



2006

Weeks Bay National Estuarine Research Reserve
20-Year Designation Anniversary:

History of research within the Reserve boundary



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Some words about research in the Weeks Bay watershed from L. G. Adams, the Reserve Manager...

Weeks Bay in coastal Alabama has been identified as a relatively pristine area representative of an estuarine system in the Louisiana biogeographic province of the northern Gulf Coast. This recognition led to the designation of Weeks Bay and surrounding areas to become the 16th Reserve on February 19, 1986. Weeks Bay Reserve has since become a site based center of excellence in research and education promoting conservation of coastal resources through stewardship and outreach practices.

Research at Weeks Bay has always been a focus for the Reserve. As part of the stated mission, the Reserve functions to provide a stable environment for research and coordinates activities to make available information necessary for improved understanding and management of estuarine areas. As part of the designation process, baseline studies had been incorporated into the Environmental Impact Statement for the Weeks Bay area. Since that time, over the last two decades, much has been accomplished in the realm of research and monitoring. Dozens of projects have been completed and hundreds of researchers have utilized the area to learn more about estuaries.

Research at Weeks Bay Reserve takes place at several levels: to provide resources, support, and background data to independent researchers; to increase understanding of estuarine functions through applied research and monitoring; and, to answer questions related to management issues within the watershed and the resulting impact on coastal estuaries. Over the years Weeks Bay Reserve has facilitated research ranging in topics from land use changes, polluted runoff, and sediment transport, to turtle populations, benthic diatoms, and energy transport. The System-wide Monitoring Program (SWMP) at the Reserve has been collecting environmental data for ten years. This information has greatly facilitated research providing valuable data to supplement various projects and provide a glimpse at cyclic changes and possible trends. Conservation of coastal resources promises to remain a challenge in the foreseeable future. The role of research will continue to be an integral part of the programs at Weeks Bay Reserve providing information needed to meet this challenge in a beneficial way.





L.G. has the chance to ‘show off’ the Reserve to our prestigious guests. From left to right are: James H. Griggs, M. Barnett Lawley, L. G., and Governor Bob Riley

L. G. Adams (lg.adams@dcnr.alabama.gov) is the Reserve Manager. He received his BS in Marine Biology from Auburn University and his MS in Biology from West Georgia College. In 1986, he received his Masters in Education from Auburn University finishing with a special problems course at the Dauphin Island Sea Lab. He has taught Marine and Environmental Science at Fairhope High School, and Human Anatomy and Physiology at Faulkner State Community College. In 1992, he joined the Weeks Bay Reserve as Education Coordinator for the Baldwin County School System. This position had the responsibility of providing programs for county schools grades K-12. In addition, L. G. also worked on exhibit and trail development, specimen collections and grant proposals requesting funds for future projects. In 1995, he accepted the position of Manager for the Reserve. This position requires overseeing all activities at the Reserve, maintaining contacts with the other 26 National Estuarine Research Reserves (NERRs) and interacting with various levels of federal, state, and local governments.

Keeping up with research in the Weeks Bay watershed from Scott Phipps, Research Coordinator...



Scott W. Phipps was born and raised on the Illinois prairie. He earned a BS at Eastern Illinois University in Botany, an MS at Eastern Illinois University in Biological Science, and a Ph.D. at Mississippi State University in Biological Science. His research interests include water quality, non-point source pollution and toxicological effects on the benthic algal assemblage; aquatic and physiological ecology; phycology. He did his Ph.D. research here at Weeks Bay NERR on a Graduate Research Fellowship and has been the Reserve Research Coordinator since the fall of 1999.



“A Brief History of Research in Weeks Bay”

Coastal and estuarine researchers recognized early on that Weeks Bay was an excellent site for certain types of research. The entire watershed of Weeks Bay – from the first order blackwater streams at its headwaters to the embedded estuary at its terminus – is within Baldwin County. The usefulness of this small system as a model for much larger systems was not lost on the researchers, educators and conservationists that came together to promote and create the Reserve as it now exists. To begin the process of designation, an environmental impact survey was commissioned and it was published in 1985.



In 1990, The Research Coordinators (RCs) in the system at that time began meeting yearly and discussing issues of importance at the national level. These meetings were the beginning of the System-Wide Monitoring Program (SWMP). The stated goal of SWMP is to “track short-term variability and long-term change” in estuarine systems. SWMP started with the deployment of electronic hydrographic dataloggers at 2 permanent sites. These dataloggers monitor water temperature, conductivity and salinity, depth, pH, dissolved oxygen and turbidity – logging a reading every half hour. Dataloggers were first deployed at Weeks Bay in the fall of 1995 (originally by Dauphin Island Sea Lab staff) and these sites are still being monitored. A weather



station monitoring air temperature, relative humidity, barometric pressure, wind speed and direction, photo-synthetically active radiation and rainfall was added in 2001. Two more hydrographic sites were added in 2002. In 2003, monthly measurements of ammonium, nitrite, nitrate, phosphate and chlorophyll concentration began at each of the datalogger sites. At one site we began taking monthly tidal cycle samples of these same parameters. All of these data are carefully checked for accuracy and maintained in a database

housed at the Belle Baruch Laboratory in Georgetown, South Carolina. These data (from all 27 NERRs in the Nation) are available for querying or downloading on the internet at:

<http://cdmo.baruch.sc.edu>. Weather data from Weeks Bay Reserve has been available since 2002 real-time on the web at: <http://cast-net.disl.org/monitoringdata/nep/index.htm>. These real-time data are available through the support of the Marine Estuarine Environmental Research Center at Faulkner State Community College, the Mobile Bay National Estuary Program, and Dauphin Island Sea Lab staff.

Another research program initiated by the RCs is the Graduate Research Fellowship Program (GRF). This is a competitive fellowship providing a stipend for graduate students who do their research at a NERRS site. Each Reserve has 2 fellowships at a time that last for 1, 2 or 3 years. Since the beginning of the GRF program at Weeks Bay Reserve, there have been 8 projects finished and 2 are ongoing. A new fellowship will be awarded June 1st of this year. For more information on the GRF program, see the NERR website at: <http://nerrs.noaa.gov>.

The Research Coordinator position was established at the Weeks Bay Reserve in the fall of 1999. The RC oversees SWMP and the GRF program, directs original research projects and coordinates/cooperates with visiting researchers on their projects within the Reserve. The



SWMP technician position was added in 2002. A Graphic Information Systems (GIS) technician was also added through the Protected Area GIS initiative at NOAA. This specialist is involved with mapping, remote sensing and data management. Earlier, the Watershed Coordinator position was established and more recently, a Stewardship Coordinator position was created. A more detailed history of these departments is included elsewhere in this issue. The Watershed Coordinator is involved in non-point source pollution investigation and mediation and the

Stewardship Coordinator is involved in conservation biology and restoration ecology.

Research within the watershed has increased exponentially since the establishment of the Reserve. As we collect more baseline data, and more research is based here, the overall knowledge base becomes greater which attracts even more research! This symbiotic enhancement is simply illustrated by the list of 20 research institutions (see below) that have had researchers working at the Weeks Bay Reserve in the last 5 years. Most importantly, research from Weeks Bay directly affects management decisions of this valuable natural resource.

20 Research Institutions...

...that have had research projects in Weeks Bay Reserve over the past 5 years:

- | | |
|-----------------------------------|--|
| 1. Dauphin Island Sea Lab | 11. University of Southern Mississippi |
| 2. University of South Alabama | 12. Louisiana State University |
| 3. Troy University | 13. Texas A&M University |
| 4. Auburn University | 14. University of West Florida |
| 5. University of Alabama | 15. The Ohio State University |
| 6. Mississippi State University | 16. Case Western Reserve University |
| 7. Eastern Illinois University | 17. Geological Survey of Alabama |
| 8. Southern Illinois University | 18. United States Geological Survey |
| 9. Gulf Coast Research Laboratory | 19. AL Dept of Environmental Management |
| 10. University of New Orleans | 20. and, of course, AL Dept. of Conservation & Natural Resources, Lands Division |

Graduate Research Fellowships

The following abstracts were copied directly from the NOAA NERRS GRF site; additional information about fellowships can be found at: <http://nerrs.noaa.gov/Fellowship/welcome.html>

Graduate Research Fellows conduct projects within the following five subject areas:

1) Effects of non-point pollution, nutrient dynamics

Effect of the arsenic/phosphorus ratio on benthic microalgal assemblage structure in an estuary

*Scott Phipps
Graduate Research Fellow 1997-1998
Weeks Bay, AL
Mississippi State University*

Arsenic has a toxic effect on biological organisms because it competes for binding sites with phosphorus. Uptake of arsenate is a function of phosphate availability and in environments where phosphate is limited, arsenate toxicity is more pronounced. In estuaries, phosphorus and arsenic availability vary along a horizontal gradient so that conditions could occur wherein arsenic would have significant impact on the biota. Due to the settling of particulate matter that may be complexed with a variety of pollutants, the benthic microalgae may have the most important interactions with arsenic. Consequently, the study of benthic microalgal assemblages in estuaries and their response to the changes in arsenic concentrations can provide a basis for better understanding the complex interactions between the biotic and toxic substances.

The general objective of my proposed work is to test the hypothesis that arsenic/phosphorus ratios exert a "community structuring influence" on estuarine benthic microalgal assemblages. This study will investigate the effect of arsenic experiments that will identify any changes in benthic microalgal assemblages structure resulting from increasing arsenic concentration (Experiment 1), determine a possible "mechanism" of that effect on the species level (Experiment 2), and demonstrate directly the effect of manipulation of the arsenic/phosphorus ratio on benthic microalgal assemblage function (Experiment 3).

Non-point source nutrient inputs and their role in the food web of the Weeks Bay NERR, Alabama

*Kelly Shotts
Graduate Research Fellow 1997-2000
Weeks Bay, AL
University of South Alabama*

Estuaries are ecologically productive and economically valuable, natural coastal ecosystems. As a result of increased use, water quality conditions in estuaries have degraded, shallow water food webs have been disrupted, and estuarine-dependent fish populations have declined. My research,

in combination with detailed water quality monitoring, aims to examine the relationships between non-point resource nutrient inputs and food web dynamics in the Weeks Bay National Estuarine Research Reserve. Monitoring procedures will include light field measurements, nutrients (NO₃, NO₂, NH₄, SiO₂) sampling chlorophyll and phaeopigment analysis, and quantification of dissolved organics (carbon and nitrogen), particulate organics (PC/PN), and suspended sediments. Nutrients sources and food web dynamics will be identified through ¹³C, ¹⁵N, and ³⁴S stable isotope analysis on DIC and POC in water column, hardwood leaf litter, plankton, larval and juvenile fish, and decapod crustaceans. This project directly addresses two NERRS priority areas for support: (1) effect of non-point source pollution, and (2) mechanisms for sustaining resources within estuarine systems. Though being studied within the Weeks Bay National Estuarine Research Reserve, these issues are relevant to other reserves in that nutrients enrichment is experienced in estuaries nationwide. Both the monitoring and the research components proposed here are key in evaluating the management efforts that are being required in other coastal states by the Coastal Zone Act Reauthorization Amendments.

The linkage between land-use/land-cover, nitrogen flux, and denitrification in estuarine habitats

John Lehrter

Graduate Research Fellow 2000-2002

Weeks Bay, AL

University of Alabama

Understanding the suite of physical, chemical, and biological processes that control the dynamic transport and fate of nitrogen (N) as it transits from watershed source to coastal ecosystem is a complex challenge that must be undertaken if we are to maintain and restore the integrity of our aquatic ecosystems. This research proposal utilizes a multi-disciplinary approach to assess the relationships between land-use/land cover (LULC), watershed N flux, and estuarine denitrification.

The Weeks Bay watershed will be subdivided into sub-basins based on predominant LULC types to assess how different LULC complexes influence the magnitude and timing of watershed N flux. Stream flow measurements and water samples of N (NH₄, NO₃+NO₂, NO₂, DON, and PN) will be collected at the pour points of each of the delineated sub-basins approximately weekly over an annual cycle. These data in conjunction with a linked hydrologic/N transport model will be utilized to explain N data collected weekly in Weeks Bay over the same time period as the stream measurements. Further, the fate of N entering the estuary and its adjacent wetland habitats will be determined by measuring seasonal denitrification rates in these habitats with a membrane inlet mass spectrometer. Coupling of the N flux data and estimates of denitrification will allow for the determination of N retention rates by the Weeks Bay estuary under variable N flux conditions. Information regarding the annual variability of N flux and denitrification will be directly useful to those involved in determining best management practices in the watershed.

