



**Mississippi-Alabama Sea Grant Consortium
2011 Progress and/or Completion Report Form**

Title as it appears on title/cover page:

An Interdisciplinary Assessment of Population Growth and Development impacts on the Fish River Basin Coastal Community.

MASGC Project Number: R/CCD-14

Project Initiation Date: 2/1/2008

Completion Date: 1/31/2011

Principal Investigator: Latif Kalin

Affiliation: Auburn University

Co-Principal Investigator: Charlene LeBleu

Affiliation: Auburn University

Co-Principal Investigator: Susan Pan

Affiliation: Auburn University

Co-Principal Investigator: Rebecca Coleen Retzlaff

Affiliation: Auburn University

Co-Principal Investigator: Graeme Lockaby

Affiliation: Auburn University

The SMART Objective, which is linked to your project:

By 2011, one watershed-scale water-quality model to quantify the impact of land use/cover changes in Fish River, Alabama, will be used by the Alabama Department of Environmental Management to rapidly assess the River's Clean Water Act § 303d status.

If an objective is listed above, please address how this is being met within the text of your report. Note: some SMART Objectives are being met by multiple projects. Please address how this objective is being met by your project on page 4 of this report.

Why we are asking for this information:

This form is designed to gather performance information and statistics on MASGC-supported research, education and outreach projects for our annual report to the National Sea Grant Office. MASGC strives to fund rigorously reviewed, technically sound projects that result in impacts. Your project is one of these, and we are confident that the work you proposed will result in local, state, regional, national, and/or international benefits. As a program we are accountable to the National Sea Grant Office to demonstrate that the work we do results in positive impacts and accomplishments.

The annual report is one of the primary ways that Sea Grant College Programs are assessed, therefore we ask that you complete this form to reveal the successes of your project to date and demonstrate a component of Mississippi-Alabama Sea Grant Consortium strengths. We recognize that there are many times that a project must mature after its official end date but please provide details about the status of your project and note if an entry is completed or anticipated.

We have provided several sources of information to assist you with completing the annual report. They include:

- the MASGC annual report that was submitted to the National Sea Grant Office last year and includes a section on your project if you submitted an annual report last year
- the annual report you submitted last year to MASGC for this project if applicable
- a supplemental guide with examples and list of partners
- the MASGC strategic plan so that you can see how your project is related to the overall MASGC program (your SMART objective(s) are listed at the beginning of this document)

Instructions:

Please refer to the supplemental document that provides more in-depth instructions many of the sections below.

Some sections of this annual report form are cumulative while other sections refer only to work that has taken place between February 1, 2010, and January 31, 2011. Please follow the instructions for each section.

Please fill in all fields that apply to your project. If there is nothing to report in a field, write "NA" (Not Applicable). You should provide only the requested information. Reports with insufficient information will be returned for completion.

Complete a separate report for each MASGC project on which you serve as principal investigator. Your report is due by June 17, 2011. Submit the report to Loretta Leist as a Microsoft Word document. Please contact Loretta Leist with questions:

loretta.leist@usm.edu or 228-818-8835

Date of Report Submission:

Person Completing Report Name:

Type of report (X):

Progress Report Completion Report

Status of the project (X):

New Continuing Complete Extended

Change in Scope or Length of Project

Have there been any approved changes made to the project, such as project extension, changes in the scope of work or PIs? If so, briefly explain here. The reporting requirements including instructions for changes to the project are available online at: <http://www.masgc.org/forms>.

Enter change in scope or length of project description:

LK: The original end date of the project was 1/31/2010. We had received a 1-year no-cost extension. The project ended on time on 1/31/2011.

Summary of Progress to Date:

The paragraph summary should not exceed 5,000 characters including spaces with emphasis given to describing the translation of the project to end-users through outreach and education. This section should be cumulative and cover progress from the initiation of the award through January 31, 2011.

Enter paragraph summary:

This project had research and outreach components. The research part was composed of 4 categories: geographic analysis, water quality sampling and analysis, watershed modeling, and best practices analysis. The geographic and best practices analyses were completed in year one. The water quality sampling/analysis and watershed modeling required the whole three years to finish. The outreach and education effort was in years 2 and 3, with the main efforts being in year 3. Water quality sampling and analysis results showed that in general there is a reduction nitrogen and increase in phosphorous loadings from the Fish River tributaries to the Weeks Bay compared to water quality data collected during mid 1990's. This shift was linked to the shift to peanut farming in early 2000's. A best practices manual was prepared to guide the stakeholder and decision makers to mitigate such effects. A modeling effort was undertaken with the Soil and Water Assessment Tool (SWAT) to study the effects of changing land use/cover on water quality and quantity. The SWAT model was shown to be reliable tool in predicting such impacts. To convey all these and educate the public, in year 3 we had a workshop and a charrette in the city of Fairhope. 30 people attended the workshop and the charrette, out of which 30% were from Baldwin County. We had presentations on i) the state of the Fish River Watershed, water quality data and SWAT watershed modeling; ii) an overview on green policy in Baldwin County in comparison to federal and state levels; and iii) LID model policy and design, and economic benefits of protecting trees during development. A hands on charrette of a site in Baldwin County was conducted with the same group above to show the current constraints of using LID

