



BEAUFORT COUNTY
STORMWATER MANAGEMENT UTILITY BOARD

Wednesday, June 5, 2013

2:00 p.m.

Beaufort Industrial Village, Building 2 Conference Room

102 Industrial Village Road, Beaufort

843.255.2801

In accordance with South Carolina Code of Laws, 1976, as amended, Section 30-4-80(d), all local media was duly notified of the time, date, place and agenda of this meeting.

1. CALL TO ORDER – 2:00 p.m.
 - A. Approval of Agenda ([backup](#))
 - B. Approval of Minutes – May 1, 2013 ([backup](#))
2. INTRODUCTIONS
3. PUBLIC COMMENT
4. REPORTS
 - A. Monitoring Update – Bob Klink
 - B. Utility Update – Bob Klink
 - Grant awarded to SCDNR ([backup](#))
 - Next Webcast ([backup](#))
 - C. Upcoming Professional Contracts Report – Rob McFee
 - D. Financial Report – Alan Eisenman ([backup](#))
 - E. Maintenance Project Report – Eddie Bellamy ([backup](#))
 - F. Stormwater Manager (Status) – Rob McFee
5. UNFINISHED BUSINESS
 - A. Regional Coordination – Rob McFee
6. NEW BUSINESS
7. PUBLIC COMMENT
8. NEXT MEETING AGENDA
 - A. July 3, 2013 ([backup](#))
9. ADJOURNMENT



Beaufort County Stormwater Management Utility Board (SWMU Board)
Meeting Minutes

May 1, 2013 at 2:00 p.m. in Beaufort Industrial Village Building #2 Conference Room
Draft May 10, 2013

Board Members

Present	Absent
Don Smith	Allyn Schneider
James Fargher	
Donald Cammerata	
John Youmans	
William Bruggeman	
Patrick Mitchell	

Ex-Officio Members

Present	Absent
Andy Kinghorn	Ron Bullman
	Scott Liggett
	Tony Maglione

Beaufort County Staff

Carolyn Wallace
Robert Klink
Eddie Bellamy
Alan Eisenman

Visitors

Reed Armstrong, Coastal Conservation League

1. Meeting called to order – Don Smith

- A. Agenda approved.
- B. March 6, 2013 and April 3, 2013 Minutes were approved as posted.

2. Introductions – Completed.

3. Public Comment – None.

4. Reports –

- A. **Monitoring Update** – Bob Klink: Monitoring meeting was held March 26, 2013 at 1:30pm in the PW conference room. Following are the highlights reported from the meeting:
 - Okatie East wetland enhancement project permits are almost in place.
 - Developed open water copper sampling protocol with SCDHEC and GEL Engineering. Danny Polk, assisted by personnel from USCB, did collect a sample.
 - The MOU with USCB to create the water quality lab has been signed and GEL Engineering has been helpful to USCB in coordinating the purchase of lab equipment
 - Danny Polk to meet with Dr. Badr to address some issues to move the water budget study along.
 - Next monitoring meeting is May 28, 2013 at 1:30pm in the PW conference room.
- B. **Utility Updates** –
 - Bob Klink: During the widening of Hwy 278, the county has the opportunity to install volume control structures in four locations. This is a state project but the county has taken it

upon them to bring this project in to compliance with the county's volume control requirements.

- Bob Klink: Next stormwater webcast titled "Please come Audit My MS4" will be May 15, 2013 from 12 noon until 2:00pm in the BIV #2 conference room.

C. Upcoming Professional Contracts Report – Bob Klink: There are no additional engineering contracts that are being proposed or being developed.

D. Financial Reports – Alan Eisenman: Mr. Eisenman presented the un-audited March interim financial statements for the Stormwater Utility. Following are the highlights from his presentation:

- Revenues are a little lower (a net of \$40K) compared to last year this time.
- Expenses are also lower compared to last year. Mr. Eisenman contributed this to fewer projects and fewer personnel. Mr. Bellamy explained some of the dynamics that have caused fewer major projects being constructed.

E. Maintenance Projects Report – Eddie Bellamy: Mr. Bellamy reported on (4) major projects: Ogden Court Outfall, Sanders/St. Helena Island Post Office, Browns Island Road/Stroup Road, and Joe Allen Drive/Patterson Road. He also presented (17) minor and/or routine maintenance projects in a shortened format.

F. Stormwater Manager Status – No report.

5. Unfinished Business –

A. Regional Coordination – No report.

6. New Business – None.

7. Public Comment – None.

8. Next Meeting Agenda – Mr. Rob McFee was not present at the meeting to report on the status on filling the vacant Stormwater Manager's position. This agenda item will be added to the proposed June agenda. The next agenda was approved with this addition.

9. Meeting Adjourned.

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Title Page Form**

Proposal title: Collaborative Research to Prioritize and Model the Runoff Volume Sensitivities of Tidal Headwaters

Project duration: One year

Total funds requested: \$284,316

Project coordinator: Dr. John W. Leffler

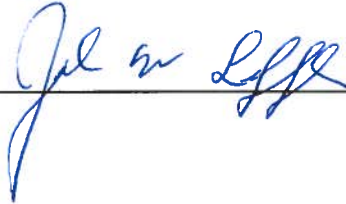
Position and affiliation: ACE Basin NERR Research Coordinator, Marine Resources Research Institute, South Carolina Department of Natural Resources

Address: 217 Ft. Johnson Rd., Charleston, SC 29412

Phone: 843-953-3903

Email: LefflerJ@dnr.sc.gov

Project coordinator signature: _____



Date: April 12, 2013

Fiscal agent: Dr. John W. Leffler

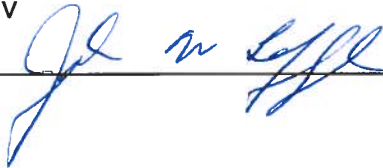
Position and affiliation: Manager, Manager, Sustainable Mariculture/Crustacean Monitoring/ACE Basin Section, Marine Resources Research Institute, South Carolina Department of Natural Resources

Address: 217 Ft. Johnson Rd., Charleston, SC 29412

Phone: 843-953-3903

Email: LefflerJ@dnr.sc.gov

Fiscal agent signature: _____



Date: April 12, 2013

NERRS site(s) involved in this proposal: ACE Basin NERR

**Please Note: The Contents of this proposal are CONFIDENTIAL!
All information contained herein is considered confidential; this information shall not be duplicated, used, or disclosed in whole or in part for any purpose other than the evaluation of this application.**

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Title Page Form, Continued**

Additional project team member: April Turner

Role on project: Collaboration Lead

Position and affiliation: Coastal Communities Specialist, S.C. Sea Grant Consortium

Address: 287 Meeting Street Charleston, SC 29401

Phone: 843-953-2078

Email: April.Turner@scseagrant.org

Additional project team member: Dr. Denise Sanger

Role on project: Applied Science Lead

Position and affiliation: Manager, Environmental Research Section, Marine Resources Research Institute, South Carolina Department of Natural Resources

Address: 217 Ft. Johnson Rd., Charleston, SC 29412

Phone: 843- 953-9074

Email: SangerD@dnr.sc.gov

Additional project team member: Daniel B. Ahern

Role on project: Intended User Representative

Position and affiliation: Stormwater Utility Manager, Beaufort County, SC

Address: 134 Fuller St., Beaufort, SC 29902

Phone: 843-255-2805 Office; 843-812-7570 Cell

Email: dahern@bcgov.net; ahern2@earthlink.net

Additional project team member: Anne C. Blair

Role on project: Science Investigator (hydrological modeling)

Position and affiliation: Research Scientist, National Oceanic and Atmospheric Administration, National Ocean Service, National Centers for Coastal Ocean Science, Hollings Marine Laboratory

Address: 331 Fort Johnson Road, Charleston, SC 29412

Phone: (843) 762-8992

Email: Anne.Blair@noaa.gov

Additional project team member: Dr. Eric W. Montie

Role on project: Science Investigator (salinity monitoring)

Position and affiliation: Assistant Professor, Department of Natural Sciences, University of South Carolina Beaufort

Address: One University Blvd., Bluffton, SC 29909

Phone: 843-208-8107

Email: emontie@uscb.edu

B. Proposal Narrative

1. Coastal Management Problem

Non-point source pollution from stormwater runoff associated with rapid coastal human population growth and large-scale land use changes threaten the integrity of ecologically and economically valuable estuarine ecosystems worldwide. Climate change is expected to exacerbate these stormwater problems (Karl *et al.* 2009). A portion of the ACE Basin lies within Beaufort County (BC), South Carolina, a community very concerned about the threat of stormwater degrading its estuarine environments, a challenge that figures prominently in its Comprehensive Plan, local media, and government affairs (Van Dolah *et al.* 2000, Island Packet 2001, Beaufort County 2007, Pollack and Walker Szivak 2007, Town of Bluffton 2008). This concern is also cited as a priority for the ACE Basin NERR in its 2011-2016 Management Plan and its Coastal Training Program (CTP) Strategic Plan (Maier 2010, Walker 2010). The Reserve has been actively involved with BC in addressing stormwater issues through its CTP and Stewardship activities. BC's rapid growth (83% between 1990 and 2006 and an additional 70% increase expected through 2025) makes it particularly susceptible to environmental degradation from stormwater runoff (Beaufort County 2007). The local population is particularly concerned that, in addition to runoff transporting biological and chemical contaminants, the "flashiness" of salinity changes due to stormwater influx of freshwater negatively impacts larval recruitment and survival of shellfish, crustaceans, and fish in the marshes. The health of these fishery resources is of the highest priority for local residents and rapid salinity changes are considered locally to be as much a problem as contaminants or nutrient enrichment (Barber 2008, Town of Bluffton 2008).

The County has modified its stormwater requirements to include water quantity (runoff volume) within their Best Management Practices (BMP) manual in addition to water quality (Ahern *et al.* 2012). The County's rationale is that reducing the runoff of stormwater into estuaries results in fewer bacterial, nutrient, and chemical contaminants as well as less rapid salinity changes (J.R. McFee, County Engineering and Infrastructure Director, personal communication). BC has implemented some of the toughest regulations in the country, which may serve as a model for coastal communities nationally. Within specifically identified "volume sensitive" watersheds they will require that all stormwater be retained on site through a variety of Low Impact Development (LID) approaches (the proposed project will integrate well with an existing ACE Basin NERR Science Collaborative project that is developing a regional LID manual).

Three barriers have been identified by the Intended User group which invited us to partner with them. A significant barrier to implementing BC's volume control plan is the lack of credible scientific data (1) necessary to identify those watersheds and portions of creeks which are most sensitive to stormwater runoff. BC's stormwater standards have been contentious at times considering the financial impact to developers and property owners. BC officials understand the importance of high-quality data collected by unbiased, respected entities for developing science-based management policies (D. Ahern, personal communication).

Recognizing another barrier, that it lacks the internal capacity (2) to conduct the necessary studies, early in 2012, the BC Stormwater Management Utility (Utility) approached the South Carolina Department of Natural Resources (SCDNR), the ACE Basin NERR, and the University of South Carolina at Beaufort (USCB) with a request to help it identify specific “volume sensitive” waters, based upon scientifically rigorous data, so that the most austere regulations could be applied to those areas. A 5-year cooperative Memorandum of Understanding (the Agreement) among BC, SCDNR, USCB, and the Town of Bluffton (TB) was developed and approved by County Council with a commitment of funds (~\$25K/year) to begin the process of both identifying these watersheds and assessing whether the observed levels of salinity “flashiness” in tidal creeks negatively impact key fishery resources. The level at which these funds can be allocated represents a final significant barrier (3) in that it will take at least five years to obtain the desired data. This constraint on funding means that only one or two creek systems per year can be assessed. It would also mean that these critical, user-prioritized watersheds would be monitored in different years, making side-by-side volume sensitivity rankings more complicated. The requested funds from this proposal would provide BC with the data they need in order to address policy in a timely manner. The data would be available for incorporation into their next Stormwater Management Plan (2016-2026) which they must develop and approve in the next few years. Under the current Agreement and work schedule the data will not be available in time for inclusion in this Plan.

A reviewer requested more information about the cooperative Agreement among BC, SCDNR, USCB, and TB referred to above. A Memorandum of Understanding was created in August 2012 and signed by all parties. It establishes an “...Intergovernmental Agreement...” to “...define and implement environmental initiatives related to the protection of Beaufort County Watersheds and other outstanding natural resources.” The Parties agreed to...

“Formulate a Joint Project to assess the relationship between rainfall and salinity range in priority watersheds. It is the intent of the parties that this agreement will act as an umbrella for annual work plans that will assess the relationship to see if there is a way to prioritize our tidal headwaters as to their runoff volume sensitivity:

- a. Coordinate monitoring in three priority watersheds
 - i. May River
 - ii. Okatie River
 - iii. Battery Creek
- b. Develop annual monitoring plans that all parties will help develop;
- c. Coordinate activities to track impact of proposed restoration projects;
- d. Determine if there is a way to prioritize creeks by volume sensitive waters;
- e. Coordinate monitoring activities to reflect ongoing studies;
- f. Share research being conducted by USCB and SCDNR-MRD Mariculture Center;”

“Term. The term of this Intergovernmental Agreement shall be from September 1, 2012 for a period of no more than 5 years.”

In our pre-proposal, we originally cited six barriers. As the reviewers very correctly pointed out, three of these barriers concerned political, economic, and ideological perspectives that this study was never designed to address, perspectives in fact which may not be altered by scientific data. While it is true that such barriers exist, at this stage those are the concerns of the BC elected and appointed officials. The data that we will collect will enable those officials to make sound, science-based policy decisions and overcome the three barriers this revised proposal now addresses. Given the five year Agreement with BC, we may in the future be called upon to assist in addressing those barriers through outreach and education efforts. However, that assistance has not been requested by our Intended Users who have the responsibility to establish policy for managing stormwater in the county and its municipalities.

The immediate end users impacted by this problem are the Beaufort County Council elected officials, the Council-appointed Stormwater Management Utility Advisory Board (Advisory Board) volunteers who represent each legal jurisdiction of the County, and the Stormwater Management Utility (Utility) and Engineering Division professional staff, all of whom are charged with managing stormwater within BC. In addition we will work with the Beaufort County Stormwater Management Implementation Committee (Implementation Committee), a group of engineers, professional staff, and officials representing each of the municipalities within the County and who are charged with addressing the technical issues associated with stormwater management and supporting the Advisory Board. All of these entities are insistent on strong scientific justification for any major revamping of stormwater policies. Coastal municipalities throughout South Carolina and the Southeast are all faced with similar challenges and are watching BC's experience with implementing strict volume control ordinances.

Because of the existing Agreement with the County and the cooperative efforts over several years that preceded it, this proposed project is just one stage on a trajectory of collaboration between SCDNR and USCB researchers and a variety of BC Intended Users. The proposed work is already planned as a result of the initiation and guidance provided by various BC officials and has been formalized by an executed Agreement. The proposed project can thus "hit the ground running" with further consultations and preparations starting immediately upon grant notification before funds are even received. The existence of the Agreement also ensures that work on this project, especially additional fine-tuning data collection, data analysis, interpretation, translation, and dissemination will continue at least 3 years beyond completion of the requested grant itself.