Effects of anthropogenic eutrophication on the magnitude and trophic fate of microphytobenthic production in estuaries

Adrienne Dunsmuir

Graduate Research Fellow 2001-2003

Weeks Bay, AL

University of South Alabama

Microphytobenthic communities are an integral part of estuarine ecosystems, playing an important role in sediment stabilization, biochemical processes and primary production. The trophic importance of microphytobenthos in estuarine food webs depends on the fate of its production (i.e. the routes microphytobenthic production can follow, for instance herbivory, burial and export). Yet, very few studies have examined the fate of microphytobenthic production. As a consequence, the trophic role of microphytobenthos in estuaries is poorly known. In addition, little is known about how human-induced eutrophication affects this role, although this is an important piece of information to understand the impacts of eutrophication on the ecology of estuaries.

This study aims at examining the magnitude and fate of microphytobenthic production in three sub-estuaries of Mobile Bay, AL, subject to contrasting levels of eutrophication. The study sites will be located at the mouths of Weeks Bay, Dog River and Fowl River. Microphytobenthic chlorophyll concentrations will be measured in sediment cores 2.5 cm in diameter. Primary production will be estimated by quantifying the uptake of ^{14}C by core samples incubated with in situ conditions. Herbivory and export will be determined using cages deployed in the field. Burial will be estimated as the increment in phaeophytins (chlorophyll degradation product) with increasing sediment age. Moreover, to better understand the differences observed in the magnitude and fate of microphytobenthic production, I will also measure ammonium, nitrate, nitrite, and phosphate, and particulate C/N ratio in the sediment; and water column chlorophyll, total solids in suspension and light extinction.

This research will substantially contribute to the understanding of the ecology of Weeks Bay because microphytobenthos is the most important primary producer in the Bay and, yet, little is known about the magnitude and fate of its production. Moreover, this project will compare estuaries that have differing levels of eutrophication, thus presenting information that will be useful for the management of estuaries under increasing levels of eutrophication. This study, therefore, falls well within the NERRS research priority areas of "the effects of non-point source pollution on estuarine ecosystems" and "mechanisms for sustaining resources within estuarine ecosystems."

Benthic algal community structure and bioaccumulation of mercury in a coastal watershed

Lucie Novoveska

Graduate Research Fellow 2004-2005

Weeks Bay, AL

Eastern Illinois University

This project seeks to identify tributaries of the Fish River watershed in coastal Alabama which apparently are contaminated with bioavailable mercury. Although largemouth bass in the Fish River ecosystem are known to contain relatively high concentrations of mercury, their mobility limits their usefulness as biomonitors. In contrast, benthic microalgal assemblages are immobile due to their attachment to stream substrata. Upon collection, they can be easily desiccated and stored for extended periods, making them an ideal choice for biological monitoring of metals contamination. Artificial substrates will be continuously exposed at 10 sites in the channel of the Fish River at different distances from Weeks Bay. Every third month during one year, samplers will be exposed for periods of three weeks with the intent of monitoring seasonal changes in the variables of interest. Mercury concentration of individual cells will be determined using a Scanning Electron Microscope/Energy Dispersive X-Ray Spectrometer (SEM-EDS) that enables quantification of metals content of biological materials at the cellular level. Species richness and diversity of benthic diatom assemblages will be described, thereby enabling assessment of individual species or community level parameters as indicative of metal contamination. The primary purpose of this study is to quantify mercury content of individual species and to describe diatom community structure at all sites in an effort to identify tributaries or reaches of the Fish River watershed which represent the heretofore unidentified source of mercury contamination.

2) Habitat conservation, restoration:

Assessment of essential fish habitats as nurseries for economically important fishes: Tools for management and conservation

Virginia Shervette

Graduate Research Fellow 2004-2005

Weeks Bay, AL

Texas A&M University

Estuaries are described as semi-enclosed bodies of water, which have free connection with the open sea, and within which seawater is measurably diluted with freshwater from land drainage (Pritchard 1967). As a result of the connection to freshwater inputs, the ocean, and the land, estuaries are extremely susceptible to human disturbances. Commercial fishing activities, industrial and housing development, as well as other human impacts significantly alter estuarine habitats through the exploitation of both fish and invertebrates, introduction of exotic species, industrial waste, and land conversion. Understanding how species utilize estuarine habitats is critical for future conservation efforts in estuaries. The focus of my research in Grand Bay and Weeks Bay is to elucidate the differences in nursery value of several juvenile fish habitats for individual species such as spotted seatrout, silver perch, red drum, spot and pinfish. Specifically, I am currently quantifying density and biomass and I propose to quantify growth, and survival of juvenile fishes within multiple habitat types (marsh, seagrasses, oyster, and soft-bottom). To quantify relative growth of individual species within each habitat type, I will use field enclosures which restrict fishes to a habitat type and exclude predators, but allow access to the bottom substrate for foraging. Such enclosures have been used successfully to measure fish growth rates in a variety of habitats with a variety of fish species. I will evaluate the relative survival of individuals of each of the 5 species from the growth experiment within each habitat type during the spring, summer, and fall in field tethering and laboratory mesocosm experiments. I will

create an ecological model with all of the data collected from my current density study and this proposed work in order to test hypotheses concerning juvenile nursery habitats. The proposed research will provide new information about nutrient (food web) dynamics, habitat conservation essential to fish production, and potential mechanisms for sustaining resources within estuarine ecosystems.

3) Sustaining resources within estuarine ecosystems:

A GIS analysis of land use and its potential link to sedimentation in Weeks Bay, Alabama

John Cartwright
Graduate Research Fellow 2000-2001
Weeks Bay, AL
Mississippi State University

The Weeks Bay estuary of southern Alabama, as well as its associated watershed, have become an area of increasing environmental concern with the explosion of urban development (Halcomb, 1995). The rapid development in coastal areas is producing problems in rural areas that have not been dealt with in the past. One of the primary problems is the increase in sedimentation in the watershed due to urban development within the vacant rural environment. There are numerous problems with sedimentation, with non-point source pollutants being the greatest and most frequent problem.

A GIS model relating land use to potential sediment sources would be very useful in finding solutions to sedimentation problems. The trend of urban development in the Weeks Bay watershed is producing a source of sedimentation, as population grows over the next decade. The applications of a model of this nature are not limited to the present situation, but may be used for monitoring and future planning in the watershed area as the population grows and land use changes.

Salinity tolerance in the protozoan *Hyalophysa chattoni*, an external symbiont of grass shrimp

Kristy Pisani
Graduate Research Fellow 2003-2004
Weeks Bay, AL
Troy State University

This project will examine the effects of salinity changes on symbionts of estuarine crustaceans. Specifically, I will examine the ability of the symbiotic protozoan *Hyalophysa chattoni* to acclimate to salinity changes, including salinity extremes (0 ppt-55 ppt). The host shrimp *Palaemonetes pugio* is known to tolerate a wide salinity range, but the effect of these salinity changes on the symbionts is not known. Shrimp will be collected from the Weeks Bay NERR and acclimated to a series of salinities in the laboratory. Size measurements and the survival rate of the symbionts will be recorded. I will test the hypothesis that the symbiont will be unaffected by salinity changes. Statistical analysis will include a one-tailed ANOVA and contingency

tables using the chi square statistic. After determining host and symbiont salinity tolerance limits, silver nitrate preparations will be made to examine the diagnostic ciliature of the symbionts acclimated to those limits. These data could influence species criteria for these ciliates and would be an important contribution to our knowledge of biodiversity in estuaries. This study will provide baseline data to the Weeks Bay NERR, and will provide data useful to Weeks Bay as this small estuary normally experiences wide changes in salinity.

4) Economic, sociological, anthropological research: none to date

5) Biodiversity, effects of invasive species:

Krista Kay van Amerongen
Graduate Research Fellow 1999-2000
Weeks Bay, AL
University of South Alabama

Adjacent to the Mobile Bay in Southern Baldwin County, the Weeks Bay estuary provides a variety of aquatic habitats for resident turtle species. This study was designed to assess the biodiversity of the fresh water turtle community and to estimate the relative densities of each species. Trapping extended from 28 May 1999 to 4 August 2000. Turtles were collected using aquatic hoop traps on each end of a 12-m interior lead net. Turtles were collected using aquatic hoops traps on each end of a 12-m interior lead net. There were a total of 1004 turtle, representing 8 species, captures with *Pseudemys concinna* (River cooters) made up 17.2%, and the endangered *Pseudemys alabamensis* (Alabama red-bellied turtles) made up 20.1% of the community. The remaining 4.7% consisted of *Deirochelys reticularia* (Chicken turtles), *Apalone spinifera* (Spiny softshell turtles), *Chelydra serpentina* (Common snapping turtles), and *Macrolemys temminckii* (Alligator snapping turtles). A total of 238 turtles, representing six different species, were recaptured. Three turtle species had significant recapture rates: *P. alabamensis* (14%), *P. concinna* (26.5%), and *P. floridana* (21%). Population estimates for these three species are presented using the Schnabel calculation method.

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The following are abstracts not yet posted to the NOAA NERRS GRF website for 2005-2006 GRFs, and the subject area therein:

**1) Effects of non-point pollution, nutrient dynamics**

**Variability in Phytoplankton Productivity on Hourly- to Monthly Time-Scales and Its Coupling with Nitrogen Inputs to Weeks Bay, Alabama**

*Andy K. Canion*  
*Graduate Research Fellow 2005-2006*  
*Dauphin Island Sea Lab, The University of South Alabama*

As a consequence of population increase in Baldwin County, AL, non-point source nutrient loading into the watershed of Weeks Bay is expected to double in the next 15 years. Since nutrient availability is a major factor that regulates primary productivity, increases in nutrient availability may have a large impact on phytoplankton productivity and ultimately the carbon cycle in Weeks Bay. It is understood that the dynamics of phytoplankton productivity in turbid estuaries are driven by short-term (hours and days) variability in the availability of light and nutrients. In order to predict what effect nutrient increase in Weeks Bay will have over long timescales, this short-term (hourly to daily) variability must be incorporated into primary productivity models. Recent technological advancements make it possible to do so. This study will compare short-term (hours and days) and long-term (seasonal) variability in the factors that determine productivity and quantify the response of productivity to nutrient delivery in Weeks Bay.

This project will contribute to an understanding of the changes in productivity in Weeks Bay that are expected with increases in non-point source pollution. Therefore, it falls within the NERRS research focus area of eutrophication and the effects of non-point source pollution and/or nutrient dynamics. It will have immediate implications for management of nutrient inputs to Weeks Bay as well as a broader application to other shallow, turbid estuaries.

#### **4) Economic, sociological, anthropological research**

##### **Understanding aspects of the Human Dimensions of Weeks Bay NERR and how they apply to effective management of essential fish habitat**

*Virginia Shervette*  
*Graduate Research Fellow 2005-2006*  
*Texas A&M University*

Fisheries regulations and policies are often set with particular biological objectives in mind (i.e., maintaining essential habitat for a given species). However, as many fisheries managers have learned, regulations and policies must be at least minimally satisfactory to anglers and other fishing interests. Otherwise, dissatisfied stakeholders will use the political process in order to block proposed regulations or get existing policies of regulations changed. Thus, ideal fisheries regulation or policy is the alternative that maximizes human benefits while at the same time maintaining biological objectives. By understanding more about anglers, why they fish, where they fish, as well as their attitudes toward various management regulations and policies, fisheries managers can assess where anglers stand on resource issues, regulations, and general biological knowledge of the system in which they love to fish. In addition, information collected from anglers is useful in understanding and predicting how anglers may react to possible changes in management practices. Today, scientists and managers view such information as essential to fisheries management agencies because they recognize that fisheries management is no longer just biological management, but people management also. In this study, I sought to understand the human dimensions of Weeks Bay anglers, especially as they pertain to economically important species and their habitats, by establishing information on the extent and distribution of fishing activities, describing demographic characteristics, general fishing habits, attitudes, motivations, expenditures, and species preferences of Weeks Bay fishers and anglers.