techniques in Baldwin County and the need for policy change. Design time was also used to show what LID site techniques might offer improvement to specific water quality problems. Feedback from the workshop concluded that the event was an overall success and much interest was expressed in conducting more of these workshops and charrettes in the future, specifically with larger coastal sites. Several comments identified how important it was to not only learn about the watershed modeling information, but also learn how to communicate that information to their clients and stakeholders. Knowing how to properly communicate modeling information also serves as a useful tool in promoting a new LID policy in Baldwin County and other coastal areas.

Section 1: Accomplishments and Outcomes:

List the major accomplishments and outcomes that your project has achieved. Be brief (one or two structured sentences per accomplishment/outcome) and not to exceed a total of 10 accomplishments and outcomes for your research project. Please number each accomplishment or outcome. This section should be cumulative and build on any previous accomplishment list if this is your second report. Do not change accomplishments listed from any previous report.

Copy your project accomplishments and outcomes from previous report (if applicable) here:

1. **GIS:** Land use/cover (LULC) maps for the years 1995, 2001, and 2008 are developed from remote sensing (Landsat TM) imageries and aerial photographs. The trend in LULC changes from 1995 to 2001 and from 2001 to 2008 are analyzed using these developed LULC datasets.
2. **GIS:** We found that LULC conversion is mainly from pasture to urban residential and commercial.
3. **Water Quality:** We identified 12 sites that are suitable to take water quality samples to analyze for N, P, and TSS levels. ISCO automated samplers were installed at 4 sites to take storm flow samples, with grab samples taken from other sites.
4. **Water Quantity:** We installed pressure transducers at 10 of the water quality sampling sites to measure water stage at 15-min intervals; one site has a USGS gage and another is not suitable for flow measurements. During each storm we measure flow discharge, which will be regressed against stage to develop rating curves to eventually develop flow hydrographs at each site.
5. **Modeling:** SWAT model was setup for the Fish River watershed and successfully calibrated for flow using the 1992 National Land Cover Data (NLCD).
6. **Best Management Practices:** Literature review on identifying best management practices (BMP) that would be suitable for the study site and for the constituents we are studying (N, P, TSS) is completed. We are working on identifying the BMPs that are currently in place in the study area.
7. **Outreach:** The bulk of the outreach activities will be happening during the final year of the project. In this first year we developed some contacts to do a workshop in Fairhope, AL.
8. **GIS:** We finished accuracy assessment of the developed LULC maps. Accuracy above 80% is achieved in each of the 1995, 2001 and 2008 LULC maps.

9. **Water Quality:** We completed water quality sampling and most of the lab analysis (total 353 samples). Although analyses still are ongoing, preliminary results show substantial increase in TP and moderate decrease in NO₃ levels from mid 1990s to 2008.
10. **Water Quantity:** Stage discharge curves have been developed for each sampling site by regressing stage levels with the measured flow discharge values. The stage levels, which we still keep recording at the sampling sites every 15-min, have then been converted into flow time series.
11. **Modeling:** SWAT model was successfully calibrated and validated for N, P and TSS using 1992 LULC data. Model predicted changes in water quality with good accuracy with 2008 LULC data.
12. **Best Management Practices:** A draft document (50 pg.) on the policies and best practices suitable for water quality management in the Weeks Bay has been prepared. Once it's reviewed by all the PIs, it will be final.
13. **Outreach:** We developed contacts in the city of Fairhope, AL to present data to support an upgrade stormwater regulations and bring these new BMP/ stormwater regulations up for public vote (November 2010). A workshop will be presented in September or October 2010 (date to be decided by the stakeholders in July 2010) to assist Fairhope in promoting the new stormwater regulations and reinforce a positive public opinion for the new stormwater BMPs to become development standards and not just options. Impacts to be measured and reported after completion of the workshop.