2. Project Overview

The goal of the project is to address the three barriers to implementation of effective stormwater management policies (RFP Focus Area #3) for Intended User-identified watersheds through the acquisition of rigorous science-based supporting data. The Intended User audiences for this project are the specific councils, committees, and professional staff recognized above, i.e. those governmental entities charged with developing and implementing stormwater management policies. Much of the initial

collaboration has already occurred through multiple meetings with these entities and individuals over the past three years and collaborative research is ongoing. This is best evidenced through the development and implementation of the Agreement which not only outlines the scope of the work, but identifies three of the specific watersheds in which the research is to be done. All of the collected data will be shared and interpreted with these officials and staff, who have already envisioned how the requested information will be translated into policy development and modifications. We will work especially closely with the Utility and Implementation Committee because these professionals can provide technical input for suggested locations, watershed-specific information for the modeling work, and are best able to interpret our results in terms of the existing stormwater engineering structures found in each watershed. SCDNR and USCB are viewed as credible collectors of unbiased, rigorous scientific data and legitimate partners by these Intended Users as evidenced by the fact that the Agreement was initiated by the County and that cooperative research with SCDNR and USCB is one of BC's Top Ten External Goals for 2012 (D. Ahern, presentation made to Agreement partners on April 11, 2012).

Specifically the project will answer the following questions:

1. Can the major watersheds in the County be prioritized based on the extent and severity of volume sensitive waters? Working in partnership with the Utility and Implementation Committee, SCDNR and USCB will monitor rainfall and salinity responses in the drainages of five watersheds of critical interest to BC. The resulting profiles will define how these waters respond seasonally and tidally to rain events and the extent of the impact downstream until it is attenuated. These profiles will permit BC to rank its watersheds in terms of volume sensitive areas and to focus policy and regulatory decisions on those locations that are most critical. Acquisition of data for these rankings within the same one year period addresses the three barriers cited above.

2. How will these critical volume sensitive waters respond to implementation of volume control BMPs and to possible climate change scenarios? A partnering scientist at the NOAA-NCCOS Hollings Marine Laboratory (HML) will incorporate the rainfall data into a stormwater runoff model for projecting expected changes in stormwater runoff due to changing BMPs and precipitation patterns (Blair *et al.* 2012). This model has been developed specifically for the soils and topography found in coastal South Carolina. The results will provide BC officials and professional staff with projections of the effect implementation of different stormwater management policies will have on the identified volume sensitive watersheds. The model will also evaluate the impacts on these watersheds of altered precipitation patterns projected by various climate change scenarios. While not necessarily required to address the three identified barriers, this value-added component is welcomed by the Intended Users as a tool to help them evaluate possible engineered retrofits for priority watersheds. This forward-thinking community also wishes to design its stormwater management policies to be robust in light of possible future climate alterations.

Our original pre-proposal also included laboratory-based bioassay work to evaluate the impact of rapid and intense salinity changes on certain recreationally and commercially important estuarine organisms. Reviewers questioned whether this work was reasonable to accomplish within one year. Upon further reflection we agree that given the complexities of breeding and raising experimental organisms, such work probably should not be constrained by a one year time frame. Although our current Intended Users are interested in such research, it is not as immediate a concern and was always planned in the Agreement to be tackled after the field work was completed. We believe it will be more important to focus all of our personnel on the field and modeling work this coming year to ensure the best data collection and interpretations possible. The field data can then be used to better inform the bioassay evaluations, funding for which will be sought through future funding requests for proposals.

3. Collaborative Objectives and Methods

Three primary objectives are proposed for the collaborative component.

1. Ensure that the volunteer members of the Advisory Board, who must endorse all stormwater management policy taken before BC Council, thoroughly understand the research they have previously endorsed, are well informed as the project progresses, and are likely to embrace the results of the studies.
2. Engage the engineers and professional staff of the Utility and Implementation Committee for advice and assistance in additional watershed selection, specific site locations, interpretation of results, site-specific modeling modifications, synthesis of results, and translation of results for the Intended User community charged with policy development.
3. Enable community groups that routinely work with elected officials and professional staff on local environmental issues to understand and disseminate the results and analyses generated by this project.

To achieve these objectives we propose to work with multiple Intended Users depending on the objective. A range of collaborative learning and decision-making processes have been developed for successful integration of science in decision making (e.g., Jacobs 2002, Karl *et al.* 2007, RATF 2007, Feurt 2008). To undertake these objectives, we chose the six-step Joint Fact Finding (JFF) process developed by the Consensus Building Institute after carefully evaluating the specific barriers to stormwater management upon which this project will focus. The six steps are 1) Preparing, 2) Scoping, 3) Defining appropriate processes, 4) Conducting, 5) Evaluation, and 6) Communicating. The structured, sequential approach of this process appropriately balances science, politics, and other perspectives while advancing the process of obtaining scientific data to inform specific environmental decision-making efforts (Karl *et al.* 2007). These efforts are designed to overcome the shortcomings of science and management interactions. Doing so will ensure that the management community understands the potential breadth, limitations, assumptions, and outcomes

of the project, as identified in a number of published case studies (e.g., Choi *et al.* 2003, Jacobs *et al.* 2005, Dreelin and Rose 2008, Saliba and Jacobs 2008). Objective 2 will follow the entire JFF process whereas Objectives 1 and 3 will focus primarily on JFF steps 2 (Scoping) and 6 (Communicating).

Objective 1: In Beaufort County, the Advisory Board has the primary responsibility for overseeing stormwater management in the County. The Board is made up of appointed representatives from all areas of the County. These individuals come from a range of backgrounds representing the diversity of the County's economic and social interests. The fundamentals of this proposal were presented to the Advisory Board on January 9, 2013 as a possible expansion of the previously approved Agreement. Discussion within the Advisory Board had been ongoing for well over a year and it had authorized the priority watersheds specified in the Agreement. The concept of developing this proposal received an enthusiastic resolution of endorsement. As a result, JFF Steps 1 and 2 have already occurred. Upon notification that this grant will be awarded, prior to the actual transfer of funds we will seek a meeting with the Advisory Board to inform its members and answer questions about how the project will proceed. Whenever possible to minimize the number of meetings Advisory Board members are asked to attend, the project team will request time on the agenda of one of the Board's regularly scheduled meetings. This first meeting with an Intended User will be a revisiting of the Step 2-Scoping process. Advisory Board comments and suggestions might provide additional useful information to incorporate into watershed (beyond those specified in the Agreement) and site selection (Step 3). We have spoken before the Advisory Board previously. The meeting format is that of a committee hearing, where the proceedings are televised on the County government's public television channel and facilitated by the Board's Chair with the assistance of the director of the Utility. At the end of this one-year project, we anticipate meeting with the Advisory Board again to report on the research results (JFF Step 6-Communicating). In addition to this formal meeting, the Advisory Board will be kept informed throughout the year by the Utility director and by the Implementation Committee.

Objective 2: The Advisory Board is supported by the Implementation Committee which is comprised of professional stormwater management staff from each of the municipalities who meet together regularly. This group provides more technical expertise and support to the Advisory Board members. We propose to work primarily with the Implementation Committee and the Utility because these groups are most directly involved with the barriers this project addresses. All results, analyses, and conclusions from our studies must be vetted and endorsed by these individuals in order to be recommended to the Advisory Board, and ultimately to BC Council and the broader public. The initial steps of the JFF process have already occurred with the Utility (endorsed by the Advisory Board and the County Administrator who is signatory to the Agreement) prior to and throughout the formation of this proposal. This is evidenced by a series of meetings and discussions over the last year and the existence of the current cooperative Agreement through which the identification of the management question, identification of knowledge gaps and discussion of research methods were established. In addition to the groundwork already in place, we will revisit

Step 1-Preparing, Step 2-Scoping, and Step 3-Defining appropriate processes during the first workshop with the Implementation Committee.

Again, cognizant of the one year time frame of this project, we will arrange a workshop with the Implementation Committee immediately upon notification that this grant has been awarded. The purpose of this workshop will be to provide Implementation Committee members with an overview of the project and engage participants in facilitated discussions about various key aspects of the study to garner input from this critically important Intended User group. Beginning with a presentation outlining the proposed study design, the workshop objectives will be to discuss: (1) the proposed study creeks and selection of the fifth creek; (2) the merits of the proposed sampling sites within each creek; (3) the stormwater modeling methodology; and (4) local data sources and insights into the watershed systems that members of this committee manage.

Although three watersheds have been specified in the Agreement, one of these (Battery Creek) is actually two subwatersheds. We have discussed several options for the possible fifth watershed with the Utility, but have decided to let the Implementation Committee guide us in its selection and to prioritize additional systems for future work. This initial, and all future workshops with the Implementation Committee will be organized and facilitated by our Collaboration Lead, April Turner. During her twelve years as the South Carolina Sea Grant Coastal Communities Extension Specialist, Ms. Turner has designed and conducted multi-criteria decision-making workshops for diverse stakeholders and is skilled at managing meetings to ensure that all participants have the opportunity to express their perspectives, and that those perspectives are accurately heard and incorporated by the other participants. The project team looks forward to this level of input from the local stormwater management experts, especially in regard to the technicalities of siting the specific stations and the unique hydrological characteristics of the different watersheds.

Conducting the actual study (Step 4) will involve at least one mid-term workshop with the Implementation Committee to review the data collected to date and to seek their help in interpreting the results. Not only are we concerned about the idiosyncrasies of the dynamics of the monitored water basins, but we particularly need their knowledge of the local soils and anthropogenic modifications to the natural hydrological flows. This information will be vital for the stormwater runoff modeling component of this project at this stage.

A final workshop will be held with the Implementation Committee during the last month of the project to focus on evaluation (Step 5). The objectives of this workshop will be to discuss (1) the findings to date regarding the ranking of the priority watersheds by volume sensitivity, including our levels of uncertainty; (2) the utility of the stormwater runoff model for evaluating potential management implications that instituting various levels of water retention regulations on different watersheds might produce; and (3) the model projections of the impacts that various climate change scenarios might have on stormwater management. During the facilitation process it is essential that the

limitations and uncertainty levels associated with the data-based conclusions are clear to all participants. This involves communication (Step 6) to ensure that the analyses are clearly presented, thoroughly dissected by the professionals of the Implementation Committee, and digested by all parties involved with the workshop. In turn, the representatives of the various municipalities forming the Implementation Committee will be able to clearly communicate the project results to their constituencies and to the Advisory Board. In an effort to get maximum participation from committee members without overloading their schedules the project team will endeavor to organize these workshops around regularly scheduled Implementation Committee meetings - either as part of the formal meeting agenda or as an extended session.

Objective 3: Following each of the workshops with the Implementation Committee and an opportunity to incorporate their suggestions and knowledge into the research effort, we plan to communicate (Step 6) with several select community organizations (e.g., The Port Royal Sound Foundation, May River Watershed Action Plan Committee) so that they understand and may embrace the research conclusions resulting from this project. The goal of the meetings with to these volunteer and grassroots organizations will be to provide the scope (Step 2) of the proposed study, ensuring that the limitations, uncertainties, and potential outcomes are understood. These communities can assist in the further communication (Step 6) of the study and the eventual potential for developing policy changes. The Port Royal Sound Foundation and the May River Watershed Action Plan Committee are the groups identified because they actively interact and generally cooperate with BC and local municipal governments on environmental issues of high community concern. Robert McFee, director of the Engineering and Infrastructure Division of BC (which includes the Utility), suggested that we involve these specific groups and keep them abreast of the progress we make with this research. We have strong supporters (e.g. the ACE Basin NERR Stewardship Coordinator) involved within each of these groups and would like to interact with this Intended User group more extensively; however, the time constraints of a one-year project makes it impractical to have more than a limited level of engagement during the scope of this project. Therefore, the project team will engage these groups in a less formal capacity, through individual interaction, cultivating relationships and disseminating information to increase their awareness of the research currently underway.

We anticipate visiting with these organizations individually during their periodically scheduled meetings in the fall to primarily describe the scope and design of the project, including the suggestions incorporated from the first Implementation Committee workshop. Although likely invited to attend these meetings as presenters, we will seek to elicit additional suggestions and knowledge of local watershed conditions from members of these organizations, which can be further incorporated into our sampling regime and modeling considerations. Throughout the project duration we would also encourage them to attend the Advisory Board meetings to learn the status of project results, such as the prioritization of volume sensitive watersheds, the runoff model predictions regarding potential stormwater management retrofits, volume encumbrances, and possible implications of climate changes on stormwater entering

the studied watersheds. At this venue members of community organizations would be informed about future efforts related to the Agreement, and the project team would continue to encourage discussion and seek input that may further inform the interpretations of the collected data.

The project team anticipates that this three objective plan will create a forum for discussing future research and management needs including additional workshops outside the time frame of this grant, to target audiences. The ultimate goal will be to ensure that this information will be communicated and that policy changes might be implemented. Funding through the existing Agreement will ensure that these steps continue for at least three years following conclusion of the Science Collaborative funding.

The level of engagement with the different target audiences varies. All of the interactions with the Utility have been highly collaborative. Dan Ahern, manager of the Utility, approached the ACE Basin NERR and SCDNR for assistance with this stormwater management question. He arranged multiple meetings, some of which included the County Administrator and other County officials, and engaged the Advisory Board in support of developing the current Agreement. These Intended Users formulated the questions and identified the specific watersheds that they deemed priorities. Further engagement with the Implementation Committee and the community organizations will occur as the direct result of recommendations from Utility personnel. Interactions with the Implementation Committee will be highly collaborative as the committee will select the fifth tidal creek system to be studied, will provide considerable amounts of specific, local data necessary for the modeling component, and will utilize the expertise of its members in helping to analyze and interpret the results of the collected data. On the other hand, meetings with the Advisory Board and the community organizations will be more consultative in nature. While specific suggestions from these groups will be solicited and incorporated into the project as appropriate, the major function is to ensure that they are well informed about the process and methods so that they will be better able to understand, accept, and utilize the results. These groups will be very important in advancing policy modifications within the County and in educating citizens.

4. Applied Science Objectives and Methods

Two primary objectives are proposed for the applied science component.

1. Assess the relationship between rainfall and salinity range throughout the length of tidal creeks in BC-selected watersheds in order to define what size water bodies and which particular watersheds are most volume sensitive.
2. Project the potential impacts that implementation of volume control BMPs and changing precipitation patterns might have on salinity range in priority watersheds.

Achieving these objectives will address the barriers identified in the Coastal Problem section and begin to answer the two questions discussed in the Project Overview section.

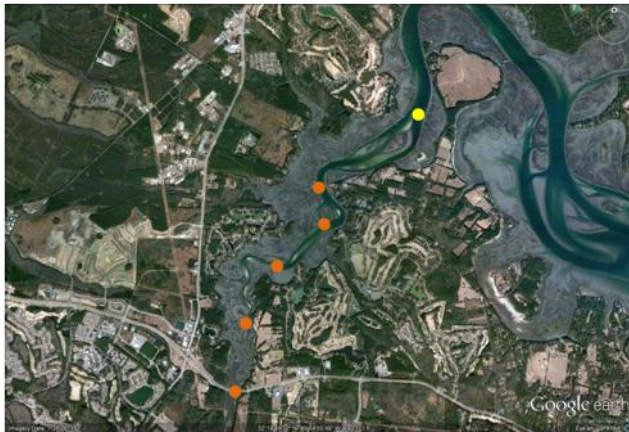


Figure 1. Approximate salinity monitoring locations for the Okatie River. Orange dots indicate SCDHEC-restricted shellfish harvesting waters as of 2011. Yellow dots indicate waters open for shellfish harvesting.