Fa11 2000

## Agenda and Schedule for the Weeks Bay Symposium

Format for presentations: 15 – 18 min presentation with 2 minutes for questions. Twenty minute cut off absolute!

- 8:00-8:15        **Registration**
- 8:15-8:30        **Welcome and Introduction**
- 8:30-8:50        **Christopher Wilson:** “The movement of sediment and radionuclide through Weeks Bay NERR.”
- 8:50-9:10        **Douglas Haywick, David Allison and Students:** “Undergraduate geology student research in Weeks Bay: resolving the storm-fairweather history of a gulf coast estuary.”
- 9:10-9:30        **Douglas Haywick, Lee Yokel and John Kempton:** “Preliminary sedimentary findings from cores extracted from Weeks Bay.”
- 9:30-9:50        **Miriam Fearn:** “Pollen analysis and sedimentation in Weeks Bay.”
- 9:50-10:10      **Charles Stapleton:** “Analysis of diatom assemblages for paleo-reconstruction in Weeks Bay.”
- 10:10-10:30     **Julia Lytle and Thomas Lytle:** “The fate of pesticide in the Weeks Bay drainage system.”
- 10:30-11:00     **Morning break with refreshments**
- 11:00-11:20     **Jonathan Pennock:** “Nutrient and Phytoplankton production dynamics in Weeks Bay, Alabama.”
- 11:20-11:50     **James Cowan:** “Fishes and their ecological function in the Weeks Bay Reserve”
- 11:50-12:10     **Krista Van Amerongen:** “Community structure of freshwater turtles in Weeks Bay Reserve.”
- 12:10-12:30     **John Beck:** “Using GIS in the Fish River watershed.”
- 12:30-12:50     **Robert Chandler:** “Surface water sampling in the Weeks Bay Watershed, 1994-1998 by the Geological Survey of Alabama.”
- 12:50-1:10      **William Deutsch:** “Water quality data of the Weeks Bay Water Watch citizen group: what it tells us and what’s next.”



**Weeks Bay Reserve Research Symposium**  
**Friday, 22 April 2005**  
**9:00 AM - 4:00 PM**  
**Weeks Bay Reserve Auditorium,**  
**11300 U.S. Highway 98,**  
**Fairhope, AL**

This Coastal Training Program sponsored symposium features presentations and poster displays about research findings in our watershed. Invited speakers include independent researchers, university students and faculty, National Estuarine Research Reserve System Graduate Research Fellows, and the Reserve staff. The varied topics include species diversity, nutrient loading, habitat restoration, and the impacts of mercury contamination.

A complete agenda will be available soon.  
There is no entry fee. Drinks will be provided for your Brown Bag lunch.

Contact Cheryl McClary, CTP Coordinator, at 251.928.9792 or  
[cmclary@dcnr.state.al.us](mailto:cmclary@dcnr.state.al.us)  
for additional information and for reservations.

*Funding for the project is provided by the Alabama Department of Conservation and Natural Resources,  
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Office of Ocean and Coastal Resource Management.*

## **Weeks Bay Reserve Research Symposium Friday, 22 April 2005**

9:00 to 9:20:     **Welcome and Introduction to the Symposium**

          L. G. Adams, Reserve Manager, Cheryl McClary, CTP Coordinator, and Scott Phipps, Research Coordinator

9:20 to 9:40:     Michael Shelton: “Monitoring of Mercury in largemouth bass tissue in the Weeks Bay watershed.”

9:40 to 10:00    Lucie Novoveska: “Benthic algal community structure and bioaccumulation of mercury in a coastal watershed.”

10:00 to 10:20   Stephen Landers: “Sessile protozoans from Weeks Bay and Dauphin Island, Alabama.”

**10:20 to 10:40   BREAK**

10:40 to 11:00   Kristy Pisani: “The effect of salinity changes on *Hyalophysa chattoni*, an apistome ciliate symbiotic on grass shrimp.”

11:00 to 11:20   John Lehrter: “A comparative analysis of nutrient loading, estuarine nutrient fluxes and net ecosystem metabolism in three tidal river estuaries differing predominately by their watershed land-use types.”

11:20 to 11:40   Virginia Shervette: “Habitat related predation of white shrimp by blue crabs using laboratory mesocosms.”

11:40 to 12:00   Morning discussion session.

**12:00 to 1:00    LUNCH**

1:00 to 1:20     John Cartwright: “Identifying potential sediment source areas with a geospatial analysis of landuse/landcover in the Weeks Bay watershed.”

1:20 to 1:40     John Rodgers: “The use of tree-ring analysis to gauge the response of slash pines (*Pinus elliottii*) to tropical cyclones in the Weeks Bay Reserve, Alabama.”

1:40 to 2:00     William J. Platt: “Short-term effects of Hurricane Ivan on Coastal Landscapes at WBNERR.”

2:00 to 2:20     Douglas W. Haywick: “Hurricane Ivan-induced changes to Weeks Bay bottom sediment.”

**2:20 to 2:40   BREAK**

2:40 to 3:00     Eric Brunden: “Nature trail restoration project.”

3:00 to 3:20     Brent Wachholder: “Preliminary studies of the corticolous lichens of Weeks Bay.”

3:20 to 3:40     James Connors: “Nitrate Fate and Transport in Groundwater, Weeks Bay, Alabama.”

3:40 to 4:00     Wrap Up

**Thank you for attending!**

## About the 2005 symposium speakers...

**John Cartwright:** “Identifying potential sediment source areas with a geospatial analysis of landuse/landcover in the Weeks Bay watershed.”

### **Abstract:**

The Weeks Bay watershed in southern Baldwin County, Alabama experienced rapid changes in landuse/landcover (LULC) between 1990 and 2000. These changes have resulted in increased upland erosion and higher concentrations of suspended sediment within the watershed. Presently, sediment is the largest volumetric constituent of nonpoint source pollution and it is creating complex problems for watershed management. The efforts of this research developed a spatial model that shows potential source areas of sediment within the watershed relevant to the changes in LULC. Landsat satellite image scenes were used to classify LULC within the Weeks Bay watershed with multispectral satellite image data from leaf-off and leaf-on periods during 1990 and 2000. Analysis and classification of these scenes produced a modified low-level Anderson LULC classification with an overall accuracy of 78% that included the following classes: forested vegetation, herbaceous vegetation (seasonal and persistent), mixed or transitional vegetation, urban or built-up areas, and water. Change detections of the classified images yielded increases of 92.5% in urban areas and these data were coupled with topographical and descriptive slope data in a geographic information system. Raster-based linear algebraic spatial modeling provided a qualitative evaluation of potential sediment source within the Weeks Bay watershed based on the changes of the LULC classification and slopes of the landscape. Identification of these sediment sources can aid in the implementation of environmentally sound watershed management schemes.

John Cartwright is a Research Associate for the GeoResources Institute at the High Performance Computing Collaboratory (HPC2) of Mississippi State University. John received his B.S. and M.S. degrees from the Department of Geosciences at Mississippi State University. His B.S. was concentrated in professional geology and his M.S. focused on the use of geospatial technologies for watershed management (as a NOAA Graduate Research Fellow at the Weeks Bay National



Estuarine Research Reserve). After completion of his degrees he has served as both a geospatial application specialist and instructor at Mississippi State University. John's research has centered itself along the Northern Gulf of Mexico (primarily the Mississippi and Alabama coastal areas) with research projects ranging from land-use/land-cover mapping to transportation corridor studies. His current interests are in anthropogenic activities impacts to coastal watersheds and geospatial applications for environmental management.

**James Connors:** “Nitrate Fate and Transport in Groundwater, Weeks Bay, Alabama.”

Much recent research has focused on the influx of dissolved, agriculturally derived nutrients to ecologically sensitive coastal environments via submarine groundwater discharge. These chemicals have been implicated as causes of eutrophication and associated biodiversity changes and benthic hypoxia/anoxia. Assessments of submarine groundwater discharge frequently entail the use of point-of-discharge detection methods, such as seepage meters that directly measure the volume of groundwater influx over time at a certain point, and shallow offshore piezometers that measure the local vertical hydraulic gradient between surface water and groundwater. A problem with these tools is that they do not characterize hydrogeological and chemical variations along terrestrial and offshore groundwater flow paths, which are important contaminant fate and transport considerations. This study combines an offshore seepage meter and shallow piezometer network with contamination assessment tools, such as nested monitoring wells, continuous soil/sediment borings, aquifer tests, and downhole geophysical logs, to quantify and chemically characterize effluent groundwater in Weeks Bay, a shallow subestuary of Mobile Bay, located along the Alabama portion of the U.S. Gulf Coast. Land use around Weeks Bay is predominantly agricultural, and local synthetic fertilizer usage rates have historically been among the highest in the nation. These facts, combined with natural climatological and geological conditions, render local aquifers particularly susceptible to surface derived nitrate contamination. This research is the first quantification and water quality investigation of groundwater discharge to Weeks Bay.



Jim is a co-founder and Senior Principal of Eco- Systems, Inc., a multi-practice environmental consulting and engineering firm with offices in Texas, Mississippi, Tennessee, Alabama, and Georgia. He is also a fulltime member of the University of South Alabama’s Earth Sciences faculty and a registered Professional Geologist in several states. His 20+ years of practice have included extensive municipal and industrial stormwater planning and permitting, as well as numerous projects involving water resources and contaminant hydrology, and service as an expert Hydrogeologist in several legal actions.

Jim & Eric Brunden installing groundwater monitoring units at the Reserve

(<http://www.gulfmex.org/crp2001c.html>).



**Douglas W. Haywick:** “Hurricane Ivan-induced changes to Weeks Bay bottom sediment.”

**Abstract:**

Major Hurricane Ivan (category 3) made landfall near Gulf Shores, Alabama in the early morning of September 16, 2004. After causing millions of dollars worth of damage along the Alabama and Florida coastlines, the storm passed over Weeks Bay. Approximately three months after Hurricane Ivan’s landfall, several undergraduate students at the University of Alabama initiated a study to map bottom sediment distribution across Weeks Bay. These data are being compared to previous bottom sediment maps done in 1998 (6 months after category 1 Hurricane Danny made landfall at Weeks Bay), 1999 (four months after category 3 Hurricane Georges made landfall in nearby southern Mississippi), and 2000, a relatively quiet year when no major storms or floods impacted the study area. Hurricane Ivan was the strongest tropical system since Hurricane Fredrick in 1979 to directly affect Weeks Bay and it induced significant changes in sediment distribution, particularly in shallow shoreline environments and adjacent to river mouths\inlets. Hurricanes Danny and Georges both transported well-sorted sand well into Weeks Bay, albeit from different directions. Preliminary interpretation of grain size data collected during this study period suggests that similar sediment transport and re-suspension also occurred during Hurricane Ivan.

Doug is an Associate Professor of Geology at the University of South Alabama. A native of Canada, he earned a BS degree in Geology and Chemistry in Ontario and an MS degree in Earth Sciences in Newfoundland prior to receiving his doctorate in Geology from an Australia university. He began teaching at the University of South Alabama shortly after leaving Australia.

His current research interests included coastal sedimentology, sedimentary geochemistry, geoarchaeology and geoscience education. He and his students have been studying sedimentation in Weeks Bay since 1991, the year he took up residence in Alabama.



**Stephen Landers:** “Sessile protozoans from Weeks Bay and Dauphin Island, Alabama.”

**Abstract:**

Until recently few studies have examined the sessile ciliated protozoa of the Mobile Bay region. This may be related to the difficulty in collecting sessile protists. Unlike planktonic ciliates, sessile ciliates must be collected through the use of natural or artificial substrates submerged in the water for protozoan colonization. This presentation reviews three recent studies from my lab in which the colonization density of sessile ciliates is examined during each month of the year, at different locations in the region. The bacterivorous genera *Vorticella* and *Zoothamnium* were dominant organisms at all sites. The colonization density of these genera correlated with water temperature. The carnivorous suctorian *Lernaephrya* was present only at the northern end of Weeks Bay when salinities were low, suggesting that temperature is not the dominant controlling factor for all genera. Other ciliated protozoa collected in these studies include *Acineta*, *Chaetospira*, *Cothurnia*, *Ephelota*, *Pysicola*, *Metafolliculina*, and *Stentor*.