Add new accomplishments and outcomes achieved from February 1, 2010, to January 31, 2011 here. Do not exceed 10 new accomplishments/outcomes:

1. **Water Quality Sampling & Analysis:** We completed water quality sampling and all the lab analysis. Results show substantial increase in TP and moderate decrease in NO₃ levels from mid 1990s to 2008.
2. **Water Quality Trends:** We have shown that LULC classifications play important role in understanding water quality trends. Introduction of peanut farming in the early 2000's had a big impact on the N/P ratio of the Fish River tributaries.
3. **Water Quantity:** For each sampling site flow discharge time series have been obtained at 15 min time interval for 18 months. No trend is detected in flow at the USGS site.
4. **Modeling effect of LULC changes:** SWAT model was shown to be a reliable tool in predicting changes in water quality (N, P, and TSS) and quantity as a result of changing LULC.
5. **Best Management Practices:** The document on the policies and best practices suitable for water quality management in the Weeks Bay has been finalized.
6. **Outreach:** Thirty (30) professionals (Landscape Architects, Planners, Arborists, Civil Engineers, and Forest Hydrologists) attended a Low Impact Development (LID) Workshop and Charrette in Fairhope, Baldwin County, AL, at the Fairhope Public Library.
7. **Workshop:** We had presentations on i) the state of the Fish River Watershed, water quality data and SWAT watershed modeling; ii) an overview on green policy in Baldwin County in comparison to federal and state levels; and iii) LID model policy and design, and economic benefits of protecting trees during development.

8. **Charrette:** A hands on charrette of a site in Baldwin County was conducted with the same group above to show the current constraints of using LID techniques in Baldwin County and the need for policy change. Design time was also used to show what LID site techniques might offer improvement to specific water quality problems.
9. **Workshop and Charrette Feedbacks – general comments:** Feedback from the workshop concluded that the event was an overall success and much interest was expressed in conducting more of these workshops and charrettes in the future, specifically with larger coastal sites.
10. **Workshop and Charrette Feedbacks – specific comments:** Several comments identified how important it was to not only learn about the watershed modeling information, but also learn how to communicate that information to their clients and stakeholders. Knowing how to properly communicate modeling information also serves as a useful tool in promoting a new LID policy in Baldwin County and other coastal areas.

Section 2: Project Impacts:

Project impacts are a high priority for Sea Grant. Include as many impacts as possible in this section. MASGC encourages you to think broadly when completing this section of the annual report. There may be cases where there are a limited number or no impacts to be reported at this time. If you do not believe that your project has a current impact, please suggest a potential impact and note that it is a potential impact.

Use the provided examples and instructions document for guidance on writing your impact.

Enter your project impacts:

FOCUS AREAS: SCD

TITLE: Watershed Models and Sustainable Development

RELEVANCE: Changes in land use and cover, especially urbanization, is known to impact water quality and quantity in watersheds, often adversely. Quantification of such impacts is crucial for sustainable development. This is especially so in coastal regions where population growth and ensuing urbanization problem put enormous stress on coastal resources. Due to the proximity of coastal watersheds to the coasts, pollutants find little time to be assimilated. Fish River watershed which drains to Weeks Bay (an Outstanding National Water) has been rapidly urbanizing lately. Therefore, establishing the linkage between the water quality and land use/cover types in the area is vital for sustainable future development.

RESPONSE: Over a two year period we sampled and analyzed the water quality in many tributaries of the Fish River. Using this and past data we developed a watershed model (SWAT) to explore whether models can accurately predict effects of land use/cover changes on water quality

RESULTS: SWAT model was shown to be reliable tool for such purposes. ADEM is currently reviewing our modeling effort (through MS thesis) for potential use of SWAT in their TMDL development efforts in the Fish River watershed. After a one day workshop (attended by 30) most of the attendees acknowledged how little they knew about watershed modeling and were interested in learning how to communicate that information to their constituents, clients and stakeholders. The Baldwin County Planning Commission (several attended the workshop) recently hired John Curry, PE of Hydro Solutions, LLC to provide SWAT watershed modeling for the county.

RECAP: Stakeholders and planners are more interested in applying new technologies in their decision making for sustainable development.

Additional Question Relative to Impacts

Indicate how you are progressing related to the SMART objective related to your project if one was listed on the first page of this document. If not, skip this question.

Enter progress toward your SMART Objective:

No ADEM officials attended the workshop although they paid their registration. However, they are seriously interested in the SWAT model for potentially using it in the Fish River watershed TMDL development. They asked for a report to make and assessment. We recently sent the MS

thesis of the student (Harsh Singh) who did the modeling part of this project. ADEM also selected Fish River watershed as a pilot watershed to develop TMDL nutrient criteria. We will provide them the water quality data (N, P, and TSS) that we collected during this study at several tributaries of the Fish River to help them in that regard.