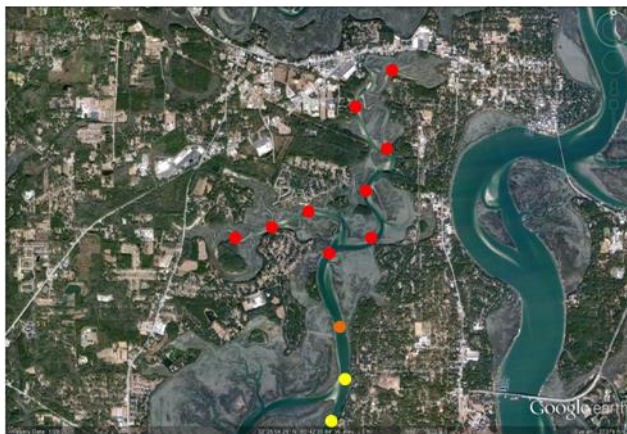


Figure 2. Approximate salinity monitoring locations for the County Complex and the Burton Hill/Grober branches of Battery Creek. Red dots indicate SCDHEC-prohibited shellfish harvesting waters as of 2011. Orange dots indicate restricted waters and yellow dots indicate waters open for shellfish harvesting.

The proposed study will assess the volume sensitive waters in five priority watershed creeks (Site Map). Four of the study creeks have already been identified by the Advisory Board and Utility based on their current Beaufort County Stormwater Management Plan (2006) and Ward Edwards Engineering (2011) report which focused on regional water quality retrofits. The four creeks identified by Beaufort County include (1) upper Okatie River (Figure 1), (2) Battery Creek - County Complex branch (Figure 2), (3) Battery Creek - Burton/Grober branch (Figure 2), and (4) upper May River (Figure 3). These creeks will serve as the foundation for the proposed project with an additional creek identified during the first collaborative Implementation Committee workshop. The full Implementation Committee will also be encouraged to comment on the four watersheds proposed by BC.

For this project, each system will be monitored for salinity, temperature, and depth (tidal cycle) over at least a 9-10 month period (dependent on purchasing of sondes and time to analyze the data) to capture a range of rainfall events. Should this prove to be an anomalously wet or dry year, the equipment can be left in place and sampling can continue beyond the one year period of this grant. Due to the existence of the Agreement, continuing

work is already anticipated, although at a scaled back pace after this grant expires. However we are committed to this collaboration with BC and will continue to monitor until adequate data are collected to achieve the project objectives. Sampling sites in each creek system will be established from the headwaters to a downstream location that should extend into what is expected to be volume “insensitive” waters. The downstream location will be identified based on previously collected data provided by

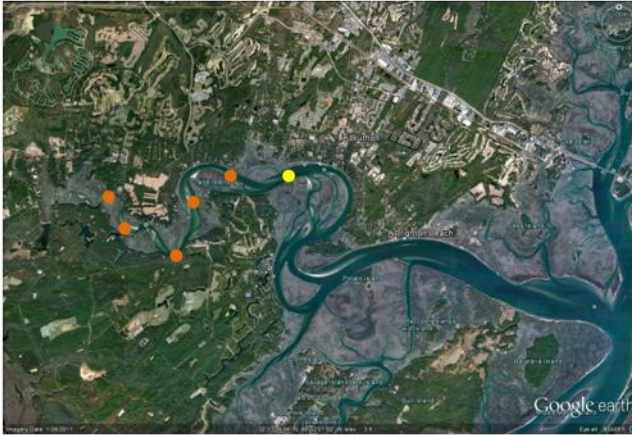


Figure 3. Approximate salinity monitoring locations for the May River. Orange dots indicate SCDHEC-restricted shellfish harvesting waters as of 2011. Yellow dots indicate waters open for shellfish harvesting.

the South Carolina Department of Health and Environmental Control (SCDHEC) such as shellfish bed harvesting classification change, an indication that the system is no longer volume sensitive. Figures 1-3 identify proposed locations for the Okatie River, Battery Creek, and May River with the restricted and prohibited shellfish sites delineated. Six monitoring sites will be roughly equally distributed down the Okatie, May and as yet unidentified system. The Battery Creek system is unique in that we will be sampling both branches which will result in 4-5 sites within each system and 3-4 sites within the main stem of those two confluences.

These locations will be dependent on available deployment locations. We will make every attempt to locate the units on docks and outside of the main channel to limit the potential for disturbance by boats. The lengths of the study creeks that are SCDHEC-closed to shellfish harvest are approximately 5 km (Figures 1-3). In light of this extent of probable volume sensitive waters plus the magnitude of the tidal exchanges, we believe that deploying six data logging sondes per system will be adequate to identify the demarcation between the volume sensitive and volume insensitive waters.

At each site, a HydroLab[®] salinity/temperature/depth data logger will be installed near the bottom of the water column. An assessment of data collected by the South Carolina Estuarine and Coastal Assessment Program (SCECAP) in similar local systems demonstrates that instantaneous salinity readings from the surface and bottom of over 270 sampling sites found that the average difference was only 0.3 ppt and the maximum value average was only 3.8 ppt (<http://www.dnr.sc.gov/marine/scecap/tables.html>). Therefore, we conclude that there is little stratification within the well-mixed estuarine systems of South Carolina tidal creeks due to the large range (2-3 m) of the semi-diurnal tides. The sondes will be installed near the bottom to ensure that they remain submerged even during the lowest spring tides. At one midstream location a unit with dissolved oxygen capabilities will be deployed. This will provide some information on the overall water quality and variability observed in these systems, an important component for the future bioassay work. Data sondes will take measurements at 30 minute intervals. The water quality dataloggers will follow QA/QC procedures similar to those employed by the NERR System-wide Monitoring Program (SWMP) to ensure the instrumentation functioned properly in the field and that all units and parameters were within the manufacturer's recommendations (Small *et al.* 2010). A rain gauge will be installed at a central location in the watershed. The rain gauge will be checked for

accuracy prior to deployment and upon retrieval using the manufacturer's recommended procedures and again applying SWMP QA/QC protocols.

Stormwater runoff will be modeled using the Stormwater Runoff Modeling System (SWARM) developed by NOAA-HML scientist, Anne Blair, to estimate the expected watershed runoff (Blair *et al.* 2012). SWARM is grounded in the US Department of Agriculture Natural Resources Conservation Service curve number (CN) method which Blair has modified for coastal South Carolina soil and topography conditions. The CN reflects the watershed runoff potential, and the higher the CN, the greater the runoff potential. A range of input parameters are required for running SWARM including watershed boundaries, soil, and land cover. ArcGIS will be used to obtain necessary information for the stormwater runoff and to evaluate a range of factors that might influence the runoff (e.g., distance down the creek). GIS layers will be supplied by the Utility including LIDAR and watershed boundaries for each of the study creeks. Watershed boundaries are available for all of the creek systems that have been identified by Advisory Board for us to study; however, we may need to bisect the watersheds to represent our area of interest. This will be achieved by overlaying the defined watershed on topographic maps, aerial images, and digital elevation maps which will allow us to subdivide the watershed (Sanger *et al.* 2008). The watershed polygons are used as masks for data extraction from soil and land cover spatial layers (USDA National Cooperative Soil Survey 2009; Multi Resolution Land Characteristics Consortium, National Land Class Database 2007).

The CN is calculated based on soil and land use characteristics in the watershed. Soils are classified as one of four hydrologic soil groups: A through D with A comprising soils most pervious to rainfall and having the lowest runoff potential (e.g., sand and gravel, soils that are well-drained) and D comprising soils most impervious to rainfall and having the highest runoff potential (e.g., clay, soils with a high water table). To classify soils, we will match map unit symbols listed in the attribute table to map unit names (USDA NRCS National Cooperative Soil Survey, Web Soil Survey Database 2009), and then sort into hydrologic soil groups A through D. For land use, our modeling system employs ten categories, four are for developed areas (High, Medium, Low, and Open Space (e.g., golf courses, parks, one-two acre residential lots)) and six are for undeveloped areas (Forests, Cultivated, Pasture, Brush, Wetland, Pond). To classify land cover, we will convert the Multi Resolution Land Characteristics Consortium land cover categories to those provided with the CN method. For simplification, we will retain the NLCD labels for four developed categories: Developed-High, Developed-Medium, Developed-Low, and Developed-Open.

The CN method calculates an area weighted CN for the entire watershed based upon the sub-areas of the individual curve numbers assigned to the hydrologic soil-land cover complexes, and these individual curve numbers are provided by USDA NRCS (2004). Next, we will modify the individual CN for each land cover category based on the proportional representation of the four hydrologic soil groups and calculate the final watershed CN using the modified CN and the proportional representation of each land cover category. The final watershed CN reflects average antecedent runoff conditions

and can be further modified to reflect wet or dry conditions. Once the area-weighted CN is calculated, it is then used to estimate runoff for the watershed (Blair *et al.* 2012). A Son-Tek-IQ Plus meter capable of measuring flow, total volume, level, and velocity in irregular/naturally-shaped creek channels will be deployed for approximately (depending on precipitation patterns) two months in each of the monitored creeks. Although the hydrological model has been validated in other coastal drainages, these measurements will ensure that the model results are empirically verified for the specific systems of interest.

Once the initial SWARM models have been developed for the study systems, we will conduct a second workshop with the Implementation Committee to discuss the watershed boundaries and results from the initial modeling. This will provide us with a chance to obtain local knowledge of these watersheds and whether the soil and land cover being used in the models is truly representative of those watersheds. Specific anthropogenic landscape modifications or very recent land use changes will be identified by the Implementation Committee members. Modifications will be made to the SWARM for each creek dependent on the Implementation Committee input. Once the model inputs are finalized, then runoff can be estimated using SWARM for each rain event within each creek watershed.

Data will be managed in a Microsoft Access database similar to the 1995-1998 and 1995-2000 NERRS SWMP water quality synthesis (Wenner *et al.* 2001 and Sanger *et al.* 2002, respectively). Data analysis will relate the rainfall patterns to the maximum, minimum, and range of salinity. Classical harmonic regression techniques will be used to remove the influence of tidal periodicity (Sanger *et al.* 2002). Data analysis will incorporate time lags for both upland discharge and dispersal of the freshet downstream through the creek. The monitoring sites throughout each creek will be compared to see how the precipitation-induced freshet translates downstream with respect to duration and extent of salinity change attributable to the rainfall event. The stage of the tidal cycle will be incorporated into this analysis of the attenuation of the freshet. The sites in each creek will provide us with a fine scale distribution of the salinity change thereby providing information for the determination of volume sensitivity requested by BC. The sites will then be compared to the SCDHEC shellfish monitoring data to determine if there is a relationship between the dispersal of freshwater through the system and the water quality impairment observed. The creek systems being studied provide us with a range of differences including proximity to ocean, watershed size, and potential freshwater inflow.

The runoff modeling will assess the volume of water expected to enter into each system which is dependent on rainfall, soil, and extent of impervious surface (GIS data supplied by Utility). Once the model is developed for each watershed, we will evaluate the impact of several scenarios each of 1) implementation of engineered stormwater management retrofits designed to contain stormwater volume within that drainage; and, 2) changes in precipitation patterns due to climate change, i.e. less frequent rainfall occurring in larger amounts on drier soils. The altered runoff volumes predicted by the

model will be compared to collected data to evaluate how the salinity range translates downstream.

As mentioned previously, we will make use of existing data sets provided by the SCDHEC Shellfish Monitoring program, the SCECAP habitat assessment program, GIS data layers by the Utility, and other previous tidal creek monitoring programs conducted by SCDNR.

5. Roles and Responsibilities

Project Coordinator. Dr. John Leffler, the ACE Basin Research Coordinator, will have overall administrative responsibilities for the project and will coordinate the activities of all team members. He will participate in the experimental design, data analysis, and interpretation of results. Dr. Leffler will have primary responsibility for reporting to the Intended Users and to the Science Collaborative. While in academia, he was a Professor of Environmental Science, Division Chair, Associate Dean of the College, Chair of numerous intra- and inter-collegiate committees, and Secretary of the Applied Section of the Ecological Society of America. Dr. Leffler coordinated a 15 county quality of life indicators and benchmarks program, and organized six regional conferences. He will spend two months time working on this project.

Fiscal Agent. Dr. John Leffler will also serve as the fiscal agent. During his time with the SCDNR he has administered grants totaling approximately \$3.2M. In academia he administered 20 federal, state, and private research contracts and grants totaling approximately \$2.2M. He served 20 years as Chief Financial Officer of a small incorporated business and as the Managing Member of a real estate LLC. Fiscal management is included in his two months commitment.

Collaboration Lead. As Coastal Communities Extension Specialist with the South Carolina Sea Grant Consortium, April Turner routinely works with coastal stormwater utility managers and concerned parties. Through NOAA's Coastal Services Center she has had specific training in project design and evaluation, facilitation, community-based social marketing, as well as Christine Feurt's collaborative learning course. She will develop a successful strategy for collaboration and workshop facilitation and implement these processes in an effective and efficient manner. Ms. Turner will devote a month of her time to this project.

Applied Science Investigator. Dr. Denise Sanger, Manager of SCDNR-MRRI's Environmental Research Section and recognized expert on Southeastern tidal creeks, will have primary responsibility for managing the scientific research effort. She will design and oversee the field monitoring and instrument deployments, supervise field staff, analyze and summarize data, prepare oral and written reports, and interpret results for Intended Users. Dr. Sanger will devote two months time to this project.

Intended User Representative. Daniel Ahern, our major collaborative partner throughout this project, is the Director of the Utility. Mr. Ahern originated this proposed project, serves as the immediate liaison to the Advisory Board, Implementation Committee, County Council, and local municipalities, will provide land use and LIDAR

shapefiles of pertinent watersheds, and will continue to provide guidance throughout the project. He will donate approximately half a month to this project.

Additional Investigators. Anne Blair, a research scientist at NOAA's HML, will use the field data to quantify and model stormwater runoff in the monitored watersheds using algorithms she developed specifically for the unique soils and topographies of coastal South Carolina. She will run scenarios exploring changes to runoff that might result from implementation of different BMPs and from changes in precipitation patterns due to climate change. Two months of her NOAA-NCCOS-supported time will be devoted to this project. Dr. Eric Montie, an Assistant Professor at USCB, is currently collaborating with us on monitoring a major watershed in BC. He will expand his salinity monitoring work and will devote one month of his time to this project.

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**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Reserve Manager Form**

Date: January 14, 2013

Project coordinator: John W. Leffler

NERRS site: ACE Basin

NERRS manager: Phil Maier

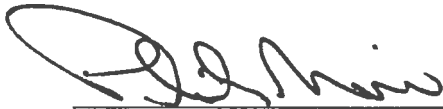
Preliminary Proposal: Please check the option below that best describes the level of your Reserve staff member(s)' involvement in developing the preliminary proposal and your expectations regarding their involvement in implementing the proposed project. If applicable, please include any clarifying or additional comments in the space below.

Option A: NERRS staff members were involved in the development of the proposal and they will play a significant role in the implementation of the proposed project.

Option B: NERRS staff members were consulted during the development of the proposal and will have some involvement in the implementation of the proposed project.

Option C: NERRS staff members had limited involvement in the development of the proposal and will not play a significant role in the implementation of the proposed project.