Dr. Landers is a Professor in the Department of Biological and Environmental Sciences at Troy University. He received his B.S. from Iowa State University, and the M.S. and Ph.D. from North Carolina State University. After a post-doctoral appointment at the Bowman Gray School of Medicine in Winston-Salem (Wake Forest University), Dr. Landers joined the faculty at Troy University in 1993. Dr. Landers has taught many courses at Troy, including Invertebrate Zoology, Parasitology, and Organismal Biology, and also taught Marine Protozoology at the Dauphin Island Sea Lab. His research interests focus on marine protozoa, particularly apistome ciliates and gregarines, which are symbionts of decapod crustaceans and polychaete annelids. Additionally, he is interested in protozoans that colonize substrates in marine habitats, and has examined colonizing ciliates from Weeks Bay. During his career he has published six new protozoan species descriptions and is involved in cellular studies of these new species.

**John Lehrter:** “A comparative analysis of nutrient loading, estuarine nutrient fluxes and net ecosystem metabolism in three tidal river estuaries differing predominately by their watershed land-use types.”

**Abstract:**

Estuarine retention of watershed nutrient loads, system-wide nutrient biogeochemical fluxes, and net ecosystem metabolism (NEM) were determined in three estuaries on the Alabama Gulf coast that exhibit differing levels of nutrient input. Nitrogen (N) and Phosphorus (P) loads were highest for the agriculturally dominated Weeks Bay estuary followed by the Fowl River estuary, a forest-dominated system, and Dog River, an urbanized estuary. Dissolved inorganic nitrogen (DIN) was the dominant N input from the agricultural and urbanized watersheds while dissolved organic nitrogen (DON) was the largest percent input from the forested watershed. Highest annual mean sediment  $N_2$ ,  $O_2$ ,  $PO_4^{3-}$  and  $NH_4^+$  fluxes occurred in Weeks Bay which also had the highest primary production rates. The highest percentage of annual total nitrogen (TN) load lost to denitrification (72%) occurred in Dog River, which had the longest mean residence time (7 days). NEM increased with DIC:TOC loading which was positively correlated with the percentage of non-forested land-use. Overall, Fowl River was net heterotrophic,  $-69 \text{ g C m}^{-2} \text{ y}^{-1}$ , Dog River was balanced between heterotrophy and autotrophy, and Weeks Bay was net autotrophic,  $24 \text{ g C m}^{-2} \text{ y}^{-1}$ . This comparative watershed-estuarine approach empirically links changes in watershed land-use to changes in estuarine ecosystem processes.



John Lehrter was a NOAA/NERRS fellow at Weeks Bay from 2001-2002 during which time he was working on his PhD at the University of Alabama/Dauphin Island Sea Lab. For his dissertation, John studied how changes in land-uses in the watersheds of Weeks Bay, Dog River, and Fowl River impacted the hydrology and export of nutrients and sediments from these watersheds and subsequently how changes in hydrology and nutrient loads resulted in eutrophication of the estuarine receiving waters. Currently John is a Research Scientist with EPA’s Gulf Ecology Division and while he is involved in large-scale oceanographic and estuarine research around the country he wishes he could do more work in the beautiful waters of Fish River, Magnolia River, and Weeks Bay.

John by the Magnolia River at US Highway 98. Photo from: “The Pelican Post - Summer 2001”

**Lucie Novoveska:** “Benthic algal community structure and bioaccumulation of mercury in a coastal watershed.”

**Co-authors:** S. W. Phipps (Weeks Bay NERR), P.P. Liu and C. L. Pederson (Eastern Illinois University)

**Abstract:**

Largemouth bass in the Fish River watershed of coastal Alabama are known to contain relatively high concentrations of mercury, the source of which is unknown. We used benthic microalgal assemblages in effort to describe spatial distribution of mercury in the Fish River and its tributaries. Artificial substrates were deployed for 3-week exposure periods at 13 sites on 4 separate occasions. When analyzed by cold vapor atomic absorption spectroscopy, mercury concentrations in periphyton ranged from 0.066  $\mu\text{g/g}$  (Pensacola Branch) to 0.493  $\mu\text{g/g}$  (Barner Branch). Principal Components Analysis indicates that physical and chemical heterogeneity exists throughout the watershed and is correlated with agricultural and urban land use categories. Physical and chemical heterogeneity of stream sites, variability in land use/land cover, and mercury content of periphyton all are reflected in the diatom assemblages which were found to characterize each site. *Gomphonema parvulum* was cosmopolitan throughout the watershed and therefore deemed suitable for assessment of mercury contamination. However, mercury was not detected in *G. parvulum* when individual cells of from each site were observed using a Scanning Electron Microscope equipped with an Energy Dispersive X-ray Spectrometer.



Lucie is originally from the Czech Republic and decided to come to the United States as a student athlete. She played tennis for Hampton University, Virginia, where she graduated in 2003 with a B.S. in Biology. She began her M.S. degree work in 2003 at Eastern Illinois University serving as a graduate research assistant on a long term project focusing on biotic assessment of an urban stream in central Illinois. Her thesis research, *Benthic algal community structure and bioaccumulation of mercury in a coastal watershed*, was conducted at Weeks Bay, NERR. Lucie is currently enrolled as a PhD candidate at Michigan State University, Department of Zoology, and hopes to return to Weeks Bay to build upon her previous work regarding the transfer of mercury in aquatic food webs.

**Kristy Pisani:** “The effect of salinity changes on *Hyalophysa chattoni*, an apostome ciliate symbiotic on grass shrimp.”



Photo from “The Pelican Post - Spring 2005”

Kristy was a Graduate Research Fellow at the Weeks Bay Reserve in 2003-2004. She attended Troy State University working on her Master’s Thesis in Environmental Analysis and Management.

*No additional information available for this publication.*

**William J. Platt:** “Short-term effects of Hurricane Ivan on Coastal Landscapes at WBNERR.”

*No additional information available for this publication.*

**John Rodgers:** “The use of tree-ring analysis to gauge the response of slash pines (*Pinus elliottii*) to tropical cyclones in the Weeks Bay Reserve, Alabama.”

*No additional information available for this publication.*

**Michael Shelton:** “Monitoring of Mercury in largemouth bass tissue in the Weeks Bay watershed.”

**Abstract:**

Mercury in fish in Alabama’s coastal waters is a serious health and environmental concern. Fish River in the watershed of Weeks Bay is included on the Clean Water Act §303(d) list as impaired for mercury. In addition, a fish consumption warning for largemouth bass (*Micropterus salmoides*) caught in the Fish River issued by the Alabama Department of Public Health is in affect. Mercury monitoring in Fish River and its tributaries has been limited. As part of this project, monitoring of mercury in largemouth bass tissue was geographically expanded to better understand the extent of contamination and possible source(s) if any. Largemouth bass were collected from Fish and Magnolia Rivers, eight tributaries to Fish River, two tributaries to Magnolia River and four ponds in the watershed. Fish were weighed, measured for length and aged. Fish filets were tested for total mercury. Ninety-six fish were tested in this study. Mercury concentrations exceeding 1 ppm were detected in bass collected from most waterways, however the locations of bass with high total mercury levels have a geographic bias. Smaller and younger bass collected in the upper reaches of the Fish River watershed contained higher total mercury concentrations than those collected in the southern reaches of the river and its tributaries. Collection in Magnolia River and its tributaries was limited to segments accessible by boat, yet most of the bass contained greater than 1 ppm total mercury. In addition, total and methyl mercury analysis was performed on water column samples from several locations in the rivers and their tributaries. Again, water column results were similar to tissue samples with the higher concentrations appearing in upper river reaches. Sampling of the water column at six locations distributed along the length of the Fish River watershed was performed for analytes that can influence the methylation of mercury and that indicate wastewater input. No wastewater indicators and little variability in methylation factors were detected in the single sample event that support the geographical bias exhibited in the tissue concentrations. Total organic carbon was detected in higher concentrations in upper watershed areas; than in lower sites.





Mike is the Watershed Coordinator at the Weeks Bay Reserve, a component of the National Estuarine Research Reserve System and a cooperative effort of the Alabama Department of Conservation and Natural Resources, State Lands Division, Coastal Section and the National Oceanic and Atmospheric Administration. He has been involved in environmental research, water quality protection and natural resources management for over 14 years. Mr. Shelton has been project manager of the Weeks Bay Watershed Project for the least 3 years. The mission of the Weeks Bay Watershed Project is the protection and restoration of the streams and rivers of the Weeks Bay watershed through education and outreach, water quality monitoring and on-the-ground, cost share projects with area stakeholders. He did his undergraduate study in Biology at Hampden-Sydney College. Graduate work in Biology was completed at Emory University in Atlanta prior to settling in Fairhope in 1989. His environmental career began as a research contractor for the U. S. Environmental Protection Agency working on the crude oil bioremediation project following the EXXON Valdez spill in Prince William Sound, Alaska. After relocating to North Carolina, Mr. Shelton continued his efforts in improving water quality managing the applications and testing laboratory of AWARE Environmental, Inc, environmental engineers of Charlotte. Along with his duties with the Watershed Project, Mike is the coordinator of Weeks Bay Water Watch, a certified trainer for Alabama Water Watch, an associate member of the Fairhope Environmental Advisory Board and a member of the Alabama Water Watch Association Board of Directors representing the Mobile Basin.

**Virginia Shervette:** “Habitat related predation of white shrimp by blue crabs using laboratory mesocosms.”

**Abstract:**

Habitat plays an important role in the life history of many estuarine-dependent species. Essential Fish Habitat (EFH) is waters and substrates for spawning, breeding, feeding, or growing to maturity and includes such habitats as marshes, seagrasses, oyster reefs, and soft bottom. Without these habitats, fishery species would be unable to maintain the productivity essential in sustaining a fishery. This study evaluates the survivorship of juvenile white shrimp across several EFH common in Weeks Bay, AL and Grand Bay, MS NERR using experimental mesocosms. Preliminary results indicate that when blue crabs are used as predators, white shrimp juveniles experience significantly higher survival rates in marsh and soft bottom habitat types when compared with oyster habitat (ANOVA:  $F = 6.9$ ,  $p = 0.015$ ). Blue crabs exhibited great efficiency preying on white shrimp over oyster when compared with marsh and soft-bottom. Other habitat-related predation studies where fish were used as predators tended to result in greater survival of prey species over structured habitats such as marsh, seagrasses, and oyster. Blue crabs appear to utilize different foraging strategies than fish predators which may make them more efficient predators in structured habitats such as oyster. I plan on repeating the predation experiment with shrimp and crabs in order to increase replication. In addition, I hope to conduct an additional field mesocosm predation experiment to compare with our laboratory experiment results.



Virginia graduated from Mercer University with a B.A. in Spanish and Biology in 1997. She received her M.S. in Biological Sciences from University of Southern Mississippi in 2000. This fall, Virginia will graduate with her Ph.D. in Wildlife and Fisheries Sciences at Texas A&M University under the tutelage of Dr. Frances Gelwick. For the past nine years, Virginia has studied ecological topics in wetlands and estuaries. Much of her research focuses on the importance of habitat structure, such as oyster reefs and mangrove prop roots and pneumatophores, to the success of estuarine species survival and the contributions such habitats make toward fish and invertebrate community composition and enhancement (through increasing biodiversity). She is also interested in the Human Dimensions of fisheries management. Her dissertation focuses on comparing and contrasting the role habitats such as

oyster, marsh, and nonvegetated bottom play in community structure, growth, and predator/prey interactions of estuarine nekton species. Virginia conducts her research in the Gulf of Mexico and along coastal Ecuador. In the midst of her doctoral research, Virginia had a baby boy who is now 15 months old.



**Brent Wachholder:** “Preliminary studies of the corticolous lichens of Weeks Bay.”

**Abstract:**

The Gulf Coast is the second greatest center of lichen diversity in the United States, but lichenological research in the area has been limited. In March 2003, we conducted the first survey of corticolous lichens at Weeks Bay NERR. Our goals were to identify lichens present and characterize the lichen communities of different tree species and transects. Lichens were identified between 50 and 150 centimeters from the base on two permanently tagged hardwood trees at points every ten meters along three permanent transects. Gymnosperms along transects very rarely had lichens, so the survey was limited to 11 species of hardwood trees. A total of 58 lichen species were identified: two are new records for Alabama. All lichens collected along the transects were crustose or foliose. Lichen communities varied considerably between transects and tree species. Tree species was the major factor influencing lichen species richness on individual trees. Differences between transects could not be explained by tree species or size alone, suggesting lichen communities are influenced by other local factors such as disturbance history and dispersal limitations. Future goals include examining the effects of restoration efforts on lichen communities and collection and identification of uncommon fruticose lichens found on gymnosperms.