Thirty percent of the Sept 2010 workshop attendees were planners from Baldwin County including four Baldwin County Planners, two City of Daphne Planners, two City of Foley Planners and two Fairhope Planners. These planners had never heard of SWAT watershed modeling prior to this workshop. The Baldwin County planning has now hired John Curry, PE of Hydro Solutions, LLC to provide SWAT watershed modeling for the county.

Section 3: Performance Measures

This reporting period covers activities through February 1, 2010 to January 31, 2011. The next reporting period for “anticipated” Performance Measures covers activities through February 1, 2011 to January 31, 2012. Only report on activities for this reporting period and new anticipated activities for next year. If it was entered on your last report, do not count it again.

Use the guidance document provided for additional explanation and examples. Please answer any of the following if they relate to your project. Answer each section as best as you can. There will likely be entire sections that do not apply to your project. If they do not relate to your project, please write NA.

Economic (market and non-market) benefits derived from your project.

EXAMPLE 1: MASGC-sponsored *Vibrio vulnificus* education programs have contributed to a decrease in per capita incidence of *Vibrio vulnificus* infection in the state over the past decade. While the total number of cases reported has remained steady, the population of the state has increased by 14%, over 1,200,000, since 2000. According to the FDA, the economic cost to society of a single case of *Vibrio* is \$2,008,917, making the value of this educational effort in excess of \$12 million dollars.

Economic benefit (\$) = \$12,000,000

EXAMPLE 2: MASGC conducted a training program consisting of 4 workshops, 2 new fact sheets, and 13 site visits for crab processing plants that enabled 13 plants to continue operations and save an estimated 65 jobs.

Businesses retained = 13

Jobs retained - 65

MASGC conducted education programs consisting of a planning workshop and a design charrette. Total number of attendees were 30 with 30% from Baldwin County.

Reported policy change—Baldwin County will engage watershed modeling to inform and support changes that will result in a healthier watershed.

Policy change = 1 (Baldwin County will now engage watershed modeling)

Please fill in these 2 tables. Add additional rows as needed.

2/1/2010 - 1/31/11 Actual

Description of benefit	Economic benefit (\$)	Businesses created (#)	Businesses retained (#)	Jobs created (#)	Jobs retained (#)	Patents/Licenses (#)
EXAMPLE 1: <i>Vibrio</i> education program	12,000,000					
EXAMPLE 2: Crab processing plant training program			13		65	
SWAT Watershed Model						
Water Quality Data						

2/1/11 - 1/31/12 Anticipated

Description of benefit	Economic benefit (\$)	Businesses created (#)	Businesses retained (#)	Jobs created (#)	Jobs retained (#)	Patents/Licenses (#)

Healthy Coastal Ecosystems

Please fill in this table.	2010 Actual 2/1/2010-1/31/2011	2011 Anticipated 2/1/2011-1/31/2012
Number of acres of degraded ecosystems restored as a result of your project		
Linear feet of shoreline restored as a result of your project		
Number of stakeholders who use ecosystem-based approaches in the management of land, water and living resources in coastal areas because of your Sea Grant project	30 attendees participated in hands-on workshop and charrette	

Number of coastal communities that have restored degraded ecosystems as a result of Sea Grant activities.

Coastal communities can include cities, municipalities, small towns even if unincorporated and neighborhoods if they have a cohesive identity.

List multiple communities in the appropriate boxes.	2010 Actual 2/1/2010-1/31/2011	2011 Anticipated 2/1/2011-1/31/2012
Communities that have restored degraded ecosystems as a result of this project	EXAMPLE 1. Ft. Bayou Estates, MS 2. Turkey Creek, MS	EXAMPLE 1. Orange Beach, AL
	1.	1.

Tools, technologies, and information services that are used by partners/customers to improve ecosystem-based management.

Examples of tools include: land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, AUVs, genetic markers for fishery stocks) and resource development (e.g. culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools.

Please fill in this table. Add additional rows as needed.	2010 Actual (2/1/2010 - 1/31/2011)		2011 Anticipated (2/1/2011 - 1/31/2012)	
	Developed	Used	Developed	Used
Tool, Technology or Information Service EXAMPLE: Sea Bird Bycatch Reduction Flag (developed in 2009 and use is anticipated in 2010)	YES	NO	NO	YES
SWAT Modeling (via contract with Hydro Solutions, LLC)	YES	YES		

Hazard Resilience in Coastal Communities

List the coastal communities provided with information on local hazard resilience and hazard mitigation tools, techniques and best practices with your Sea Grant-funded project:

1.