Additional comments (optional):



Signature of Reserve manager

1/14/13

Date

Full Proposal (if applicable): If the applicant is invited to submit a full proposal, we ask that you review this document to determine whether the level of NERRS involvement in proposal development and implementation of the proposed project has changed. Please check the option below that best describes the level of change.

Option A: The level of NERRS Involvement has not changed since the preliminary proposal.

Option B: Yes, there has been a change. Please explain:



3/27/13



BEAUFORT COUNTY STORMWATER UTILITY
120 Shanklin Road
Beaufort, South Carolina 29906
Voice (843) 255-2801 Facsimile (843) 255-9478



January 11, 2013

TO: NERRS Science Collaborative FY2013 Funding Opportunity

Subject: Letter of Commitment- SCDNR Application on “Collaborative Research to Prioritize the Runoff Volume Sensitivities of Tidal Headwaters and to Assess the Salinity Change Impacts on Critical Fisheries Resources”

Dear Proposal Reviewers,

The Beaufort County Stormwater Utility is committed to supporting and collaborating with this proposal from SCDNR to prioritize runoff volume sensitivities of tidal headwaters. The information that would be gathered under this proposal is critical to help make appropriate decisions on levels of protection needed in our county.

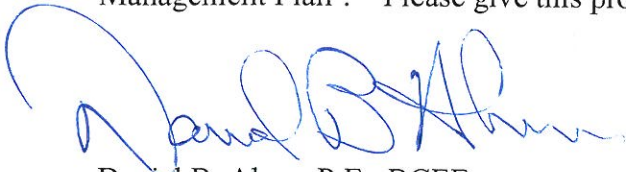
Beaufort County is strongly committed to protecting its waters and has taken significant efforts to control stormwater impacts on estuaries. The county’s water quality efforts date from 1998 when the county established water quality practice requirements. The county has seen a 30% increase in population since that time and has managed to maintain the same percentage of open shellfish harvesting waters. New shellfish harvesting area closures in 2008 led the county to determine that clean excess stormwater runoff into natural freshwater wetlands was contributing a significant bacteria load to the tidal headwaters. In response to this finding, the county in 2009 adopted stormwater runoff volume controls that retain runoff from storms up to the 95th percentile rainfall event (1.95 inch in Beaufort County). The county also adopted on-lot volume controls in 2011 to address new construction in developments that did not have development-wide runoff volume controls. The Stormwater Utility was the lead in these activities and its efforts lead the county to be recognized in 2012 with a National Association of Counties Achievement award.

The Utility is concerned that the present standards may not be protective enough for some headwaters of tidal creeks. Restoration of designated water uses in certain critical headwaters may require more stringent volume control limit than the county-wide standard. The Utility is also concerned that even if we can address the current impairments (elevated bacteria levels) that the rapid changes of salinity, caused by runoff, may be detrimental to our fishery resources. In order to obtain data to make these critical water determinations, the Utility reached out to SCDNR and University of South Carolina, Beaufort (USCB) to conduct salinity monitoring. A Memorandum of Understanding (MOU) was prepared and approved by Beaufort County Council on August 6, 2012.

Unfortunately, with the present level of funding available from the County, this work will take 5 years and will not be available for the next County-wide Stormwater Management Plan update. The update to the 2006 plan will be due in 2016.

This proposal would allow for answers of “critical waters” determination in time for this to be incorporated into the updated Stormwater Management Plan. The County hopes that the data coming from the study will identify critical waters that will need more stringent limits. This will apply the preventive controls and allow the Utility to focus on restoration of presently impaired waters through construction of retrofit projects.

This project will greatly increase the county’s capacity to develop controls that will protect our estuaries and control the impacts of stormwater. Our Stormwater Utility Advisory Board also is supportive of this effort and at their monthly meeting on January 9, 2013 passed the following motion: ‘The SW Utility Board supports the SCDNR proposal to speed up the salinity monitoring so that data can be available for the updating of the County-wide Stormwater Management Plan’. Please give this proposal your favorable attention.



Daniel B. Ahern P.E., BCEE
Stormwater Manager
Beaufort County Stormwater Utility

F.

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Budget Form**

You must submit one budget form for your project. All project team members (including students) from the fiscal agent's institution should be listed in section A of the budget form. Project team members and/or graduate students from institutions other than that of the fiscal agent must be listed as subcontractors in section F.

In the full proposal stage, you must also provide a cumulative budget sheet for each subcontractor. If applicable to your proposal, the budget for supplies and services related to meetings or workshops should be listed under the 'expendable supplies and services' budget line.

Proposal: Collaborative Research to Prioritize and Model the Runoff Volume Sensitivities of Tidal Headwaters

Fiscal Agent: John W. Leffler

Project Coordinator: John W. Leffler

A. Salaries and wages for personnel from fiscal agent's institution	Number of people	Amount of time on project (in months)	Funds requested
Fiscal agent: John Leffler	1	0.5	2,367
Project Coordinator: John Leffler	1	1.5	7,101
Collaboration Lead: April Turner	1	1.0	subcontract
Applied Science Lead: Denise Sanger	1	2.0	10,432
Intended User Representative: BCSMU staff	1	~0.5	0
Science Investigator: Anne Blair	1	2.0	0
Science Investigator: Eric Montie	1	1.0	subcontract
Database Manager – Biologist 3	1	3	12,682
On-site Field Manager – Biologist 2	1	12	40,042
Field Technician (Non-Student Hourly)	1	12	20,604
Total Salaries and Wages			93,228
B. Fringe benefits: 35% full-time; 10% hourly			27,479
Total Salaries and Benefits (A and B)			120,707
C. Permanent equipment (for single items over \$5000. Everything else is expendable supplies)			8,500
D. Expendable supplies and services			90,140
E. Travel (US, including PR and Canada)			4,386
F. Subcontractors and other costs			
Subcontract name (List all individually)			
University of South Carolina-Beaufort (E. Monte)			42,910
South Carolina Sea Grant (A. Turner)			5,529
Other costs – Boat Days (26 @ \$35)			910
Total Subcontractors and other costs			49,349
Total direct costs (A through F)			273,082
Total indirect costs: 12.05% SCDNR Salaries/Wages			11,234
Total costs			284,316

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Budget Form**

You must submit one budget form for your project. All project team members (including students) from the fiscal agent's institution should be listed in section A of the budget form. Project team members and/or graduate students from institutions other than that of the fiscal agent must be listed as subcontractors in section F.

In the full proposal stage, you must also provide a cumulative budget sheet for each subcontractor. If applicable to your proposal, the budget for supplies and services related to meetings or workshops should be listed under the 'expendable supplies and services' budget line.

Proposal: Collaborative Research to Prioritize and Model the Runoff Volume Sensitivities of Tidal Headwaters

Fiscal Agent: John W. Leffler

Project Coordinator: John W. Leffler

Subcontract to South Carolina Sea Grant Consortium

A. Salaries and wages for personnel from fiscal agent's institution	Number of people	Amount of time on project (in months)	Funds requested
Collaboration Lead: April Turner	1	1.0	4,320
Total Salaries and Wages			4,320
B. Fringe benefits: 28% full-time			1,209
Total Salaries and Benefits (A and B)			5,529
C. Permanent equipment (for single items over \$5000. Everything else is expendable supplies)			
D. Expendable supplies and services			
E. Travel (US, including PR and Canada)			
F. Subcontractors and other costs			
Total Subcontractors and other costs			
Total direct costs (A through F)			5,529
Total indirect costs: waived			0
Total costs			5,529

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Budget Form**

You must submit one budget form for your project. All project team members (including students) from the fiscal agent's institution should be listed in section A of the budget form. Project team members and/or graduate students from institutions other than that of the fiscal agent must be listed as subcontractors in section F.

In the full proposal stage, you must also provide a cumulative budget sheet for each subcontractor. If applicable to your proposal, the budget for supplies and services related to meetings or workshops should be listed under the 'expendable supplies and services' budget line.

Proposal: Collaborative Research to Prioritize and Model the Runoff Volume Sensitivities of Tidal Headwaters

Fiscal Agent: John W. Leffler

Project Coordinator: John W. Leffler

Subcontract to University of South Carolina at Beaufort

A. Salaries and wages for personnel from fiscal agent's institution	Number of people	Amount of time on project (in months)	Funds requested
Science Investigator: Eric Montie	1	1.0	6,743
Technician (Non-Student Hourly; 20 hr/wk)	1	10	8,000
Total Salaries and Wages			14,743
B. Fringe benefits: 23.45% faculty; 8.3% hourly			2,245
Total Salaries and Benefits (A and B)			16,988
C. Permanent equipment (for single items over \$5000. Everything else is expendable supplies)			
D. Expendable supplies and services			20,824
E. Travel (US, including PR and Canada)			
F. Subcontractors and other costs			
Total Subcontractors and other costs			
Total direct costs (A through F)			37,812
Total indirect costs: 26% of DC excluding USCB defined equipment (\$2500)			5,098
Total costs			42,910

G. Budget Justification

Salaries and Wages (\$93,228): Since this grant is for only a one year period, both start-up and completion tasks must be accomplished within that time frame. Therefore senior personnel will devote more time to the project in one year than they typically would on multi-year projects. Dr. John Leffler will serve as both the Project Coordinator and as the Fiscal Agent. He will devote a total of 2 months to serve in these capacities. April Turner, the South Carolina Sea Grant Consortium's Coastal Communities Specialist will serve as Collaboration Lead. She will devote one month of her time (\$4,320) to this project and South Carolina Sea Grant will be compensated through a subcontract. Dr. Denise Sanger will serve as the Applied Science Lead and will devote 2 months time to the project. The manager of the Beaufort County Stormwater Management Utility, our primary intended user representative, will devote approximately 0.5 months of his time to the project. Anne Blair, a scientist with NOAA's Hollings Marine Laboratory, will provide the hydrological modeling expertise. She will devote approximately two months of her time in support of this project as part of her NOS-NCCOS responsibilities. Dr. Eric Monte, a faculty member at USCB, will be involved with field monitoring of rainfall and salinity and will devote one month of his time to this work. His salary (\$6,743) is included in the subcontract to USCB.

A senior SCDNR biologist will provide expertise in setting up and managing the database and will assist with data analysis. He will devote 3 months effort to the project. Another SCDNR biologist stationed at the Waddell Mariculture Center in Beaufort County will serve as the on-site manager and will supervise staff and direct all field monitoring work. He will devote 12 months to this project. Because this is only a one year project, we have chosen to employ a temporary hourly technician, who can be hired quickly, to assist with the fieldwork. The hourly technician will devote 12 months to this project.

The reduction of \$37,967 in the Salary and Wages line from the preproposal is the result of our decision to postpone the bioassay work and not include it in the present proposal as explained in the Narrative.

Fringe benefits (\$27,479): Fringe benefits are calculated at a 35% rate for all salaried employees and at a 10% rate for hourly employees.

Permanent Equipment (\$8,500): A Son-Tek-IQ Plus meter (\$8,500) capable of measuring flow, total volume, level, and velocity in irregular/naturally-shaped creek channels is requested. Although the hydrological model has been validated in general, the meter will be moved among all the monitored drainages to ensure that the model remains valid for each situation.

The Equipment line has been reduced from the preproposal by \$28,710, although the Supply line has increased substantially. We had originally planned to use primarily Onset-HOBO salinity sondes as our primary monitoring instrument with one YSI 6600 data sonde in each drainage for calibration. Because this is an ongoing project (although at a small scale), we had deployed several HOBO sondes this past year, but found that the data were difficult to interpret. After considerable testing in the laboratory, we concluded that the instruments lacked both accuracy and precision. The manufacturer finally agreed with our conclusions and has withdrawn these instruments from the market. Because the data we will collect will be used to develop policy and

might possibly be challenged in court, we must insist on collecting data of the best possible quality. We tested alternative instruments from different companies and found the HydroLab MS5 salinity/temperature/depth sondes to perform very well at the best price. Negotiations with the manufacturer will permit SCDNR and USCB to buy the instruments required for this project at a price approximately 65% that of retail. Since these instruments will cost us less than \$5000 each, they have been moved to the Supply line rather than the Equipment line. The number of data sondes requested under Supplies in addition to three HydroLab MS5 and two YSI 6600 sondes supplied by SCDNR will permit us to monitor all watersheds as originally proposed.

Expendable supplies (\$90,140): SCDNR will be expanding field efforts to four watersheds beyond what is currently being monitored, requiring the purchase of six HydroLab MS5 salinity/temperature/depth sondes for each new system plus two back-up sondes in case of loss or malfunction (26 total @ \$3,034 each). Additional HOBO recording rain gauges (4 watersheds plus one back-up @ \$591 each) are required to monitor all watersheds simultaneously. Funds will be required for deployment supplies (\$3,300) such as PVC pipe, anchors, cables, hardware, signage, etc. and for supplies such as cables and a field battery with secure containment to operate the Son-Tek-IQ Plus volume flow meter in support of the modeling effort (\$3000). \$2000 is requested to support the workshops and meetings with various primary and secondary intended user groups discussed in the Narrative. This will be used for refreshments, printed materials, and other incidentals. A total of \$11,703 in supplies that would have supported the bioassay work has been deleted from this budget compared to that of the preproposal.

Travel (\$4,386): Travel funds are requested for 24 trips to deploy, maintain, download, and recover sondes at 100 miles roundtrip and \$0.555 per mile. An additional six trips between Charleston and Beaufort County to supervise scouting and set up of monitoring sites at 200 miles roundtrip and ten trips between Charleston and Beaufort for workshops and meetings with intended users during the year at 160 miles roundtrip (both at \$0.555 per mile) are also requested. \$1500 is requested for one of the principals to attend a regional conference to disseminate results and collaborative information about this project.

Subcontractor and other costs (\$49,349): A subcontract (\$5,529) will be provided to South Carolina Sea Grant (SCSG) for one month of April Turner's time to serve as Collaboration Lead on this grant. Fringe benefits (\$1209) on Ms. Turner's salary are calculated at 28%.

\$42,910 is requested for a subcontract with the University of South Carolina-Beaufort which is currently a partner in the Agreement with Beaufort County. This includes one month salary (\$6,743) for Dr. Eric Montie who will supervise field monitoring of one of the watersheds. A temporary half-time field technician (\$8,000) will assist with the routine maintenance and data downloads from the sondes and rain gauges employed by Dr. Montie. Fringe benefits are calculated at 23.45% for Dr. Montie and 8.3% for the technician. The remaining funds will purchase six HydroLab MS5 salinity/temperature/ depth sondes at \$3,034 each, a HOBO rain gauge logger (\$591), deployment supplies, and boat fuel for accessing the monitoring locations. USCB indirect costs are calculated at 26% of total direct costs excluding equipment. Since the university's equipment definition is \$2500, it considers the data sondes as equipment and excludes them from its indirect rates.

In addition to the subcontract funds for SCSG and USCB, SCDNR requests 26 boat days at \$35 per day in order to deploy, maintain, download, and recover the monitoring sondes.

While not an official “match”, the project will benefit from Anne Blair devoting 2 months time, which is valued at \$15,360.

\$14,710 of the requested funds are dedicated directly to the Collaborative effort. This entails 3/8's of Leffler's time and fringe benefits, the subcontract with SCSG for Turner's time and fringe benefits, workshop and meeting supplies, travel for the workshops and meetings, and dissemination of project information at a regional meeting. This amounts to 5.2% of the requested funds. Approximately 5.1% of requested funds will be used for administrative expenses (1/4 of Leffler's salary and fringe benefits plus indirect costs).