*No additional information available for this publication.*

# Dauphin Island Sea Lab

The State of Alabama's Marine Science Institution



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**George F. Crozier, Ph.D.**  
**Executive Director,**  
**Dauphin Island Sea Lab**



Dr. George Crozier received his Ph.D. in Marine Biology from Scripps Institution of Oceanography (University of California, San Diego) in 1968. Although trained originally as a comparative biochemist, Dr. Crozier has spent most of his professional career in Coastal Zone Management, which might be considered as a specialization in applied marine ecology. He has been the Executive Director of the Dauphin Island Sea Lab at the mouth of Mobile Bay since 1979. As the Director of the Coastal Policy Center at the Laboratory, he is active regionally in most management issues. Dr. Crozier received NOAA's *Walter B. Jones Coastal Steward Award* for 1999/2000 and has been honored by the State of Alabama as a science educator. He is currently deeply engaged in the issues emerging from urban sprawl in coastal areas and mitigation thereof.

**Doctor Crozier describes his relationship with the Reserve...**

My first real contact with the Weeks Bay National Estuarine Research Reserve came during the period that the Reserve was struggling with the joint management system shared by ADECA and ADCNR – Marine Resources. The Advisory Committee was chaired by Dr. Jimmy Jones, the MS/AL Sea Grant Program Director. The first really independent Reserve Manager was a DISL product, Ms. Pam James so there has been a strong connection between the two institutions for at least 20 years!

My only project connected with Weeks Bay was my leading the technical proposal to have the Bay designated as Outstanding National Resource Waters. Thomas McAlpin and I spent quite a few hours on the road between the coast and Montgomery arguing to ADEM that Weeks Bay was a viable candidate for the designation. Then there were hours spent convincing **local** interests that Weeks Bay was a viable candidate but also explaining that the status did not provide the level of protection to the water quality that many had hoped for. The current threats posed by development at the head of the watershed clearly underscore that unpleasant reality.

The other contribution I can claim is having taught L.G. everything he knows about coastal ecology and coastal zone management. I had the pleasure of having him take a number of “special topic” courses with me at DISL when both of us were quite a bit younger. He turned out okay.



*The real Dr. Crozier  
– the MAD Scientist!*



**Mike Dardeau  
Marine Scientist**



For the past 20 years I have directed Technical Support at Dauphin Island Sea Lab, a unit that provides faculty and students with information, technology and services related to coastal research. In addition, I am a member of DISL's Coastal Policy Institute, a multidisciplinary effort by planners, educators and scientists to serve the needs of local government, industry and agency decision makers in coastal management issues. One role I serve in this capacity is as a member of the Technical Advisory Committees of the Mobile Bay National Estuary Program and the Weeks Bay National Estuarine Research Reserve. Another is as the Quality Assurance Coordinator for the Alabama Center for Estuarine Studies. I regularly speak to a variety of audiences about the role of science in management decisions and have published on the systematics and ecology of marine organisms in over a dozen scientific journals.



My association with Weeks Bay began in the early eighties when several DISL researchers were awarded funds to conduct research in Weeks Bay. In particular, one researcher studying zooplankton required monthly trips to Weeks Bay to sample slack, high tides at night in particular habitats. He left DISL for another university before beginning the study and I ended up doing the sampling for him. I spent many pleasant nights on Weeks Bay, waiting on the weather or the tide to be right. Later, when the SWMP sampling began, my technicians and I contracted with WBNEER to set up sampling protocols and actually maintained the stations at Mr. Grounds' and Mr. Lipscomb's for over 2 years.

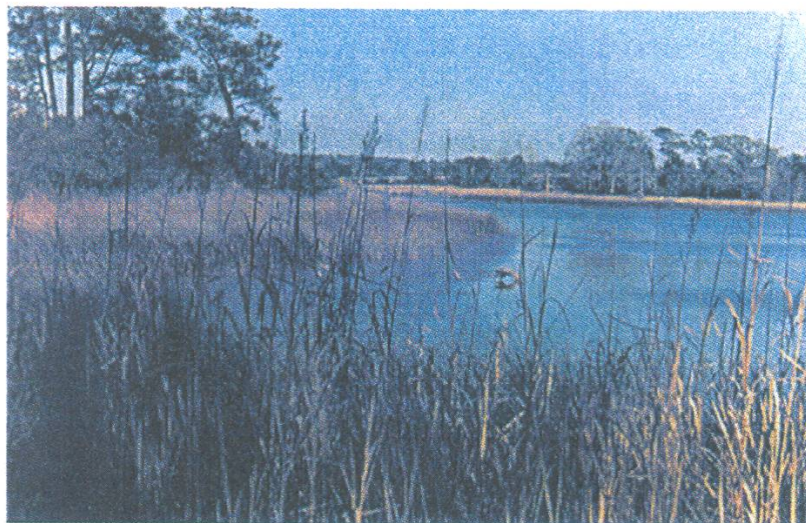
I have also served on numerous of committees at Weeks Bay to develop watershed management plans, long range development plans and five year strategic plans and served as a

reviewer for both the WBNEER program and for scientific proposals over the years.

Dr. Tina Miller-Way, Dr. George Crozier and I worked together to coordinate the authors of the Estuarine Profile chapters and I authored the chapter on estuarine consumer communities. I'm currently vice chair of the Weeks Bay Advisory Committee and have worked to harvest the SWMP data collected at Weeks Bay and present it real time on the web at our [www.mymobilebay.com](http://www.mymobilebay.com) site.

## **Appendices:**

# Weeks Bay National Estuarine Research Reserve: An Estuarine Profile and Bibliography



T. Miller-Way  
M. Dardeau  
G. Crozier

Editors

Dauphin Island Sea Lab Technical Report 96-01



## Acknowledgments

The Weeks Bay National Estuarine Research Reserve is part of the National Estuarine Research Reserve System, established by Section 315 of the Coastal Zone Management Act, as amended. Additional information about this system can be obtained from the Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, US Department of Commerce, 1305 East-West Highway, Silver Springs, Maryland 20910. This profile was prepared under contract NA370R0413.

A great many people have been helpful in the location and retrieval of information concerning the Weeks Bay National Estuarine Research Reserve and the Weeks Bay watershed. These include S.R. Heath, M.S. Van Hoose, and Major J. Waller of the Alabama Dept. of Conservation, Marine Resources Division, P. Harper of the U.S. Fish and Wildlife Service, Dr. G. Regan of Springhill College, Mobile, Alabama, B. Harbour of Bishop State Community College, Mobile, Alabama and S. Brown, Alabama Department of Environmental Management. C. Wood and J. Cowan of the Dauphin Island Sea Lab assisted in preparation of portions of the document. We thank Dr. K. Heck, Dauphin Island Sea Lab, L. Goldman, United States Fish and Wildlife Service and Dr. C. Way, Barry A. Vittor and Associates, Mobile, AL for reviewing this document.

This report is to be cited as:

Miller-Way, T., M. Dardeau, and G. Crozier. 1996. Weeks Bay National Estuarine Research Reserve: An Estuarine Profile and Bibliography. Dauphin Island Sea Lab Technical Report 96-01.

Appendix 2

**Summary of Past and Present Research  
at Weeks Bay National Estuarine Research Reserve**

## NOAA Funded Research

- April, G.C. 1993. Estuarine Modeling  
Computer simulation of hydrodynamic and salinity behavior of Weeks Bay,  
Alabama at equatorial tide conditions.  
Status: *Complete*
- Numerical simulation of the Weeks Bay estuary: The impact of a hypothetical  
channel construction project on water movement and salinity patterns  
Status: *Complete*
- Bain, M. 1990. Abiotic and biotic factors influencing microhabitat use by fish and shrimp  
in Weeks Bay National Estuarine Research Reserve.  
Status: *Complete*
- Hopkins, T.S. 1988. The hydrology of baseline nutrient levels (C, N and P) and primary  
production in the Weeks Bay NERR.  
Status: *Unknown*
- Lockaby, G., K. Flynn, L. Teeter and R. Lowrance. Relationships between landscape  
characteristics and non-point source pollution to coastal estuaries.  
Status: *In progress*
- Marion, K.R. and J.J. Dindo. 1987. Use of indicator species as a means of assessing the  
environmental conditions of the Weeks Bay National Estuarine Research Reserve.  
NOAA Technical Report Series OCRM/SPD. Washington, D.C.  
Status: *Complete*
- Marion, K.R. and J.J. Dindo. 1988. Enhancing public awareness of estuaries: A natural  
history survey of the Weeks Bay NERR.  
Status: *Complete*
- McClintock, J.B. and K.R. Marion. 1990. Habitat utilization, population dynamics,  
reproductive biology and trophic ecology of the blue crab in Weeks Bay, Alabama.  
Status: *Complete*
- Pennock, J.R. and T.S. Hopkins. 1991. Biogeochemical and hydrodynamic regulation of  
nutrient / production dynamics in shallow, terrestrially impacted estuaries.  
Status: *Complete*
- Schroeder, W.W., W.J. Wiseman, Jr. and S.P. Dinnel. 1989. Wind and river induced  
fluctuations in a small, shallow tributary estuary.  
Status: *Complete*
- Stout, J.P. 1987. Delineation of emergent habitats of the Weeks Bay NERR.  
Status: *Complete*
- Stearns, D.E. 1990. Zooplankton community composition, species abundance, and  
grazing impact: Tidal, monthly, and seasonal and habitat differences  
Status: *Complete*

## **Other Funding**

### **Marine Environmental Sciences Consortium**

Schreiber, R.A. and J.R. Pennock. 1995. The relative contribution of benthic microalgae to total microalgal production in a shallow sub-tidal estuarine environment.  
Status: *Complete*

### **Mississippi-Alabama Sea Grant**

Pennock, J.R. and J.J. Cowan, Jr. 1996 Nutrient-enhanced production and trophic dynamics in Weeks Bay, Alabama.  
Status: *In progress*

### **Field Validation Research Program, US EPA**

Lytle, J.S and T.F. Lytle. Field validation of pesticide impact in Weeks Bay, Alabama.  
Status: *In progress*

### **Weeks Bay National Estuarine Research Reserve Fellowship**

Wimberly, P. Investigating the benefits of best management practices in controlling nonpoint source pollution in the Weeks Bay watershed.  
Status: *In progress*

Wolfe, D.L. and D. W. Haywick. 1994. Rock lithification at Magnolia Springs.  
Status: *Complete*

### **Auburn University Cooperative Extension Service**

Beck, J.M., B.F. Hajek and J.E. Hairston. Determining critical nonpoint pollution sources in the Fish River watershed.  
Status: *Complete*

### **EPA Watershed Project Grants (*all in progress*)**

Alabama Department of Public Health. Construction and monitoring of alternative on-site treatment systems in Weeks Bay Watershed.

Alabama Water Watch, Auburn University. Establishing a citizen monitoring group in the Weeks Bay Watershed.

Baldwin County Soil and Water Conservation District. Weeks Bay pollution prevention project: Cost-share for agricultural BMP's.

Geological Survey of Alabama. Monitoring agricultural BMP's (chemical, physical and biological parameters) on Fish and Magnolia Rivers.

Geological Survey of Alabama. Pesticides and groundwater data - thematic map.

United States Geological Survey. Two USGS stage and one instream gaging stations in the Weeks Bay watershed.

## Bibliography

Included in this bibliography are documents which have specifically addressed the Weeks Bay National Estuarine Research Reserve or its watershed. These documents have been separated by document type. It is hoped that this will be a dynamic bibliography: thus, persons recognizing an omission should feel free to contact the Reserve Manager and amend this section.

### *Published Literature*

Byrd, I. B. 1955. A report on commercial fishing studies conducted in the tidal streams of Alabama. Proceedings of the Southeastern Association of Game and Fish Commissioners Meeting 6:75-80.

Crance, J.H. 1971. Description of Alabama estuarine areas - Cooperative Gulf of Mexico estuarine inventory. Alabama Marine Research Bulletin 6: 1-85.

