol. Bull. 25:30.

Rodgers, J.H., Jr., K.L. Dickson, and J. Cairns, Jr. 1976. Primary Production and Degradation rates of Submergent and Emergent Macrophytes of the New River, Glen Lyn, Va. Assoc. Southeastern Biol. Bull. 23:91.

Clark, J.R., J.H. Rodgers, Jr. and K.L. Dickson. 1976. Relative Sensitivities of Methods Used to Evaluate the Effects of Perturbation on Periphyton Communities. Assoc. Southeastern Biol. Bull. 23:50.

Rodgers, J.H., Jr., J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1977. Primary Production and Decomposition of Submergent and Emergent Aquatic Vascular Plants of the New River, Glen Lyn, Virginia. North Am. Benthological Soc. (April 6-8) Roanoke, VA. p. 26.

Clark, J.R., J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1977. Analyses of Aufwuchs Communities. Assoc. Southeastern Biol. Bull. 24:81.

Rodgers, J.H., Jr., J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1977. Functional Responses of Aufwuchs Communities to Perturbations in Artificial Streams. 40<sup>th</sup> Annual Meeting Am. Soc. Limnol. Oceanogr. (June 20-23) East Lansing, Mich.

Rodgers, J.H., Jr., D.S. Cherry, K.L. Dickson, and J. Cairns, Jr. 1978. Influence of

Thermal Effluent on Population dynamics of Asiatic Clam (*Corbicula manilensis*) in the New River, Virginia (Mollusca: Bivalvia). Assoc. Southeastern Biol. Bull. 25:48.

Clark, J.R., J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1978. A Benthic Diatometer for Use in Large Rivers. North Am. Benthological Soc. (May 10-12) Winnipeg, Manitoba, Canada, p.9.

Graney, R.L., J.H. Rodgers, Jr., D.S. Cherry, K.L. Dickson, and J. Cairns, Jr. 1978. Heavy Metal Accumulation by the Asiatic Clam (*Corbicula manilensis*) from Field Collections and Laboratory Bioassays. VA. Academy of Science, VPI&SU, Blacksburg, VA.

Rodgers, J.H., Jr., D.S. Cherry, R.L. Graney, K.L. Dickson, and J. Cairns, Jr. 1978. Comparison of Elemental Accumulation by the Asiatic Clam (*Corbicula fluminea*) from Thermal Influenced River Water and Laboratory Bioassays. American Society for Testing and Materials Symposium on Aquatic Toxicology. (Oct. 16-17) New Orleans, LA.

Rodgers, J.H., Jr., J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1978. Nontaxonomic Analyses of Structure and Function of Aufwuchs Communities in Lotic Microcosms. SREL Symposium "Microcosms in Ecological Research." (Nov. 8-11, 1978) Augusta, GA.

Dal Santo, D. and J.H. Rodgers, Jr. 1979. Bluegill (*Lepomis macrochirus*) Blood Enzymes as Indicators of Exposure to Sublethal Concentrations of Cadmium. Assoc. Southeastern Biol. Bull. 26:54.

Wallace, L.J.D. and J.H. Rodgers, Jr. 1979. Periphyton Electron Transport System as an Indicator of Perturbation in the Watauga River, Tennessee. Assoc. Southeastern Biol. 26:54.

Molloy, B.K. and J.H. Rodgers, Jr. 1979. Periphyton Respiration in the Watauga River, Tennessee: Impact of Industrial and Municipal Effluents. Assoc. Southeastern Biol. Bull. 26:55.

Graney, R.L., D.S. Cherry, and J. Cairns, Jr. 1979. Behavioral and Lethal Responses of the Asiatic Clam (*Corbicula fluminea*) to Cu, Zn, Cu-Zn, and K exposures. Assoc. Southeastern Biol. Bull. 26:89.

Dickson, K.L., F.Y. Saleh, and J.H., Rodgers, Jr., 1980. Determining Specific Chemical Waste Load Allocations to Aquatic Receiving Systems. 53rd Annual Conference of the Water Pollution Control Federation. (Sept. 28 - Oct.3) Las Vegas, NV.

Rodgers, J.H., Jr., M.E. McKevitt, D.O. Hammerland, K.L. Dickson, and J. Cairns, Jr. 1980. Primary Production and Decomposition of Submergent and Emergent Aquatic