Total direct costs are \$273,082.

Indirect costs are \$11,234 which is calculated at 12.05% of SCDNR salaries and wages.

Total costs are \$284,316. This represents a decrease of \$28,796 from the preproposal budget due to elimination of the bioassay component, but an increase in the cost of the data sondes required to collect highest quality data.

John W. Leffler
Marine Resources Research Institute
South Carolina Department of Natural Resources
217 Fort Johnson Road
Charleston, South Carolina 29412
Phone (843) 953-3903; Fax (843) 953-9820; E-mail LefflerJ@dnr.sc.gov

EDUCATION:

<u>College/University</u>	<u>Major</u>	<u>Date</u>	<u>Degree</u>
Albright College	Biology	1967-1971	B.S.
University of Georgia	Zoology/Ecology	1971-1977	Ph.D.

PROFESSIONAL EXPERIENCE:

<u>Date</u>	<u>Position</u>	<u>Employer</u>
2010-present	ACE Basin NERR Research Coordinator	SC Department of Natural Resources
2005-present	Marine Scientist	SC Department of Natural Resources
1978-2004	Professor of Environmental Science	Ferrum College
2003-2004	Chair, Life Science Division	Ferrum College
1983-2003	Chief Financial Officer	The Pet Clinic of Rocky Mount, Inc.
1997-1998	Coordinator, Indicators & Benchmarks	The New Century Council, Roanoke, VA
1987-1989	Associate Dean of the College	Ferrum College
1986-1987	Chair, Life Science Division	Ferrum College
1977-1978	Research Associate	University of Georgia
1970, 1972	Student Fellow, Research Technician	Woods Hole Oceanographic Institution

CURRENT RESEARCH INTERESTS:

- Climate change impacts on estuarine and coastal plain ecosystems.
- Protection and restoration of coastal resources and habitats impacted by anthropogenic stressors.
- Impacts of stormwater management BMPs on estuarine water quality and ecosystem health.
- Development of commercially viable, environmentally sustainable high density aquaculture systems.
- Application of nuclear magnetic resonance-based (NMR) metabolomics to aquaculture.
- Environmental and anthropogenic stressors on populations of wild crustaceans.
- Evaluation of human health benefits and risks of seafood consumption.

PROFESSIONAL HIGHLIGHTS:

- Developed and successfully taught 32 different college-level courses in environmental science, zoology, statistics, and chemistry.
- Conducted externally funded research on living shorelines in estuaries, stormwater runoff impacts on estuaries, sentinel sites for monitoring climate change impacts on estuaries, environmentally sustainable aquaculture systems and diets, metabolomic applications in aquaculture, public health effects of seafood consumption, monitoring, management, and recovery of endangered bats species, impacts of land use practices on lake water quality, ecosystem-level ecotoxicology screening protocols, and the influence of species diversity and energy/nutrient subsidies on ecosystem stability.
- Consultant for US Environmental Protection Agency, US Fish and Wildlife Service, US Forest Service, VA Department of Game and Inland Fisheries.
- Coordinator of Indicators and Benchmarks Program; developed and implemented a community indicators program for an 11-county, 5-city region of western Virginia; a sustainable development effort that integrated environmental, social, economic, and political dimensions to address sustainability and quality of life issues; developed comprehensive set of metrics to track trends and detect changes resulting from actions to improve conditions; enlisted community leaders from business, government, education, healthcare, social welfare, cultural, and environmental organizations to cooperatively evaluate regional quality-of-life issues from a holistic, integrative perspective; assembled, wrote, and edited 121 page report disseminated throughout region.

- Secretary of the Applied Section of the Ecological Society of America: 1983–1985; involved nationally in efforts to reorient the ESA to actively integrate ecological knowledge with society’s needs for scientifically based environmental management.
- 88 professional presentations and 43 journal articles or technical reports.
- Designed, administered, and personally directed over 30 federal, state, and private research contracts, grants, and revenue accounts valued at over \$3.5M.

PUBLICATIONS SINCE 2010:

- Ray, A.J., Seaborn, G., Vinatea, L., Browdy, C.L., Leffler, J.W. 2012. Effects of biofloc reduction on microbial dynamics in minimal-exchange, superintensive shrimp (*Litopenaeus vannamei*) culture systems. *Journal of the World Aquaculture Society*. In Press.
- Schock, T.B., Newton, S., Brenkert, K., Leffler, J.W., Bearden, D.W. 2012. An NMR-based metabolomic assessment of cultured cobia health in response to dietary manipulation. *Food Chemistry* 133:90-101.
- Browdy, C.L., Ray, A.J., Leffler, J.W., Avnimelech, Y. 2012. Biofloc based aquaculture systems. In *Aquaculture Production Systems*, J.H. Tidwell (Ed.), Wiley-Blackwell, Ames, IA, USA.
- DuRant, E., Brunson, J., Leffler, J.W. 2011. Biofloc-based recirculating aquaculture systems for the culture of Pacific white shrimp. *Hatchery International* June/August 2011: 28-29.
- Kent, M., Browdy, C.L., Leffler, J.W. 2011. Consumption and digestion of suspended microalgae by juvenile Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture* 319: 363-368.
- DuRant, E., Haveman, J., Brunson, J., Leffler, J.W. 2011. Waddell Mariculture Center continues research on biofloc-based shrimp culture. *Global Aquaculture Advocate* 14 (3): 32-34.
- Ray, A.J., Lotz, J.M., Brunson, J., Leffler, J.W. 2011. Accurate shrimp sampling method assists stocking process for growout. *Global Aquaculture Advocate* 14 (3): 24-25.
- Ray, A.J., Lewis, B.L., Browdy, C.L., Leffler, J.W. 2011. Suspended solids removal to improve *Litopenaeus vannamei* production in minimal-exchange, superintensive culture systems. *Panorama Acuicola* 16(3):8-21.
- Ray, A.J., Venero, J.A., Browdy, C.L., Leffler, J.W. 2010. Simple settling chambers aid solids management in biofloc system. *Global Aquaculture Advocate* 13 (4): 28-30.
- Ray, A.J., Seaborn, G., Wilde, S.B., Lawson, A., Browdy, C.L., Leffler, J.W. 2010. Characterization of microbial communities in minimal-exchange, intensive aquaculture systems and the effects of suspended solids management. *Aquaculture* 310:130-138.
- Vinatea, L., Gálvez, A.O., Browdy, C.L., Stokes, A., Venero, J., Haveman, J., Lewis, B.L., Lawson, A., Shuler, A., Ray, A., Leffler, J.W. 2010. Photosynthesis, water respiration and growth performance of *Litopenaeus vannamei* in a super-intensive raceway culture with zero water exchange: Interaction of water quality variables. *Aquacultural Engineering* 42(1): 17-24.
- Ray, A.J., Lewis, B.L., Browdy, C.L., Leffler, J.W. 2010. Suspended solids removal to improve shrimp (*Litopenaeus vannamei*) production and an evaluation of a plant-based feed in minimal-exchange, superintensive culture systems. *Aquaculture* 299: 89-98.

OTHER SELECTED PUBLICATIONS

- Leffler, J.W. (ed.) 1998. *Vital Signs: Community Indicators for the New Century Region*. The New Century Council. Roanoke, VA. 121 pp.
- Klinger, S., Reynolds, R., Leffler, J.W. 1995. *Indiana Bat (Myotis sodalis) Conservation Plan for the George Washington National Forest*. U.S. Forest Service, Roanoke, VA. 26 pp.
- Leffler, J.W. 1984. The use of self-selected, generic aquatic microcosms for pollution effects assessment. In Harris H. White (ed.), *Concepts in Marine Pollution Measurements*. Maryland Sea Grant College, College Park, Maryland. pp. 139-158.
- Leffler, J.W. 1980. Microcosmology: theoretical applications of biological models. 1980. In J. P. Giesy (ed.), *Microcosms in Ecological Research*. DOE Symposium Series. NTIS. pp. 14-29.
- Leffler, J.W. 1979. Effects of familiar area on the homing ability of the little brown bat, *Myotis lucifugus*. *J.Mammalogy* 60:201-204.

APRIL L. TURNER

SC Sea Grant Consortium
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april.turner@scseagrant.org

AREAS OF EXPERTISE

Extensive experience assisting local and regional government staff and officials, citizen groups, interagency working groups, and private nonprofit organizations in South Carolina with land-use planning, water resource management and protection, sustainable nature-based tourism, and climate change/hazard vulnerability assessments.

EDUCATION

- **Master of Parks, Recreation, & Tourism Management, Clemson University, 1992-1994**
Concentration: Natural Resource Management
- **Bachelor of Arts in Geography, University of Colorado, 1986-1989**
Concentration: Natural Resource Management

PROFESSIONAL EXPERIENCE

Coastal Communities Extension Specialist

South Carolina Sea Grant Consortium

June 2000 – Present

Provide community decision-makers and the public with tools and resources to address the pressures of coastal growth. Coordinates the South Carolina Nonpoint Education for Municipal Officials (SCNEMO) through which statewide water quality workshops were organized for communities in 27 of the state's 46 counties; representatives of over 100 municipalities participated in these educational sessions. Manages the S.C. Coastal Information Network, a program and web site to provide educational and training opportunities to coastal decision-makers. Administers the S.C. Coastal Communities Initiative Small Grants Program, and collaborates with other extension specialists to provide programs related to climate variability/change and natural hazards, working waterfronts, and nature-based recreation and tourism.

As part of her Extension programming she has been tasked with conducting formal and informal stakeholder and organizational needs assessments; designing and conducting decision-making workshops for diverse stakeholders; building working groups, planning teams and collaborative partnerships; facilitating collaborative teams of managers, scientists, regulators, and policy makers; and conducting and analyzing evaluation of events and processes.

Environmental Planner II

SC Dept. of Health & Environmental Control (SCDHEC) –

Office of Ocean and Coastal Resource Management (OCRM)

February 1998 – June 2000

Managed and coordinated Planning Division outreach and information dissemination activities through the development and maintenance of a website, the publication of informational articles, and development of educational workshops. Provided technical assistance to public officials and other government agency personnel on matters related to coastal zone management. Also, participated in research, design, contract development, and management of coastal zone research projects.

Environmental Planner I

SCDHEC-OCRM, The Charleston Harbor Project

October 1996 – February 2000

Work primarily with principle investigators to develop public education products from Charleston Harbor Project (CHP) studies, research projects, and management activities involving non-point source water quality, biological resources, recreational and cultural resources. Compiled and processed CHP quarterly and semi-annual reports and coordinated the production and distribution of educational publications and other materials.

PROFESSIONAL INVOLVEMENT & TRAINING

Professional Involvement: Member of the American Planning Association and the South Carolina Chapter, Urban Land Institute – South Carolina, National NEMO Network, The South Carolina Coastal Information Network.

Training: NOAA Coastal Services Center's Introduction and Intermediate ArcGIS Training, Coastal Inundation Mapping, Roadmap to Adapting Coastal Risk, CanVis, and Project Design & Evaluation Courses; Collaborative Learning; Fostering Sustainable Behavior; Water Words That Work; FEMA's Community Rating System; USEPA/National Sea Grant Extension Smart Growth Training.

SELECTED PUBLICATIONS, REPORTS, & PRESENTATIONS

- Maintenance of Low Impact Development (LID) Stormwater Practices: Guidance for Homeowners Associations Based on Oak Terrace Preserve in North Charleston, S.C.*, S.C. Sea Grant Consortium, Charleston, S.C., 2010.
- S.C. Community Resource Inventory (CRI-SC) Website*. 2010. A. Turner, project coordinator.
(<http://www.clemson.edu/public/rec/baruch/cri/>; <http://maps.clemson.edu/cri/index.html>).
- Low Impact Development Brochure, SC Sea Grant Consortium, Charleston, SC, 2009.
(www.scseagrant.org/pdf_files/lid_final_brochure.pdf)
- Lanford, B. and A. Turner. 2009. Citizens' Guide To Community Planning for the Greater Myrtle Beach Region, S.C. Sea Grant Consortium, Charleston, SC, 22 pp.
- Polluted Stormwater Brochure, SC Sea Grant Consortium, Charleston, SC, 2008.
(www.scseagrant.org/pdf_files/NPSbrochure.pdf)
- Rhodes, R., A. Von Harten, and A. Turner. 2008. Coastal Waterfront Access Challenges and Opportunities for South Carolina Marine Fisheries Stakeholders. Technical Report to the S.C. Sea Grant Consortium, 73 pp.
- S.C. Coastal Information Network (SCCIN) Web site. 2008. A. Turner, project coordinator.
(<http://www.sccoastalinfo.org>).
- Jasper County Natural Resources Conservation Plan*. Edited by A. Turner, L. Fairchilds and C. Graves. 88 pp., S.C. Sea Grant Consortium, 2007.
- Turner, A.L. 2006. Summary of Trends in Land Use Policy and Development in the Coastal Southeast. In, G.S. Kleppel, M.R. DeVoe, and M.V. Rawson (eds.), *Land-Use Change in the Coastal Zone: managing environmental quality in rapidly growing regions*. Springer-Verlag, New York.
- Turner, A.L. and H.R. Landry. 2004. Engaging South Carolina's Local Decision Makers in Addressing Water Quality Issues: A Recap of the SC NEMO Program. *Public Policy & Practice* 3:33-40.
(<http://ipspr.sc.edu/ejournal/assets/ej%202004-05%20WATER.pdf>).
- Ashley Scenic River Advisory Council. 2003. Ashley Scenic River Management Plan. S.C. Department of Natural Resources, Columbia, S.C., 74 pp.
- Pietras, A., A. Turner, and C. Sawyer. 2003. Taming Stormwater Toolbook. Berkeley-Charleston-Dorchester Council of Governments Press, Charleston, SC, 53 pp.

DENISE M. SANGER

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Charleston, SC 29412
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Education

Ph.D., Marine Science, University of South Carolina, Columbia, SC US – Dec 1998
Dissertation Title: Physical, Chemical, and Biological Environmental Quality of Tidal Creeks and Salt Marshes in South Carolina Estuaries.

B.A., Marine Biology, University of California at Santa Cruz, Santa Cruz, CA US – Mar 1993

Fields of Expertise

Ecologist with an emphasis in estuarine benthic ecology, sediment chemistry, water quality, ecological risk assessment, status and trends monitoring of ecosystem health, application of science to management, multidisciplinary team management, strategic and implementation planning, and creation and manipulation of data in relational databases.

Professional Experience

Associate Marine Scientist – Marine Resources Research Institute, South Carolina Department of Natural Resources (MRRI-SCDNR). Charleston, SC. April-2012 – present.

Assistant Director for Research and Planning – South Carolina Sea Grant Consortium (SCSGC). Charleston, SC. May 2006 – April 2012.

Senior Scientist – Office of Ocean and Coastal Resource Management, SC Department of Health and Environmental Control (SCDHEC-OCRM). Charleston, SC. August 2003 - April 2006.

Assistant Marine Scientist – Marine Resources Research Institute, SC Department of Natural Resources (SCDNR). Charleston, SC. March 2001 - August 2003.

Associate Coastal Resource Coordinator – National Oceanic and Atmospheric Administration through an Oak Ridge Institute of Science and Education Internship, Dallas, TX. February 2000 - November 2000.

Post-doctoral Associate – Marine Resources Research Institute, SC Department of Natural Resources, through the Medical University of South Carolina (MUSC), Charleston, SC. June 1999 - February 2000.