Loesch, H. 1965. Distribution and growth of penaeid shrimp in Mobile Bay, Alabama. Publications of the Institute of Marine Science 10:41-58.

Lu, Z., G.C. April, D.C. Raney and W.W. Schroeder. 1994. DO, BOD and organic nitrogen transport in Weeks Bay, Alabama. p. 191- 200. *In* G.L. Pederson (ed.) National Symposium on Water Quality.

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Matthews, T. R., W. W. Schroeder and D. E. Stearns. 1991. Endogenous rhythm, light and salinity effects of postlarval brown shrimp *Penaeus aztecus* Ives recruitment to estuaries. Journal of Experimental Marine Biology and Ecology 154:177-189.

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# **Weeks Bay Reserve Research Library:**

## **Summary of research within the Reserve boundary**

**Reference Type:** Report

**Author:** ADCNR

**Year:** 1983

**Title:** Weeks Bay National Sanctuary Environmental Assessment

**Institution:** Alabama Department of Conservation and Natural Resources, Game and Fish Division for the Office of State Planning and Federal Programs. Submitted to Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

**Date:** April, 1983

**Abstract:** This Environmental Assessment was developed as partial fulfillment of contractual obligations with the Office of Ocean and Coastal Resources Management. Partial funding for the development of this document was made possible under provisions of the Coastal Zone Management Act (P.L. 92-583), as amended.

**Reference Type:** Report

**Author:** Bain, Mark B. Robinson; Robinson, C. Lance

**Year:** 1989

**Title:** Fish and habitat relationships during spring in the Weeks Bay National Estuarine Research Reserve. FY 1988 Research at Weeks Bay Estuarine Research Reserve

**Institution:** Auburn University

**Pages:** 13

**Date:** January, 1989

**Report Number:** Award NA88AA-D-CZ013

**Keywords:** fish, Weeks Bay, Habitat, progress report, nekton, sampling, physicochemical, biology, zooplankton, invertebrates.

**Reference Type:** Report

**Author:** Bain, Mark B.; Robinson, C. Lance

**Year:** 1990

**Title:** Abiotic and biotic factors influencing microhabitat use by fish and shrimp in Weeks Bay National Estuarine Research Reserve

**Institution:** Auburn University, Alabama Cooperative Fish and Wildlife Research Unit. This work is the result of research sponsored by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under contract NA88AA-D-CZ013 with Auburn University.

**Pages:** 88

**Keywords:** Weeks Bay, fish, shrimp, microhabitat, habitat, nekton, blue crab, menhaden, anchovy, zooplankton, benthos, sampling, abiotic, invertebrates., assemblage,

**Reference Type:** Thesis

**Author:** Cartwright, John Harrison

**Year:** 2002

**Title:** Identifying potential sedimentation sources through a remote sensing and GIS analysis of landuse/landcover for the Weeks Bay Watershed, Baldwin County, Alabama

**Academic Department:** Geoscience

**City:** Mississippi State

**University:** Mississippi State University

**Number of Pages:** 83

**Thesis Type:** Master of Science

**Accession Number:** Scott Phipps has electronic file

**Abstract:** The Weeks Bay watershed in Baldwin County, Alabama has experienced rapid changes in landuse/landcover (LULC) from 1990 to 2000. These changes have resulted in increased upland erosion and higher concentrations of suspended sediment within the watershed. For this research project a spatial model was developed to identify potential sources of sediment relevant to LULC and slope. Landsat satellite imagery was classified to assess LULC within the Weeks Bay watershed. The classification includes forested vegetation, herbaceous vegetation (seasonal and persistent), mixed/transitional vegetation, urban/built-up areas, sparse/residual vegetation and water, with an overall accuracy of 78%. Change detections of the classified images yielded substantial increases in urban areas (92.5%). These data were coupled with slope data in a geographic information system and a raster analysis provided a qualitative evaluation of potential sediment sources within the Weeks Bay watershed based on the change in LULC and sloped of the landscape.

**Reference Type:** Report

**Author:** Commerce, United States Department of

**Year:** 1985

**Title:** Final Environmental Impact Statement and Management Plan for the Proposed Weeks Bay National Estuarine Sanctuary

**Institution:** Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean service

National Oceanic and Atmospheric Administration

Alabama Department of Economic and Community Affairs

Alabama Department of Conservation and Natural Resources

**Keywords:** management, interpretive center, Agencies, Weeks Bay, Soil, SPECIES, Mobile Bay, impact, Statement, Sanctuary, conservation, department of commerce, national oceanic and atmospheric administration

**Reference Type:** Book

**Author:** Dindo, Ken R. Marion & John J.

**Year:** 1988

**Title:** NOAA Technical Memorandum of Weeks Bay National Estuarine Research Reserve

**Keywords:** Weeks Bay

Avian, Amphibian

**Abstract:** A technical look at Weeks Bay and its Inhabitants, which includes the avian and amphibian species.

**Reference Type:** Report

**Author:** GSA

**Year:** 1994

**Title:** Results of Surface Water Sampling in the Fish River Watershed, Alabama

**Institution:** Geological Survey of Alabama

**Pages:** 2

**Date:** 04/94

**Keywords:** Weeks Bay, Biological oxygen demand, sampling, pH, conductance, temperature, Dissolved oxygen, fecal coliform, nutrients,

**Reference Type:** Report

**Author:** GSA

**Year:** 1994

**Title:** Results of surface water sampling in the Fish River watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1, 1994 - March 31, 1994.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Date:** 1994

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1994 - 1998

**Title:** Results of surface water sampling in the Weeks Bay Watershed, Alabama.

**Institution:** Geological Survey of Alabama

**Keywords:** sampling, Weeks Bay, Nutrients, Biological oxygen demand, pH, pathogens, fecal coliform, coliform

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1, 1995 - March 31, 1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, April 1, 1995 - June 30,

1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Evaluation of Water-Analysis Data for surface-sites in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1994 - September 1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, July 1, 1995 - September 30, 1995. October 1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Pages:** 6

**Date:** October 1995

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Water-quality data for selected surface-water sites in the Weeks Bay and Flint Creek Watersheds, Alabama: a report to the Alabama Department of Environmental Management. September 1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Date:** September, 1995

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Results of surface water sampling in the Fish River watershed, Alabama: a report to the Alabama Department of Environmental Management. 1994.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Pages:** 5

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1995

**Title:** Results of surface water sampling in the Fish River watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, October 1, 1994 - December 31, 1994.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY4004

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period January 1994-April 1997. April 1997.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Pages:** 3

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform,

flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management. October 1996.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Pages:** 5

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, July 1, 1996 - September 30, 1996.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1, 1996 - March 31, 1996.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, October 1, 1995 - December 31, 1995.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

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**Reference Type:** Report

**Author:** GSA

**Year:** 1996

**Title:** Watershed Projects of the Geological Survey of Alabama. October 1996.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY5016

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1997

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1, 1997 - March 31, 1997.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY6014

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1997

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, July 1, 1997 - September 30, 1997.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY6014

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1997

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, April 1, 1997 - June 30, 1997.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY6014

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** GSA

**Year:** 1998

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, April 1, 1998 - June 30, 1998.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY6014

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**Reference Type:** Report

**Author:** GSA

**Year:** 1998

**Title:** Results of surface-water sampling in the Weeks Bay Watershed, Alabama: a report to the Alabama Department of Environmental Management for the period, January 1, 1998 - March 31, 1998.

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Report Number:** Contract #AGY6014

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flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** Halcomb, Gary L

**Year:** 1991

**Title:** A Sediment Chemistry Baseline Study of Coastal Alabama

**Institution:** Alabama Department of Environmental Management  
Coastal Program

**Pages:** 30

**Keywords:** Sediments, metals, chemistry, aluminum, arsenic, barium, cadmium, chromium, copper, iron, mercury, lead, zinc, Weeks Bay, pollution, contamination, Mobile Bay,

**Reference Type:** Report

**Author:** Haywick, Doug W.; Geers, W F; Cooper, M D

**Year:** 1994

**Title:** Preliminary Report of Grain Size Distribution in Weeks Bay, Baldwin County, Alabama. Report to the Weeks Bay National Estuarine Research Reserve 1

**Institution:** Department of Geology and Geography, University of South Alabama  
Weeks Bay National Estuarine Research Reserve

**Pages:** 108

**Keywords:** Sediments, Weeks Bay, Grain, Sampling, Transects,

**Reference Type:** Dissertation

**Author:** Lu, Zhaodong; April, Gary C.; Schroeder, W. W.; Raney, Donald C.

**Year:** 1994

**Title:** Numerical Simulation of the Weeks Bay Estuary: Non-conservative species transport in the Weeks Bay, Alabama watershed area. BER Report No. 619-183.

**Academic Department:** Chemical Engineering

**University:** The University of Alabama. This technical report contains research results obtained under the sponsorship of the United States Department of Commerce, National Oceanic and Atmospheric Administration, Sanctuaries & Reserves Division (formerly the Marine & Estuarine Management Division), Grant No. NA89AA-D-CZ051.

**Number of Pages:** 261

**Thesis Type:** Doctor of Philosophy

**Keywords:** hydrodynamics, transport, models, description, eutrophication, toxic, toxins, chemicals, chemistry, fish river, Weeks Bay, magnolia river, waste, pollution, alachlor

**Reference Type:** Report

**Author:** Marion, Ken R.; Dindo, John J.

**Year:** 1987

**Title:** The use of indicator species as a means of assessing the environmental condition of the Weeks Bay National Estuarine Reserve

**Institution:** University of Alabama at Birmingham. This work is the result of research sponsored by U.S. Department of Commerce, National Oceanic and Atmospheric

Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under Contract #NA86-AA-CZ018

**Pages:** 46

**Date:** August 3, 1987

**Keywords:** Indicator species, Estuaries, vertebrates, Environmental condition, Assessment, Habitat, Impact, Diamondback Terrapin, Gulf Salt marsh snake, Wading Birds

**Reference Type:** Report

**Author:** Marion, Ken R.; Dindo, John J.

**Year:** 1988

**Title:** Enhancing public awareness of estuaries: A natural history survey of the Weeks Bay National Estuarine Research Reserve

**Institution:** University of Alabama at Birmingham. This work is the result of research sponsored by U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under Contract #NA87-AA-CZ015

**Pages:** 57

**Date:** August 25, 1988

**Type:** NOAA Technical Memorandum

**Keywords:** Vertebrate, survey, birds, mammals, public, awareness, species

**Abstract:** Extensive non-fish vertebrate surveys were conducted on the Weeks Bay National Estuarine Research Reserve, Alabama, and the immediate surrounding area. The surveys documented the occurrence, seasonal abundance, and distribution of vertebrates within specific habitats. Thirty-three species of reptiles and amphibians, 16 mammals, and 123 species of birds were positively identified. Overall, a reasonably diverse fauna exists, due to a variety of microhabitats. Small mammals (e.g. rodents), however, are deficient in variety and abundance. The major objective of this project was to enhance the public's awareness and knowledge of estuarine ecosystems, their functioning, and their problems. Specifically, this was accomplished by using the survey data to design printed educational materials describing the major vertebrates of the Estuary and stressing their dependence on a healthy, functioning ecosystem. Three brochures (reptiles and amphibians; mammals; birds) and profiles of ten dominant and characteristic species were prepared for dissemination to school children, teachers, and the general public, upon establishment of an interpretive center. The ultimate goal of such material is to create an awareness of estuarine ecosystems, a crucial element in reversing the trend of rapidly increasing losses of coastal and brackish marsh habitat.

**Reference Type:** Report

**Author:** McClintock, James B.; Marion, Ken R.

**Year:** 1990

**Title:** The habitat utilization, population dynamics, reproductive biology and nutrition of the Blue Crab *Callinectes sapidus* in Weeks Bay, Alabama: important implications for fisheries.

**Institution:** University of Alabama at Birmingham. This work is the result of research sponsored by U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under Contract #NA89-AA-CZ018

**Pages:** 69

**Date:** 10/22/90

**Type:** NOAA technical memorandum

**Keywords:** Habitat, Blue Crab, Callinectes, Weeks Bay, population, fisheries, nutrition

**Reference Type:** Report

**Author:** McClintock, James B.; Marion, Ken R.

**Year:** 1991

**Title:** Coupling of primary and secondary production in estuarine ecosystems: the importance of plant detritus in the diet of the Blue Crab (*Callinectes sapidus*) in Weeks Bay National Estuarine Research Reserve, Alabama.