Research Assistant – Marine Resources Research Institute, SC Department of Natural Resources through the University of South Carolina, Charleston, SC. August 1994 - December 1998.

Bioassay Laboratory Technician – Columbia Aquatic Sciences. Carlsbad, CA. April 1993 - July 1994.

Professional Societies

Coastal and Estuarine Research Federation
Southeastern Estuarine Research Society
Society of Environmental Toxicology and Chemistry
Carolina's Regional Society of Environmental Toxicology and Chemistry

Academic Experience and Affiliations

Adjunct Professor – Graduate Program in Marine Biology at the College of Charleston, Charleston, SC. 2001 – present.

Adjunct Professor – Masters in Environmental Studies at the College of Charleston, Charleston, SC. 2002 – present.

Adjunct Assistant Professor – Environmental Health Sciences Department at the University of South Carolina, Columbia, SC. 2005 – present.

Publications (Relevant)

- Blair A, D Sanger, D White, AF Holland, L Vandiver, C Bowker, S White. 2012. Quantifying and Simulating Stormwater Runoff in Watersheds. Hydrological Processes DOI: 10.1002/hyp.9616.
- Sanger, D.M., E.M. Smith, G. Voulgaris, E.T. Koepfler, S.M. Libes, G.H.M. Riekerk, D.C. Bergquist, D.I. Greenfield, P.A. Wren, C.A. McCoy, R.F. Viso, R.N. Peterson, and J.D. Whitaker. 2012. Constrained Enrichment Contributes to Hypoxia Formation in Long Bay, South Carolina (USA), an Open Ocean Urbanized Coastline. *Marine Ecology Progress Series* 461:15-30.
- Washburn, T, D Sanger. 2011. Land Use Effects on Macrobenthic Communities in Southeastern United States Tidal Creeks. *Environmental Monitoring and Assessment* 180:177-188.
- Sanger, D, D Hernandez, S Libes, G Voulgaris, B Davis, E Smith, R Shuford, D Porter, E Koepfler, J Bennett. 2010. A Case History of the Science and Management Collaboration in Understanding Hypoxia Events in Long Bay, South Carolina, USA. *Environmental Management* 46:340-350.
- White, DL, D Wolf, DE Porter, DM Sanger, GHM Riekerk, G DiDonato, AF Holland, D Dabney. 2008. Development of a Data Management Framework in Support of Southeastern Tidal Creek Research. *Environmental Monitoring and Assessment* 150:323-331.
- Buzzelli, C, AF Holland, DM Sanger, P Conrads. 2007. Hydrographic Characterization of Tidal Creeks with Implications for Watershed Land Use, Tidal Flushing, and Benthic Production. *Estuaries and Coasts* 30(2):321-330.
- Wenner, E, D Sanger, M Arendt, AF Holland, Y Chen. 2004. Variability in Dissolved Oxygen and Other Water-Quality Variables Within the National Estuarine Research Reserve System. *Journal of Coastal Research* 45:17-38.
- Wenner, EL, AH Holland, DM Sanger. 1999. Assessing Short-Term Variability in Dissolved Oxygen and Other Water Quality Variables in Shallow Estuarine Habitats. *Proceedings of the Ocean Conference* 1998.
- Drescher, SR, DM Sanger, and BC Davis. 2011. Stormwater Ponds and Water Quality. *Stormwater: The Journal for Surface Water Quality Professionals*. November-December 2011.
- Sanger, DM, MD Arendt, Y Chen, EL Wenner, AF Holland, D Edwards, J Caffrey. 2002. A Synthesis of Water Quality Data: National Estuarine Research Reserve System-wide Monitoring Program (1995-2000). *National Estuarine Research Reserve Technical Report Series 2002: 3*. SCDNR, Marine Resources Division Contribution No. 500. 135 p.
- Holland, AF, DM Sanger. 2008. Tidal Creek Habitats: Sentinels of Coastal Health. Booklet published by SC Sea Grant Consortium and NOAA for coastal decision makers.

Daniel B. Ahern

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Beaufort, SC 29902

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HIGHLIGHTS

- Over thirty years experience with US EPA and US Army
- Managed over a billion dollars of Wastewater Treatment Plant Construction Grants
- Ran compliance programs for NPDES and Safe Drinking Water Act
- Managed SW Utility Program with 3 million dollar budget
- Command experience in Public Health with Army Medical Department
- Collaboration experience with States and Federal Agencies on voluntary initiatives
- Led teams to national awards
- Writings have influenced national programs and received national writing award

EMPLOYMENT**STORMWATER UTILITY MANAGER, 2007- present**

Beaufort County, Beaufort, SC

- Managed a progressive SW Utility and relationships with 4 municipalities dedicated to protecting water resources in a coastal county experiencing considerable growth. Budget for Utility exceeds 3 million and is focused on implementing a comprehensive SW Management Plan. Utility has implemented water quality based controls for stormwater including nitrogen and is in process of implementing controls on total volume.

SUPERVISORY ENVIRONMENTAL ENGINEER, 1972 – 2007

US Environmental Protection Agency, Atlanta GA

- Managed the Region's Grant Program for municipal wastewater treatment plant construction which at one point totaled over \$1billion in grants. Received EPA Bronze Award medal for assisting Tennessee to improve their management programs for construction grants.
- Headed compliance/enforcement for wastewater treatment plants (NPDES) and for Safe Drinking Water Act. Key Leader in implementing the national municipal policy that lead region to exceed national averages.
- Lead water programs addressing watersheds, non point source, clean lakes, water quality standards and TMDLs. These programs required state oversight and coordination for achieving goals.
- Oversaw the development of Water Program Management Agreements with the National Office of Water and developed the first approved agreement between Region and National Office.
- Managed the Region's Pollution Prevention (P2) Program that impacts all the regional programs. Finalized the first Regional P2 Strategy and developed one of the better integrated programs. Had major impact on national P2 program and a paper written proposing reduction indexing, lead to inclusion of indexing in the national strategic plan targets. Another paper on leading firms to stewardship led to winning a national P2 writing award. Coached the regional Federal Electronics Challenge Team that won the region the 2006 White House Closing the Circle Award. Established many partnerships with Federal

Agencies and State Technical Assistance Offices. Nominated three times by the Region for the National P2 Honor Award.

- Experience includes short term assignments, including managing a RCRA Section for 6 months and partnered with this section to win a Resource Conservation Challenge 2005 Notable Achievement Award. Another six month assignment was with EPA's Office of Research and Development researching the risk of Manganese emissions.

ARMY OFFICER, 1969-1999 Retired Colonel

Ft Benning, Civil Affairs Group, Medical Brigade, and 3rd Medical Command

- Three years active duty and 27 reserve duty as an environmental engineer in the Army's Civil Affairs Office and Medical Department.
- Participated in numerous leadership positions in various units, received considerable decorations and finished career as the senior reserve environmental engineer at the Army's most senior deployable medical unit.

ENVIRONMENTAL ENGINEER, 1968-1969

Hazen and Sawyer Engineers, New York, NY

- Assisted in the development of Water Supply Studies and identifying reservoir site locations.

CIVIL ENGINEER, 1966

Board of Water Supply, New York, NY

- Provided oversight on a New York City Water Tunnel that went five miles under New York Harbor at a depth of over 900 ft. Assisted City in verification of excavation and identification of the line and grade of ongoing work.

EDUCATION

Master of Science in Sanitary Engineering, 1966-1968

University of North Carolina, School of Public Health, Chapel Hill NC

Post Graduate Work

- 17 credit hours of post graduate course work in Chemistry at GA Tech
- 45 credit hours of business management courses at GA State Univ.

Bachelor of Engineering (Civil), 1962-1966

The Cooper Union, New York, NY

PROFESSIONAL INVOLVEMENT

- American Society of Civil Engineers – Member, past director of GA Section, current sect/treas of section's Environmental and Water Resources Group.
- Southeast Stormwater Association – South Carolina director
- South Carolina Stormwater Managers Association

Anne Cole Blair

National Oceanic and Atmospheric Administration
National Ocean Service, National Centers for Coastal Ocean Science (NCCOS)
Hollings Marine Laboratory, Contractor, JHT, Inc.
331 Fort Johnson Road, Charleston, SC 29412 (843) 762-8992, Anne.Blair@noaa.gov

Education

M.S. (Marine Biology) – College of Charleston, Charleston, SC – 2003
57 credit hours in math and science – Union College, Barbourville, KY – 1997-1999
A.B. (Political Science) – Vassar College, Poughkeepsie, NY – 1970

Expertise

Impact of climate change and land use on watershed hydrology
Linkages between land use and ecological condition of sentinel habitats including human well-being and ecosystem services
Variability and plasticity of coastal ocean and estuarine sessile invertebrate populations
Contractual agreements among scientific partners for collaborative purposes and for fund-transfer mechanisms

Skills

ArcGis, Microsoft Office programs, EndNote, Adobe Photoshop, Google Earth, Systat
Photography, small boat operation, field research, data sonde calibration and operation
Administrative and management experience, good people skills, small business start-up and operation

Professional Positions

2004-Present Hollings Marine Laboratory, Charleston SC

Research Scientist: developing projects (stormwater runoff modeling), conducting studies (cumulative environmental impacts of private recreational docks in coastal areas of Georgia), presenting scientific findings (platform and poster), writing reports (including graphic designs and templates), compiling and analyzing data, reviewing databases for quality control, sampling tidal creeks (planning, conducting, photo documentation), supervising graduate students, mentoring interns

Administrative Support: developing Memorandum of Agreements with Center's scientific partners, contributing to NCCOS and Center data calls and review requests, purchasing equipment and supplies

Other Roles:

2012-present: Center POC and editor for NCCOS Web Project Database

2011-present: NCCOS Climate Impacts Implementation - Center Leader

2009-present: Center representative for NCCOS Climate Change theme

2004-present: Sentinel Habitats laboratory supervisor

2010-2011: Center representative for NCCOS People's Committee ;

2010-2011: Center representative for NCCOS Web Design team

2004-2009: Center POC for operation of R/V TideCreek

2000-2003 Graduate Research in Marine Biology, College of Charleston, Charleston, SC

2002-2003 Scientific SCUBA Diver, SC Department of Natural Resources, Charleston, SC

2002 One month as Research Associate, R/V Heraclitus (Planetary Coral Reef Foundation charter), Karang Kapota atoll, Sulawesi, Indonesia

2000 Teaching Assistant, College of Charleston, Charleston, SC

1984-1999 President, Anne Blair Insurance Agency, Inc., Barboursville, KY

Built and managed an innovative property and casualty independent insurance agency

Publications

- Sanger, D., **A. Blair**, G. DiDonato, T. Washburn, S. Jones, G. Riekerk, E. Wirth, J. Stewart, D. White, L. Vandiver, A.F. Holland. In review. The Impacts of Coastal Development on the Ecology and Human Well-being of Tidal Creek Ecosystems of the US Southeast. *Coasts and Estuaries*.
- Blair, A.**, S. Lovelace, D. Sanger, A.F. Holland, L. Vandiver, S. White. In review. Exploring Impacts of Development and Climate Change on Stormwater Runoff. *Hydrological Processes*.
- Blair, A.**, D. Sanger, D. White, A.F. Holland, L. Vandiver, C. Bowker, S. White. 2012. Quantifying and Simulating Stormwater Runoff in Watersheds. *Hydrological Processes*. doi: 10.1002/hyp.9616.
- Sanger, D., D. Bergquist, **A. Blair**, G. Riekerk, E. Wirth, L. Webster, J. Felber, T. Washburn, G. DiDonato, A.F. Holland. 2011. Gulf of Mexico Tidal Creeks Serve as Sentinel Habitats for Assessing the Impact of Coastal Development on Ecosystem Health. NOAA Technical Memorandum NOS NCCOS 136. 64pp.
- Holland, A. Fred, Denise Sanger, **Anne Blair** in collaboration with the Coastal Conservation League. 2011. "Case study evaluating the reductions in stormwater runoff volume and fecal coliform loadings projected to result from a transfer of development rights program in the May River watershed".
- Sanger, D., **A. Blair**, G. DiDonato, T. Washburn, S. Jones, R. Chapman, D. Bergquist, G. Riekerk, E. Wirth, J. Stewart, D. White, L. Vandiver, S. White, D. Whitall. 2008. Support for Integrated Ecosystem Assessments of NOAA's National Estuarine Research Reserves System (NERRS), Volume I: The Impacts of Coastal Development on the Ecology and Human Well-being of Tidal Creek Ecosystems of the US Southeast. NOAA Technical Memorandum NOS NCCOS 82. 85 pp.

Presentations

- Annual Meeting, Technical Advisory Committee of the Southeast Regional Climate Center, Charleston, SC, March 2012. Platform Presentation: "Changing Land Cover and Climate: Modeling Impacts on Stormwater Runoff." (*Invited*)
- 2011 Annual International Meeting of the American Society of Agricultural and Biological Engineers, Louisville, KY, August 2011. Platform Presentation: "Stormwater Runoff – Modeling Impacts of Urbanization and Climate Change."
- Ace Basin National Estuarine Research Reserve Coastal Training Program Workshop "Addressing Bacterial Contamination through Stormwater BMPs", Ridgeland, SC, May 2011. Platform presentation: "Bacterial Contamination in the context of Land Use, Runoff and Climate." (*Invited*)
- 2010 South Carolina Water Resources Conference, Science and Policy Challenges for a Sustainable Future, Columbia, SC, October 2010. Platform Presentation, "Stormwater Runoff - Modeling Impacts of Urbanization and Climate Change."
- The Coastal Society's 22nd International Coastal Conference, Wilmington, NC, June 2010. Platform Presentation, "Stormwater Runoff – Modeling Impacts of Urbanization and Climate Change."
- The Coastal Society's 22nd International Coastal Conference, Wilmington, NC, June 2010. Panel Member: Oceans and Human Health: Sentinel Habitats and Sentinel Species. Platform Presentation, "Tidal Creek Hydrology."
- NOAA in the Carolinas 2010 Meeting, Asheville NC, April 2010. Poster Presentation, "Stormwater Runoff – Modeling Impacts of Urbanization and Climate Change." (*Invited*)

Eric W. Montie

Assistant Professor of Biology, University of South Carolina (USC) Beaufort
One University Blvd, Bluffton, SC 29909 • Phone: (843) 208-8107 • Email: emontie@uscb.edu

PROFESSIONAL PREPARATION

MIT/WHOI	PhD, Biological Oceanography	2006
Clemson University	MS, Environmental Toxicology	1999
Harvard University	Post-baccalaureate studies (Biochemistry)	1994
Univ. Rhode Island	BS Zoology	1993

APPOINTMENTS AND EXPERIENCES

USC Beaufort	Assistant Professor, Biology	2011 –
Univ. South Florida	Research Associate (Neuro-imaging, bioacoustics)	2008–2010
Univ. South Florida	Postdoctoral Fellow (Marine Bioacoustics)	2007-2008
WHOI	Postdoctoral Investigator (Marine Chemistry)	2006-2007
NOAA/NOS	Research Biologist (Marine Mammals)	1999-2000

RESEARCH INTERESTS – NEUROBIOLOGY OF AQUATIC ORGANISMS

- Effects of chemical pollutants and marine toxins on the brain and hearing
- Neuroimaging of Marine Mammals
- Hearing of fish and marine mammals
- Acoustic communication of aquatic vertebrates

PUBLICATIONS (UNDERLINED AUTHORS INDICATE UNDERGRADUATE STUDENTS)

1. Powell, M.H., Nguyen, H.V., Gilbert, M., Parekh, M., Colon-Perez, L.M., Mareci, T.H., **Montie, E.W.** 2012. Magnetic resonance imaging and volumetric analysis: novel tools to study thyroid hormone disruption and its effects on white matter development. *Neurotoxicology* 33, 1322-1329.
2. **Montie, E.W.**, Wheeler, E., Pussini, N., Batthey, T.W.K., Van Bonn, W., Gulland, F. 2012. Magnetic resonance imaging reveals that brain atrophy is more severe in older California sea lions with domoic acid toxicosis. *Harmful Algae* 20, 19-29.
3. Fair, P.A., **Montie, E.**, Balthis, L., Reif, J.S., Bossart, G.D. 2011. Influences of biological variables and geographic location on circulating concentrations of thyroid hormones in wild bottlenose dolphins (*Tursiops truncatus*). *General and Comparative Endocrinology* 174, 184-194.