**Institution:** University of Alabama at Birmingham

**Pages:** 13

**Date:** 09/04/91

**Keywords:** Blue Crab, Weeks Bay, Production, estuarine, Callinectes sapidus, ecosystems

**Reference Type:** Thesis

**Author:** McCormick, Barry C.; Zhaodong, Lu; April, Gary C; Raney, Donald C; Schroeder, W W.

**Year:** 1993

**Title:** Numerical Simulation of the Weeks Bay Estuary. The Impact of a Hypothetical Channel Construction Project on Weeks Bay Water Movement and Salinity Patterns. BER Report No. 588-183

**Academic Department:** Chemical Engineering

**University:** The University of Alabama. This technical report contains research results obtained under the sponsorship of the United States Department of Commerce, National Oceanic and Atmospheric Administration, Sanctuaries & Reserves Division (formerly the Marine & Estuarine Management Division), Grant No. NA89AA-D-CZ051.

**Number of Pages:** 152

**Thesis Type:** Master of Science

**Keywords:** Weeks Bay, models, rates, hydrodynamics, watershed, simulation, numerical, mathematical, construction, salinity, bathymetry, hydrology

**Reference Type:** Report

**Author:** Miller-Way, T.; Dardeau, Michael R.; Crozier, G.

**Year:** 1996

**Title:** Weeks Bay National Estuarine Research Reserve: An estuarine profile and bibliography

**Institution:** Dauphin Island Sea Lab Technical Report 96-01

**Pages:** 127

**Report Number:** Technical Report 96-01

**Keywords:** History, Weeks Bay, Estuarine, Habitat, Nutrients, Production, Species, plant, animals, fauna, flora, land use, pollution. bathymetry, map, chlorophyll, birds, fecal coliform, geography, metals, aluminum, sediment, watershed, profile, shelf 7

**Abstract:** Preface:

The designation of the Weeks Bay National Estuarine Research Reserve recognized the Weeks Bay ecosystem to be of value from both educational/public resource and scientific/research perspectives. Population growth and concomitant development has increased in coastal regions

national wide and is occurring in south Baldwin County, Alabama. In light of the increased pressure on and increased visibility of the Weeks Bay resource, it was deemed necessary to summarize what is known, and perhaps more importantly, what is not known about the Weeks Bay ecosystem. The objective of this document, therefore, is to synthesize the many sources of information, including scientific, historical, social and political information, concerning Weeks Bay.

We have written this profile of the Weeks Bay system to be read and understood by all interested parties, including concerned citizens, monitoring groups, management agencies and scientists interested in Weeks Bay or other estuarine systems. To this end, we have chosen to refer to specific plants and animals by their common names, excluding *Genus species* designations from the text whenever possible. A list of common names and their *Genus species* equivalents is included in Appendix 1.

The last chapter of the document presents a summary of the overall ecology of the Weeks Bay system, a synopsis of information which is lacking and recommendations for research directions and management issues which need to be addressed to preserve the Weeks Bay National Estuarine Research Reserve for future generations.

**Reference Type:** Thesis

**Author:** Novoveska, Lucie

**Year:** 2005

**Title:** Benthic Algal Community Structure and Bioaccumulation of Mercury in a Coastal Watershed

**Academic Department:** Biology

**City:** Charleston, Illinois

**University:** Eastern Illinois University

**Number of Pages:** 102

**Thesis Type:** Master of Science

**Accession Number:** Scott Phipps office

**Keywords:** Weeks Bay

**Abstract:** Largemouth bass in the Fish River watershed of coastal Alabama are known to contain relatively high concentrations of mercury ( $>1 \text{ ug g}^{-1}$ ), the source of which is unknown. I used benthic microalgal assemblages in effort to assess spatial distribution of mercury in the Fish River and its tributaries. Artificial substrates were deployed for 3-week exposure periods at 13 sites on 4 separate occasions. When analyzed by cold vapor atomic absorption spectroscopy, mercury concentrations in periphyton ranged from  $0.066 \text{ ug g}^{-1}$  (Pensacola Branch) to  $0.493 \text{ ug g}^{-1}$  (Barner Branch). Principal component analysis indicated that physical and chemical environments among the sites are mostly homogeneous and are correlated with agricultural and urban land use categories. Mercury content in periphyton is reflected in the diatom assemblages which were found to characterize each site. Fact that diatoms do respond to this toxicant suggests that benthic algal communities are suitable for assessment of mercury contamination in aquatic ecosystems. *Gomphonema parvulum* was cosmopolitan throughout the watershed and therefore deems suitable for assessment of mercury contamination in individual diatom cells. Failure to detect mercury in *G. parvulum* via SEM-EDS suggests that the method is insensitive to presence of the element in unicellular organism or that *G. parvulum* does not bioconcentrate mercury. Cultured diatoms did not grow at  $1 \text{ ug g}^{-1}$  mercury concentration in agar (content that is very close to mercury concentration in Fish River periphyton) suggesting possible adaptation

of Fish River diatoms to mercury in the ecosystem.

**Reference Type:** Report

**Author:** O'Neil, Patrick E; Shepard, Thomas E; Mettee, Maurice F; McGregor, Stuart W

**Year:** 1994

**Title:** Results of biomonitoring in the Fish River watershed, Baldwin County, Alabama

**City:** Tuscaloosa

**Institution:** Geological Survey of Alabama

**Date:** June 17, 1994

**Keywords:** weeks bay, Fish, biomonitoring, Sampling, fish river, habitat, macroinvertebrates, bioassessment, physical

**Reference Type:** Dissertation

**Author:** Phipps, Scott Warren

**Year:** 2003

**Title:** Effect of arsenic/phosphorus interaction on benthic microalgal assemblage structure and function in an estuary

**Academic Department:** Biological Sciences

**City:** Mississippi State

**University:** Mississippi State University

**Number of Pages:** 71

**Thesis Type:** Doctor of Philosophy

**Accession Number:** Scott Phipps office

**Keywords:** benthic, sediment, diatom, arsenate, leachate

**Abstract:** Benthic (i.e., sediment-associated) diatom assemblages distributed along a gradient of riverine to marine conditions in Weeks Bay, Alabama were tested for their tolerance of arsenate, a toxic species transported to estuaries via riverine flow. Natural assemblages from riverine, estuarine, and marine sites showed no significant response to arsenate delivered via leachate devices when sediment chlorophyll a concentration was the response variable. However, generic richness and diversity were reduced at the marine site suggesting sensitivity to arsenate.

*Nitzschia quadrangula*, a nearly ubiquitous member of estuarine and marine benthic diatom assemblages, was cultured in the laboratory and found to be tolerant of arsenate, even increasing its growth relative to controls at intermediate concentrations of arsenate when the concentration of phosphate was low. A final experiment crossed arsenate with phosphate concentrations but employed *in situ* primary production of the diatom assemblages as the response variable.

Assemblages from riverine sites showed no decrease in primary production in the presence of arsenate whereas primary production at the marine site significantly decreased. Sites where phosphate was limiting to primary production in some cases showed phosphate protection from arsenate toxicity. Overall the results showed that the riverine sites, and to a lesser extent the estuarine site, were tolerant of arsenate due to their historical exposure. However, the lack of exposure of diatom assemblages at the marine site to arsenate was reflected in their sensitivity to arsenate.

**Reference Type:** Thesis

**Author:** Pisani, Kristy A.

**Year:** 2005

**Title:** Salinity tolerance in the protozoan *Hyalophysa chattoni*, an external symbiont of grass shrimp

**Academic Department:** Environmental Analysis and Management

**City:** Troy

**University:** Troy University

**Number of Pages:** 59

**Thesis Type:** Master of Science

**Accession Number:** Scott Phipps - electronic version

**Abstract:** No studies have examined the ability of apostome ciliates to acclimate to salinity fluctuations within their environment, nor is it known if salinity fluctuations influence the health, reproductive ability, or ciliature of apostomes. For this project, host shrimp, *Palaemonetes pugio*, were acclimated to artificial seawater concentrations ranging from 0.1R ppt to 55 ppt. Molted exoskeletons of the shrimp were collected in order to obtain the swimming protozoans released at ecdysis. Protozoans obtained from these shrimp were analyzed through measurement of the trophont stage, measurement of the tomont stage, assessment of tomont development, and trophont ciliature. The data indicate that trophont and tomont size are affected by salinity, with increasing size correlating to increasing salinity. Trophont and tomont measurements group into four tiers of sizes that change with salinity. Assessment of tomont development indicates a correlation between size, salinity, and reproductive success. Analysis of the ciliature of apostome trophonts indicates a statistically significant difference in ciliature when comparing the ciliates acclimated to hyposaline conditions to those acclimated to normal Weeks Bay salinity.

**Reference Type:** Book Section

**Author:** Schroeder, W. W.; Wiseman, W. J.; Dinnel, S. P.

**Year:** 1990

**Title:** Wind and river induced fluctuations in a small, shallow tributary estuary.

**Editor:** Cheng, R. T.

**Book Title:** Coastal and Estuarine Studies

**City:** New York, NY

**Volume:** 38

**Pages:** 33

**Keywords:** Weeks Bay, barotropic, tide, wind, diurnal, Fish river, Magnolia River

**Abstract:** Two years of wind and water level data and 18 months of runoff data from Weeks Bay, Alabama, a small tributary estuary of Mobile Bay have been analyzed. These data were supplemented with occasional barotropic exchange of water between Weeks Bay and Mobile Bay is predominantly a response to the shelf-estuarine exchange of waters between the Gulf of Mexico and Mobile Bay. The local north-south wind stress modifies this response at very low frequencies. Runoff to Weeks Bay is episodic and of short duration. It drives short-lived exchanges between the two bays. These exchanges are modified by the local winds and are probably strongly baroclinic.

**Note:** re NA86AA-D-CZ017 funding change made.

**Reference Type:** Book Section

**Author:** Schroeder, W. W.; Dinnel, S. P.; Wiseman, W. J.

**Year:** 1992

**Title:** Salinity Structure of a Shallow, Tributary Estuary

**Editor:** Prandle, D.

**Book Title:** Coastal and Estuarine Studies

**City:** Washington, DC

**Publisher:** American Geophysical Union

**Volume:** 40

**Pages:** 155-171

**Keywords:** tributary, salinity, Weeks Bay, barotropic, baroclinic, bathymetry, eigenvectors, stratification, fish river, Magnolia River

**Abstract:** Analysis of salinity data from 14 field surveys in Weeks Bay (Alabama, USA) indicate that the salinity regime within this shallow, tributary estuary varies significantly both temporally and spatially during low amplitude tidal periods. Horizontal salinity patterns range from near monogeneous to exhibiting strong, complex gradients both in the longitudinal and lateral axis. Vertical salinity structure encompasses combinations of well mixed to ultra-stratified (up to 14 ppt in two meters of water). This variability results principally from subtidal exchanges with the main estuary (Mobile Bay), both in the barotropic and baroclinic modes, and flashy local river runoff. At a secondary level, salinity fields can be influenced by both bathymetry, particularly deeper areas which either channel near-bottom water within the bay or impound bottom waters in scour holes or depression areas, and local winds associated with moderate to high energy events.

Excess fresh water in Weeks Bay, relative to Mobile Bay, can be accounted for by local river inflow. Weeks Bay fill time is one to four days and is dependent on the length of time since the last local freshet. A principal component analysis of stratification resulted in two dominant eigenvectors. The first describes 54% of the total variance and occurs when surface salinities are uniformly fresher than higher salinity bottom waters. The second, limited to the lower bay, describes 17% of the total variance and may indicate gravitational circulation driven by variations in riverine input to the bay.

**Reference Type:** Thesis

**Author:** Simms, Suzanne Powell

**Year:** 1989

**Title:** Establishment of National Estuarine Reserves: The Weeks Bay, Alabama case study

**Academic Department:** Recreation and Parks

**University:** Texas A & M University

**Number of Pages:** 74

**Thesis Type:** Masters of Agriculture

**Reference Type:** Report

**Author:** Stearns, Donald E.; Dardeau, Michael R.; Planchart, Antonio J.

**Year:** 1990

**Title:** Zooplankton community composition, species abundance and grazing impact in Weeks Bay, Alabama: tidal, monthly, seasonal and habitat differences.

**Institution:** Weeks Bay Estuarine Research Reserve. This work is the result of research sponsored by the U.S. Department of Commerce, National Oceanic and Atmospheric

Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under Contract number NA88AA-D-CZ031

**Pages:** 109

**Type:** NOAA Technical Memorandum

**Keywords:** zooplankton, composition, species, Weeks Bay, habitat, grazing, assemblage

**Reference Type:** Report

**Author:** Stout, Judy P

**Year:** 1987

**Title:** Emergent habitats of the Weeks Bay National Estuarine Research Reserve, Alabama. Dauphin Island Sea Lab Technical Report No. 87-004

**Institution:** Dauphin Island Sea Lab. This work is the result of research sponsored by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Ocean and Coastal Resource Management, Sanctuary Programs Division under Contract # NA86AA-D-CZ019

**Pages:** 45

**Date:** December 1987

**Report Number:** 87-004

**Keywords:** Wetland, Habitat, Weeks Bay, SPECIES, plant, type, wetlands, pitcher plant, mapping, aerial photographs, marshes, bottomland, swamps

**Reference Type:** Conference Proceedings

**Author:** Thollapalli, Ashok; April, Gary C.; Raney, Donald C.; Schroeder, William W.

**Year of Conference:** 1989

**Title:** Weeks Bay Modeling - a tool in the coastal zone

**Conference Name:** Sixth Symposium on coastal and Ocean Management/ASCE

**Conference Location:** Charleston, South Carolina

**Pages:** 3588-3600

**Date:** 07/11/89 - 07/14/89

**Keywords:** Weeks Bay, models, modeling, hydrodynamics, salinity,

**Abstract:** Results of preliminary investigations of Weeks Bay, Alabama using two dimensional models describing the hydrodynamic and conservative species (salinity) behavior are presented. Field data comparisons of salinity profiles show that model predicted results describe bay behavior under the conditions investigated. Continued studies to fine tune the models so that they can be used to analyze the complex interactions caused by tidal, river, and wind induced flows with the system are planned. A user friendly, computer graphics interface is also proposed to provide results in a more useful output form.

**Reference Type:** Thesis

**Author:** Thollapalli, Ashok; April, Gary C.; Raney, Donald C.; Schroeder, William W.

**Year:** 1990

**Title:** Computer simulation of hydrodynamic and salinity behavior of Weeks Bay, Alabama at equatorial tide conditions. BER Report No. 492-183

**Academic Department:** Chemical Engineering

**University:** The University of Alabama. This technical report contains research results obtained under the sponsorship of the United States Department of Commerce, National Oceanic and

Atmospheric Administration, Marine & Estuarine Management Division, Grant No. NA89AA-D-CZ051.

**Number of Pages:** 175

**Thesis Type:** Master of Science

**Keywords:** Weeks Bay, models, modeling, hydrodynamics, salinity,

**Reference Type:** Manuscript

**Author:** Unknown

**Year:** Unknown

**Title:** Fishes of known or probable occurrence in Weeks Bay National Estuarine Research Reserve

**Pages:** 6

**Keywords:** fish, Weeks Bay, Taxon, taxonomy, species, nekton, sharks, stingrays, sawfish, sturgeons, gar, tarpon

**Reference Type:** Report

**Author:** USDC

**Year:** 1985

**Title:** Final Environmental Impact Statement and Management Plan for the Proposed Weeks Bay National Estuarine Sanctuary

**Institution:** U. S. Department of Commerce, National Oceanic and Atmospheric Administration; and State of Alabama, Department of Economic and Community Affairs and Department of Conservation and Natural Resources

**Date:** November 1985

**Reference Type:** Thesis

**Author:** van Amerongen, Krista Kay

**Year:** 2003

**Title:** Biodiversity of the fresh water turtle community in the Weeks Bay Watershed, Baldwin County, Alabama

**Academic Department:** Biology

**City:** Mobile, AL

**University:** University of South Alabama

**Number of Pages:** 153

**Thesis Type:** Master of Science

**Accession Number:** Scott has hardcopy in his office

**Keywords:** terrapin

**Abstract:** Adjacent to the Mobile Bay in Southern Baldwin County, the Weeks Bay estuary provides a variety of aquatic habitats for resident turtle species. This study was designed to assess the biodiversity of the fresh water turtle community and to estimate the relative densities of each species. Trapping extended from 28 May 1999 to 4 August 2000. Turtles were collected using aquatic hoop traps on each end of a 12-m interior lead net. Turtles were collected using aquatic hoops traps on each end of a 12-m interior lead net. There were a total of 1004 turtle, representing 8 species, captures with *Pseudemys concinna* (River cooters) made up 17.2%, and the endangered *Pseudemys alabamensis* (Alabama red-bellied turtles) made up 20.1% of the community. The remaining 4.7% consisted of *Deirochelys reticularia* (Chicken turtles), *Apalone*

*spinifera* (Spiny softshell turtles), *Chelydra serpentina* (Common snapping turtles), and *Macrolemys temminckii* (Alligator snapping turtles). A total of 238 turtles, representing six different species, were recaptured. Three turtle species had significant recapture rates: *P. alabamensis* (14%), *P. concinna* (26.5%), and *P. floridana* (21%). Population estimates for these three species are presented using the Schnabel calculation method.

**Reference Type:** Report

**Author:** WBNERR

**Year:** 1995

**Title:** Summary of fecal coliform monitoring on Fish River.

**Institution:** Weeks Bay NERR

Alabama Department of Environmental Management, Mobile Field Office

**Pages:** 13

**Date:** May 15, 1995

**Keywords:** fecal coliform, pathogens, Weeks Bay, streptococci, Salmonella, Fish River, contamination

**Reference Type:** Report

**Author:** WBNERR

**Year:** 1996

**Title:** Summary of fecal coliform monitoring on Fish River; May 15, 1995-October 10, 1996.

**City:** Fairhope

**Institution:** Weeks Bay National Estuarine Research Reserve in cooperation with Alabama Department of Environmental Management, Mobile Field Office.

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** WBWP

**Year:** 1997

**Title:** Annual Report - for period between October 1, 1996-September 30, 1997.

**City:** Fairhope

**Institution:** Weeks Bay Watershed Project; submitted by Tina Lynn, Project Coordinator

**Pages:** 34

**Abstract:** This report is submitted as a requirement of the FY94 Workplan, Component 1 Task 1a, 1. This report includes plans, accomplishments, and program needs as identified between October 1, 1996-September 30, 1997.

**Reference Type:** Report

**Author:** WBWP

**Year:** 1998

**Title:** Management Plan Preface and Protection Strategies

**City:** Fairhope

**Institution:** Weeks Bay Watershed Project

**Date:** April 29

**Keywords:** Weeks Bay, Fish river, sampling, temperature, ph, dissolved oxygen, fecal coliform, flow, conductance, depth, best management practices, biological, soil, sediment, streptococcus, Biochemical oxygen demand, dissolved solids, nitrogen, phosphorus, turbidity, suspended solids, macroinvertebrates, invertebrates, habitat, fish, nekton, data analysis

**Reference Type:** Report

**Author:** WBWP

**Year:** 1998

**Title:** Annual Report - for period between October 1, 1997-September 30, 1998.

**City:** Fairhope

**Institution:** Weeks Bay Watershed Project; submitted by Eve Brantley, Project Coordinator

**Abstract:** This report is submitted as a requirement of the FY95 Workplan, Component 1 Task 2. This report includes plans, accomplishments, and program needs as identified between October 1, 1997-September 30, 1998.

**Reference Type:** Report

**Author:** WBWP

**Year:** 1999

**Title:** Annual Report - for period between October 1, 1998-September 30, 1999.

**City:** Fairhope

**Institution:** Weeks Bay Watershed Project; submitted by Eve Brantley, Project Coordinator

**Abstract:** This report includes plans and accomplishments under Watershed Project FY95 Grant. Submitted by Eve Brantley, Project Coordinator - for the period between October 1, 1998-September 30, 1999.

**Reference Type:** Report

**Author:** WBWP

**Year:** 2003

**Title:** Weeks Bay Watershed Project, Semi-Annual Report

**City:** Fairhope

**Institution:** Weeks Bay Watershed Project; submitted by Michael Shelton, Project Coordinator

**Pages:** 15

**Abstract:** This report includes plans and accomplishments under Watershed Project Grant. Submitted by Michael Shelton, Project Coordinator - for the period between October 1, 2002-March 31, 2003.

**Reference Type:** Report

**Author:** Wolfe, Dana L.; Haywick, Doug W

**Year:** 1995

**Title:** Rock Lithification at Magnolia Springs. Occasional Report No.2 to the Weeks Bay National Estuarine Research Reserve

**Institution:** University of South Alabama, Department of Geology and Geography

**Pages:** 35

**Report Number:** Occasional Report No.2 to the Weeks Bay National Estuarine Research Reserve

**Keywords:** Magnolia River, Magnolia springs, Lithification, limonite, hematite, phreatic, vadose, cementation, sediment, petrography

**Abstract:** Magnolia Springs is located adjacent to the Magnolia River in Baldwin County, Alabama. Lithification of quartz arenite sediment occurs in isolated areas. Cements consist of two generations: 1) isopachous limonite and 2) meniscus/isopachous hematite. Petrographically, the sediment is no different than unconsolidated sediments adjacent to the river. Cementation is, therefore, not controlled by grain size or porosity. Instead, cementation at Magnolia Springs is likely due to ground water percolation over an imperious layer. The transition from limonite to hematite signifies a change in chemical environment from hydrolysis (limonite) to oxidation (hematite). This probably is related to the transition from phreatic to vadose diagenesis.

The goal of the Coastal Training Program (CTP) is to improve decision-making related to coastal resource management in Alabama.



Community Culture & the Environment: Understanding a "Sense of Place" Workshop  
Wehle Center - January 2005



The Application of Water Level and Datum Information to Coastal Zone Management Workshop  
Weeks Bay Reserve Auditorium & in the Tensaw Delta  
- August 2004-



Managing the Impacts of Residential Docks and Piers in MS & AL  
Gautier Convention Center - February 2006



CTP Target audiences include:

- ❖ elected officials
- ❖ public works staff
- ❖ Planners
- ❖ Engineers
- ❖ volunteers on decision-making boards
- ❖ and others.

The key estuarine and coastal issues to be addressed are:

- ❖ reduction of non-point source pollution
- ❖ land use management practices
- ❖ protection of water resources
- ❖ preservation of biodiversity
- ❖ management of invasive species



Community Leader Wastewater Training  
Daphne Utilities Water Reclamation Facility - August 2005



Community Leader Training:  
Understanding the NEW Health Department Onsite Sewage Treatment and Disposal Rules  
March 16, 2006—Robertsdale, AL & March 17—Mobile, AL



<http://www.coastaltraining-AL.com>

Coastal Training Program objectives are to:

Provide the most current science-based information, tools, and techniques to decision-makers about natural resources in our area.

Enhance effective networking and collaboration across sectors and disciplines, and within the Reserve System on relevant coastal management issues.

Enhance understanding of the social, economic, and environmental impacts of human activity and promote stewardship within the coastal landscape.

Apply adaptive management strategies on existing and emerging issues in the CTP and on coastal management agendas.

**Cheryl D. McClary, Coastal Training Program Coordinator and document Editor**  
([Cheryl.McClary@dnr.alabama.gov](mailto:Cheryl.McClary@dnr.alabama.gov)).

Cheryl is currently a Doctoral Candidate in the Anthropology Department at the University of Georgia. Her professional foci are *ethnoecology* (the study of how knowledge systems about the environment are acquired, understood, and used) and the *anthropology of water*. She has a M.A. in Cultural Anthropology from Northern Arizona University and a B.S. in Business Administration (accounting major) from Auburn University. Her previous research projects focused on community-based forestry issues in the Southeast; the evolution of environmental ideology, identity, and action in western North Carolina; Native American hunting and fishing subsistence practices in Interior Alaska; and the effects of residential lawn care practices on Atlanta suburban watersheds.



Please visit the website to learn about upcoming CTP and regional training events:

**<http://www.coastaltraining-AL.com>**

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Office of Ocean and Coastal Resource Management.*

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Office of Ocean and Coastal Resource Management.*