4. Van Bonn, W., **Montie, E.**, Dennison, S., Pussini, N., Cook, P., Greig, D., Barakos, J., Colegrove, K., Gulland, F. 2011. Evidence of injury caused by gas bubbles in a live marine mammal: barotraumas in a California sea lion *Zalophus californianus*. *Diseases of Aquatic Organisms* 96, 89-96.
5. Moore, M.J., Hammar, T., Arruda, J., Cramer, S., Dennison, S., **Montie, E.**, Fahlman, A. 2011. Hyperbaric computed tomographic measurement of lung compression in seals and dolphins. *The Journal of Experimental Biology* 214, 2390-2397.
6. **Montie, E.W.**, Manire, C.A., Mann, D.A. 2011. Live CT imaging of sound reception anatomy and hearing measurements in the pygmy killer whale (*Feresa attenuata*). *The Journal of Experimental Biology* 214, 945-955. **(INSIDE JEB)**
7. Mann, D., Hill-Cook, M., Manire, C., Greenhow, D., **Montie, E.**, et al. 2010. Hearing loss in stranded odontocete dolphins and Whales. *PLoS ONE* 5(11): e13824. doi:10.1371/journal.pone.0013824.
8. **Montie, E.W.**, Wheeler, E., Pussini, N., Batthey, T.W.K., Barakos, J., Dennison, S., Colegrove, K., Gulland, F., 2010. Magnetic resonance imaging quality and volumes of brain structures from live and postmortem imaging of California sea lions with clinical signs of domoic acid toxicosis. *Diseases of Aquatic Organisms* 91, 243-256.
9. **Montie, E.W.**, Letcher, R.J., Reddy, C.M., Moore, M.J., Rubinstein, B., Hahn, M.E., 2010. Brominated flame retardants and organochlorine contaminants in winter flounder, harp and hooded seals, and North Atlantic right whales from the Northwest Atlantic Ocean. *Marine Pollution Bulletin* 60, 1160-1169.
10. **Montie, E.W.**, Pussini, N., Schneider, G.E., Batthey, T.W.K., Dennison, S., Barakos, J., Gulland, F., 2009. Neuroanatomy and volumes of brain structures of a live California sea lion (*Zalophus californianus*) from magnetic resonance images. *The Anatomical Record* 292, 1523-1547. **(FRONT COVER OF JOURNAL)**
11. Wilson, M., **Montie, E.W.**, Mann, K.A., Mann, D.A., 2009. Ultrasound detection in the Gulf menhaden requires gas-filled bullae and an intact lateral line. *The Journal of Experimental Biology* 212, 3422-3427.
12. **Montie, E.W.**, Reddy, C.M., Gebbink, W.A., Touhey, K.E., Hahn, M.E., Letcher, R.J., 2009. Organohalogen contaminants and metabolites in cerebrospinal fluid and cerebellum gray matter in short-beaked common dolphins and Atlantic white-sided dolphins from the western North Atlantic. *Environmental Pollution* 157, 2345-2358.
13. **Montie, E.W.**, Garvin, S.R., Fair, P.A., Bossart, G.D., Mitchum, G.B., McFee, W.E., Speakman, T., Starczak, V.R., Hahn, M.E., 2008. Blubber morphology in wild bottlenose dolphins (*Tursiops truncatus*) from the southeastern United States: influence of geographic location, age class, and reproductive state. *Journal of Morphology* 269, 496-511.
14. **Montie, E.W.**, Fair, P.A., Bossart, G.D., Mitchum, G.B., Houde, M., Muir, D.C.G., Letcher, R.J., McFee, W.E., Starczak, V.R., Stegeman, J.J., Hahn, M.E., 2008. Cytochrome P4501A1 expression, polychlorinated biphenyls and hydroxylated metabolites, and

**National Estuarine Research Reserve System Science Collaborative
FY 2013 Funding Opportunity Timeline
*Required in the Full Proposal only***

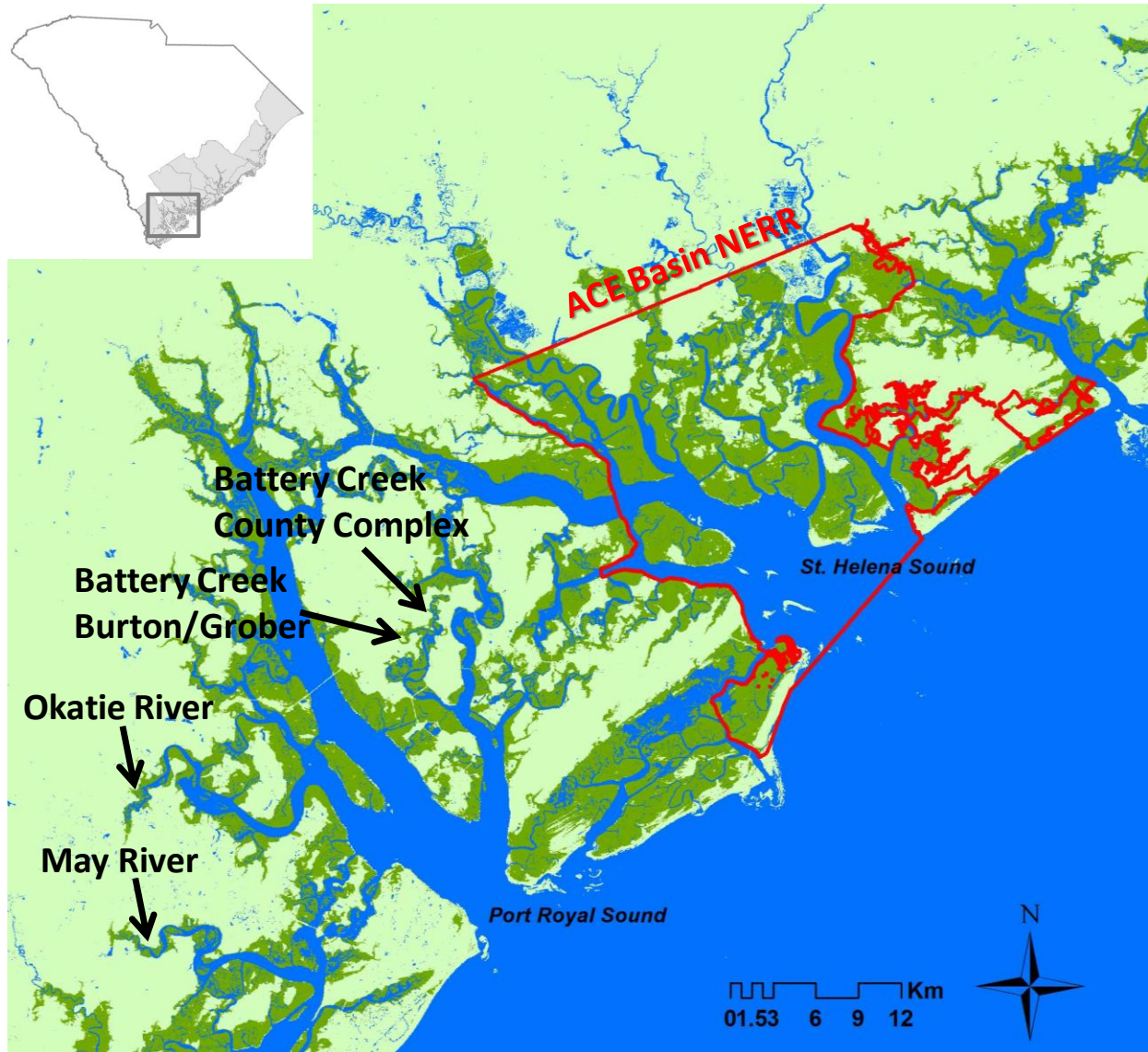
Proposal title: Collaborative Research to Prioritize and Model the Runoff Volume Sensitivities of Tidal Headwaters

Project coordinator: Dr. John W. Leffler

Please note: Q1, Q2, Q3 and Q4 refer to quarters of the project year.

List Project Objectives, Products, Activities	Pre-Project	Q1	Q2	Q3	Q4	Post-Project
Ongoing collaboration with BC and field work under the Memorandum of Agreement	X	X	X	X	X	X
BCSWM Advisory Board passes resolution endorsing proposed project	X					
Consult with BCSWM Advisory Board to share announcement of grant and revisit plans	X					
Collaborate with BCSWM Implementation Committee to select fifth creek, discuss specific sitings, methodologies, garner local data & insights (workshop 1)	X					
Purchase field equipment		X				
Deploy field equipment and collect data		X	X	X	X	X
Share findings and consult with specified community organizations		X			X	X
Analysis of data collected to date			X	X	X	X
Modeling of data collected to date		X	X	X	X	X
Prepare 6-month report for Science Collaborative			X			
Collaborate with Implementation Committee to incorporate local knowledge into stormwater model (workshop 2)				X		
Synthesize results and compile preliminary reports					X	
Collaborate with Implementation Committee on final analysis of results (workshop 3)					X	
Consult with BCSWM Advisory Board to share summary of results to date					X	
Prepare final report for Science Collaborative					X	
Continue monitoring in specific locations or possibly additional watersheds						X
Continue collaboration with Utility and Implementation Committee and consultation with Advisory Board and community organizations under the Agreement						X

J. Reference Map



A map of the region where the proposed research to identify stormwater sensitive waters will occur. Beaufort County straddles both sides of Port Royal Sound and adjoins the ACE Basin NERR. The headwaters of the May River, Okatie River, and Battery Creek are indicated. Battery Creek has two branches, both of which will be monitored. The fifth watershed will be selected through collaboration with the Beaufort County Stormwater Management Implementation Committee and the Stormwater Management Utility professional staff.

[Mastering the Language of Talking to Elected Officials](#)



June 19, 2013 (12-2pm EST)

5. Mastering the Language of Talking to Elected Officials:

“Better to remain silent and be thought a fool than to speak out and remove all doubt.” – Abraham Lincoln

Abe was on to something when we contemplate talking to elected officials about stormwater and watershed issues. It is not that we shouldn't speak out, but we often are unsure of what words to use, how much detail to include, and how, exactly, to inspire action. Whether you are local, state, or federal government staff, representing a watershed or civic group, have a stormwater-related business, or a concerned citizen, we know a few things to be true about communicating with elected officials: (1) their available time may be very short, (2) they have multiple other issues to deal with, and (3) they may not understand the issue. This webcast will specifically address the best ways to approach and communicate with elected officials, and will feature both noteworthy bloopers as well as success stories.

To date, speakers for this webcast are:

- **Chester (Chet) Arnold**, NEMO Program Co-Founder, Water Quality Educator for the University of Connecticut Department of Extension, and the Associate Director of UConn's Center for Land Use Education and Research (CLEAR) (Haddam, CT)
- **Honorable Mary Ann Lisanti**, Councilwoman, Past LGAC Chair and Harford County Council (Harford County, MD)
- **John Rozum**, Land Use and Geospatial Technology Specialist, NOAA Coastal Services Center (Oakland, CA)
- More speakers to come!

UNAUDITED AND PRELIMINARY
BEAUFORT COUNTY, SOUTH CAROLINA
STATEMENT OF NET ASSETS
Stormwater Utility
April 30, 2013 & April 30, 2012

	<u>April 30, 2013</u>	<u>April 30, 2012</u>
<u>ASSETS</u>		
Current Assets		
Cash and Investments with Trustee	\$ 3,019,409	\$ 2,682,719
Receivables, Net	2,334	-
Inventories	102,941	119,640
Prepayments	-	20,202
Total Current Assets	<u>3,124,684</u>	<u>2,822,561</u>
Capital Assets	2,841,893	2,798,912
Accumulated Depreciation	<u>(2,068,828)</u>	<u>(1,753,605)</u>
	773,065	1,045,307
Total Assets	\$ 3,897,749	\$ 3,867,868
<u>LIABILITIES</u>		
Liabilities		
Account Payable	57,400	86,313
Accrued Payroll	52,220	33,283
Accrued Compensated Absences	6,247	4,470
Total Current Liabilities	<u>115,867</u>	<u>124,066</u>
Long Term Liabilities		
Accrued Compensated Absences	63,160	70,038
Net Other Postemployment Benefits Obligation	<u>690,547</u>	<u>581,898</u>
Total Long Term Liabilities	753,707	651,936
Total Liabilities	869,574	776,002
<u>NET ASSETS</u>		
Invested in Capital Assets, Net of Related Debt	773,065	1,045,307
Reserved for Encumbrances	323,002	221,001
Unrestricted	<u>1,932,108</u>	<u>1,825,558</u>
Total Net Assets	<u>\$ 3,028,175</u>	<u>\$ 3,091,866</u>

Unaudited and Preliminary
 BEAUFORT COUNTY, SOUTH CAROLINA
 STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET ASSETS
 Stormwater Utility
 For the Period Ended April 30, 2013

	Budget FY 2013	April 30, 2013	Budget to Actual	Percent of Budget
Operating Revenues				
Stormwater Utility Fees	\$ 3,469,180	\$ 2,932,408	(536,772)	85%
Stormwater Utility Project Billings	370,664	20,299	(350,365)	5%
Total Operating Revenues	<u>3,839,844</u>	<u>2,952,707</u>	<u>(887,137)</u>	<u>77%</u>
Operating Expenses				
Personnel	2,014,323	1,515,782	(498,541)	75%
Purchased Services	1,296,188	676,057	(620,131)	52%
Supplies	426,597	238,379	(188,218)	56%
Depreciation	273,545	227,960	(45,585)	83%
Total Operating Expenses	<u>4,010,653</u>	<u>2,658,178</u>	<u>(1,352,475)</u>	<u>66%</u>
Operating Income (Loss)	(170,809)	294,529	465,338	-172%
Non-Operating Revenues (Expenses)				
Interest Earned	11,389	-	(11,389)	0%
Total Non-Operating Revenues (Expenses)	<u>11,389</u>	<u>-</u>	<u>(11,389)</u>	<u>0%</u>
Change in Net Assets	(159,420)	294,529	453,949	-185%
Net Assets, Beginning	<u>2,733,646</u>	<u>2,733,646</u>		
Net Assets, Ending	<u>\$ 2,574,226</u>	<u>\$ 3,028,175</u>	453,949	118%

Unaudited and Preliminary
BEAUFORT COUNTY, SOUTH CAROLINA
STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET ASSETS
Stormwater Utility
For the Period Ended April 30, 2012

	Budget FY 2012	April 30, 2012	Budget to Actual	Percent of Budget
Operating Revenues				
Stormwater Utility Fees	\$ 3,344,133	\$ 3,004,606	(339,527)	90%
Stormwater Utility Project Billings	64,278	399	(63,879)	1%
Total Operating Revenues	<u>3,408,411</u>	<u>3,005,005</u>	<u>(403,406)</u>	<u>88%</u>
Operating Expenses				
Personnel	1,986,780	1,493,889	(492,891)	75%
Purchased Services	770,938	555,765	(215,173)	72%
Supplies	426,223	268,680	(157,543)	63%
Depreciation	285,859	238,734	(47,125)	84%
Total Operating Expenses	<u>3,469,800</u>	<u>2,557,068</u>	<u>(912,732)</u>	<u>74%</u>
Operating Income (Loss)	(61,389)	447,937	509,326	-730%
Non-Operating Revenues (Expenses)				
Gain (Loss) on Sale of Capital Assets	50,000	50,000	-	100%
Interest Earned	11,389	-	(11,389)	0%
Total Non-Operating Revenues (Expenses)	<u>61,389</u>	<u>50,000</u>	<u>(11,389)</u>	<u>100%</u>
Change in Net Assets	-	497,937	497,937	-100%
Net Assets, Beginning	<u>2,593,929</u>	<u>2,593,929</u>		
Net Assets, Ending	<u>\$ 2,593,929</u>	<u>\$ 3,091,866</u>	497,937	119%

Project Summaries

May 2013



Project Summary: Toomer Road Outfall

Activity: Routine/Preventive Maintenance

Narrative Description of Project:

Completion: Feb-13

Project improved 2,574 L.F. of drainage system. Cleaned out 2,574 L.F. of channel ditch. Installed (2) bleeder pipes.

2013-619 / Toomer Road Outfall	Labor Hours	Labor Cost	Equipment Cost	Material Cost	Contractor Cost	Indirect Labor	Total Cost
AUDIT / Audit Project	0.5	\$10.45	\$0.00	\$0.00	\$0.00	\$6.62	\$17.06
BPINST / Bleeder pipe - Installed	40.0	\$896.70	\$145.02	\$327.27	\$0.00	\$598.20	\$1,967.19
HAUL / Hauling	67.0	\$1,470.25	\$716.90	\$479.88	\$0.00	\$961.87	\$3,628.90
ODCO / Outfall ditch - cleaned out	210.0	\$4,648.70	\$959.71	\$454.49	\$0.00	\$3,074.60	\$9,137.50
ONJV / Onsite Job Visit	13.0	\$280.98	\$52.26	\$58.90	\$0.00	\$318.11	\$710.25
PL / Project Layout	12.0	\$283.16	\$16.08	\$13.33	\$0.00	\$106.68	\$419.25
STBY / Stand By	8.0	\$179.34	\$8.04	\$13.48	\$0.00	\$119.64	\$320.50
2013-619 / Toomer Road Outfall Sub Total	350.5	\$7,769.58	\$1,898.01	\$1,347.35	\$0.00	\$5,185.72	\$16,200.65
Grand Total	350.5	\$7,769.58	\$1,898.01	\$1,347.35	\$0.00	\$5,185.72	\$16,200.65

Before



During



After





Project Summary: Seabrook Road Outfall

Activity: Water Quality

Narrative Description of Project:

Completion: Feb-13

Grubbed and cleared 50 L.F. of outfall ditch. Constructed a 25 x 50 plunge pool for erosion control. Upsized (1) access pipe. Hydroseeded for erosion control.

2013-323 / Seabrook Road Outfall	Labor Hours	Labor Cost	Equipment Cost	Material Cost	Contractor Cost	Indirect Labor	Total Cost
APINS / Access pipe - installed	52.0	\$1,162.40	\$429.83	\$989.56	\$0.00	\$653.24	\$3,235.03
AUDIT / Audit Project	1.0	\$20.89	\$0.00	\$0.00	\$0.00	\$13.23	\$34.12
HAUL / Hauling	68.0	\$1,479.80	\$727.60	\$2,554.42	\$0.00	\$980.56	\$5,742.38
HYDR / Hydroseeding	20.0	\$457.35	\$65.08	\$104.85	\$0.00	\$290.65	\$917.93
NONPRO / Non-Professional Services	0.0	\$0.00	\$0.00	\$0.00	\$109.35	\$0.00	\$109.35
ODGRB / Outfall ditch - grubbed	42.0	\$964.50	\$180.16	\$359.41	\$0.00	\$616.34	\$2,120.41
ONJV / Onsite Job Visit	19.0	\$629.22	\$76.38	\$66.00	\$0.00	\$502.89	\$1,274.49
PP / Project Preparation	3.0	\$107.18	\$6.03	\$6.00	\$0.00	\$87.65	\$206.85
PRRECON / Project Reconnaissance	4.0	\$122.24	\$8.04	\$3.00	\$0.00	\$94.38	\$227.66
SC / Sediment Control	40.0	\$914.70	\$183.72	\$231.70	\$0.00	\$581.30	\$1,911.42
UTLOC / Utility locates	1.0	\$20.89	\$4.02	\$3.00	\$0.00	\$13.23	\$41.14
2013-323 / Seabrook Road Outfall	250.0	\$5,879.17	\$1,680.86	\$4,317.94	\$109.35	\$3,833.46	\$15,820.78
Sub Total							
Grand Total	250.0	\$5,879.17	\$1,680.86	\$4,317.94	\$109.35	\$3,833.46	\$15,820.78

Before



During



After



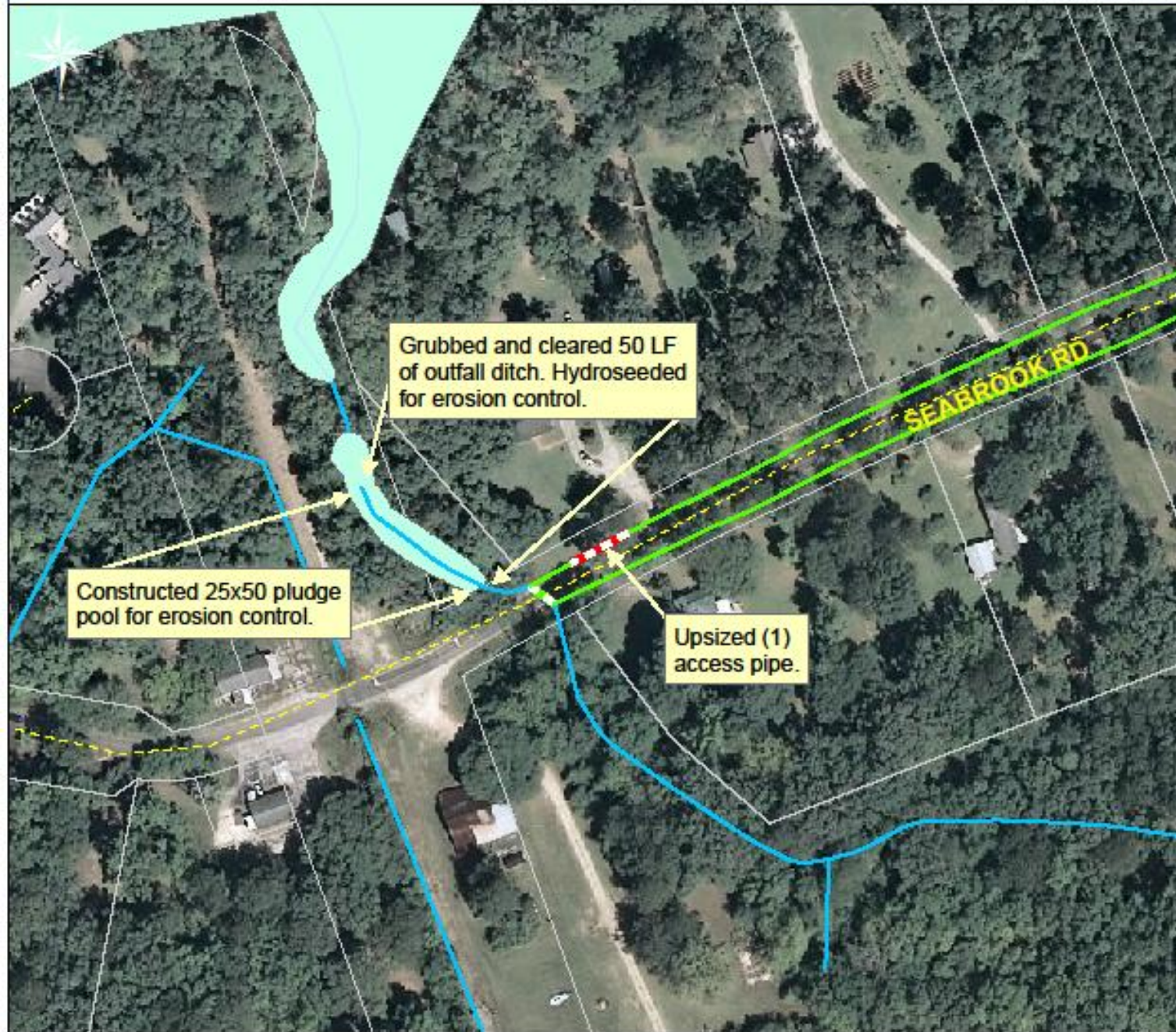
Project: Seabrook Road Outfall

Activity: Water Quality

**Project #:
2013-323**

**Township: Port
Royal Island**

**Completed:
February 2013**



Legend

	Pludge Pool
TYPE	
	River
	Creek/Stream
	River/Creek/Marsh BANK
	Channel (fka Outfall)
	Channel Pipe
	Lateral
	Lateral Pipe
	Roadside
	Roadside Pipe
	Road Pipe
	Crossline Pipe
	Driveway Pipe
	Access Pipe
	Bleeder Pipe



1 inch = 132 feet



Project Summary: Royal Pines Subdivision - Wade Hampton Drive Outfall

Activity: Routine/Preventive Maintenance

Narrative Description of Project:

Completion: Apr-13

Project improved 455 L.F. of drainage system. Cleaned out 310 L.F. of channel ditch. Upsized 145 L.F. of channel pipe to correct elevation. Installed (1) access pipe, (1) access gate, sod and rip rap for erosion control. Repaired washout.

2013-690 / Royal Pines Subdivision	Labor Hours	Labor Cost	Equipment Cost	Material Cost	Contractor Cost	Indirect Labor	Total Cost
AGI / Access Gate - Installed	34.0	\$779.28	\$34.17	\$224.95	\$0.00	\$339.15	\$1,377.55
AUDIT / Audit Project	1.5	\$31.34	\$0.00	\$0.00	\$0.00	\$19.85	\$51.18
BKFILL / Back Fill	20.0	\$417.80	\$304.24	\$137.84	\$0.00	\$264.60	\$1,124.48
HAUL / Hauling	113.5	\$2,478.06	\$1,220.72	\$1,568.88	\$0.00	\$1,559.15	\$6,826.80
ODCO / Outfall ditch - cleaned out	40.0	\$916.80	\$170.27	\$804.45	\$0.00	\$399.00	\$2,290.52
OFPI / Outfall Pipe - Installation	40.0	\$916.80	\$276.60	\$3,355.96	\$0.00	\$399.00	\$4,948.36
ONJV / Onsite Job Visit	79.0	\$2,286.80	\$301.50	\$162.29	\$0.00	\$1,771.43	\$4,522.01
PP / Project Preparation	17.0	\$415.27	\$28.14	\$24.80	\$0.00	\$180.54	\$648.75
RPWO / Repaired Washout	9.0	\$202.80	\$12.06	\$12.71	\$0.00	\$79.38	\$306.95
SI / Sod - Installation	40.0	\$916.80	\$158.40	\$14.57	\$0.00	\$399.00	\$1,488.77
WSDR / Workshelf - Dressed	14.0	\$292.46	\$115.17	\$92.82	\$0.00	\$185.22	\$685.67
2013-690 / Royal Pines Subdivision Sub Total	408.0	\$9,654.20	\$2,621.27	\$6,399.25	\$0.00	\$5,596.31	\$24,271.04
Grand Total	408.0	\$9,654.20	\$2,621.27	\$6,399.25	\$0.00	\$5,596.31	\$24,271.04

Before

During

After



Small Drainage Projects

Catch Basin Repairs

Completed in December 2012

Repaired one catch basin lid each on:

- Mattis Dr
- Middle River Dr
- Chisholm Rd

Small Drainage Projects

Port Royal Island Valley Drains

Completed in February 2013 – Port Royal Island

Cleaned 25,312 feet of valley drains on 13 roads:

Horton Dr, Roseida Rd Ext, Rivers Hill Rd, Smith Rd,
Moses Rd, Mulrain Rd, Webb Rd, Braden Rd, Smalls
Hill Rd, Grant St, Franklin Rd, Cherokee Farms Rd,
Donaldson Camp Rd

Small Drainage Projects

Ball Park/Village Creek

Completed in February 2013

Repaired washout on newly reconstructed
outfall ditch

Small Drainage Projects

L.H. Nelson Dr. Outfall, Phase II

Completed in February 2013

Cleaned out 1,360 feet of outfall ditch and
685 feet of roadside ditch

Small Drainage Projects

Port Royal Island Tree Removal

Completed in February 2013

Removed fallen trees from Chisholm Hill Rd, Bay Pines Rd, and Burton Wells Complex outfall ditches and Mint Farm detention pond

Small Drainage Projects

Burton Wells Road Outfall

Completed in February 2013

Removed blockages from flowline by hand

Small Drainage Projects

Gray Road

Completed in March 2013

Removed several blockages from flowline and repaired wash out

Small Drainage Projects

Lost Island Road

Completed in March 2013

Cleaned 1,932 feet of roadside ditch, jetted one crossline pipe and nine driveway pipes, then hydroseeded for erosion control

Small Drainage Projects

Landford Road

Completed in March 2013

Cleaned 870 feet of roadside ditch and repaired washout

Small Drainage Projects

Horse Tail Road / Dash Road Outfall

Completed in April 2013

Cleaned 3,595 feet of outfall ditch and installed bleeder pipe

QUESTIONS ?



BEAUFORT COUNTY
STORMWATER MANAGEMENT UTILITY BOARD

Wednesday, July 3, 2013

2:00 p.m.

Beaufort Industrial Village, Building 2 Conference Room

102 Industrial Village Road, Beaufort

843.255.2801

In accordance with South Carolina Code of Laws, 1976, as amended, Section 30-4-80(d), all local media was duly notified of the time, date, place and agenda of this meeting.

1. CALL TO ORDER – 2:00 p.m.
 - A. Approval of Agenda
 - B. Approval of Minutes – June 5, 2013
2. INTRODUCTIONS
3. PUBLIC COMMENT
4. REPORTS
 - A. Monitoring Update – Bob Klink
 - B. Utility Update – Bob Klink
 - C. Upcoming Professional Contracts Report – Rob McFee
 - D. Financial Report – Alan Eisenman
 - E. Maintenance Project Report – Eddie Bellamy
5. UNFINISHED BUSINESS
 - A. Regional Coordination – Rob McFee
6. NEW BUSINESS
7. PUBLIC COMMENT
8. NEXT MEETING AGENDA
 - A. August 7, 2013
9. ADJOURNMENT