Coastal communities that have adopted or implemented hazard resilience practices to prepare for and respond to/minimize coastal hazardous events.

Please fill in this table. Add additional rows as needed.		Number of resilience training/technical assistance provided		Community hazard resilience improved (e.g., changes in zoning ordinances)? (Y/N)	
Name of Coastal Community	County of the Coastal Community	2010 Actual (2/1/2010 - 1/31/2011)	2011 Anticipated (2/1/2011 - 1/31/2012)	2010 Actual (2/1/2010 - 1/31/2011)	2011 Anticipated (2/1/2011 - 1/31/2012)
EXAMPLE: Ocean Springs, MS	Jackson County	1	3	N	Y

Citizens that have been provided resiliency information, and citizens that have adopted or implemented hazard resilience practices to prepare for and respond to/minimize coastal hazardous events.

Please fill in this table.	Number of citizens	
	2010 Actual 2/1/2010-1/31/2011	2011 Anticipated 2/1/2011-1/31/2012
Provided or will be provided information or trained in local hazard resiliency and hazard mitigation tools, techniques and best practices.		
Adopted or implemented or expected to adopt or implement hazard resilient practices to prepare for and respond to/minimize coastal hazardous events		

Safe and Sustainable Seafood Supply

Number of fishers, consumers and seafood industry stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety and the health benefits of seafood.

Please fill in this table.	2010 Actual # 2/1/2010-1/31/2011	2011 Anticipated # 2/1/2011-1/31/2012	Comments
Number of producers, and distributors modifying their practices using knowledge gained in fishery sustainability, seafood safety and the health benefits of seafood			
Number of seafood consumers modifying their practices using knowledge gained in fishery sustainability, seafood safety and the health benefits of seafood			
Number of fishermen who adopt and implement responsible harvesting and processing techniques and practices			
Number of resources managers, and seafood businesses (aquaculturists, processors and recreational fishermen) who adopt and implement responsible harvesting and processing techniques and practices			

Sustainable Coastal Development

List the Actual (2/1/2010 - 1/31/11) coastal communities engaged in activities (e.g. visioning, resource inventories, analysis of development policies) or making informed development decisions that address the sustainability of economic and environmental resources as a result of Sea Grant’s capacity building, tools, data, technologies and/or education of community leaders:

1. Daphne, AL
2. Fairhope, AL
3. Foley, AL

List the Anticipated (2/1/2011 - 1/31/12) coastal communities that will be engaged in activities (e.g. visioning, resource inventories, analysis of development policies) or making informed development decisions that address the sustainability of economic and environmental resources as a result of Sea Grant’s capacity building, tools, data, technologies and/or education of community leaders:

Number of coastal communities and businesses that have adopted or implemented sustainable (economic and environmental) development practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of your project.

List multiple communities in the appropriate boxes.	2010 Actual 2/1/2010-1/31/2011	2011 Anticipated 2/1/2011-1/31/2012
List of communities that have adopted or implemented sustainable development practices and policies as a result of this project	EXAMPLE 1. Ocean Springs, MS 2. Bayou LaBatre, AL	EXAMPLE 1. Dauphin Island, AL 2. Waveland, MS 3. Biloxi, MS
	1.	1. Baldwin County, AL
List of businesses that have adopted or implemented sustainable development practices and policies as a result of this project	1.	1.

Section 3A: Cross Cutting Performance Measures

Number of graduate students and fellows supported by MASGC that enter the coastal and marine science, management and policy workforce:

- 2 planning grad students and 2 landscape architect grad students = 4 CADC

Number of people that use information gained from MASGC educational opportunities: 30+

Section 4: Other Project Accomplishments/Outcomes:

- a. **Students financially supported. This includes students supported by any Sea Grant funds (federal, match and leveraged funds included): hourly support, tuition and stipend. You should report on undergraduates or high school students and whether they are continuing or new as of this report:**

New students: Students who have not previously been counted and are supported by a MASGC project

Continuing students: Students who were previously counted and are still supported by a MASGC project

Graduate or Professional Degrees Awarded: Students who received full or partial support from a MASGC project

This table should only include items that are applicable for the period of 2/1/10-1/31/11.

Category	Number of New Students	Number of Continuing Students	Number of Degrees Awarded
Sea Grant-supported MS/MA graduate students	4-CADC		3
Sea Grant-supported Ph.D. graduate students			
Sea Grant-supported undergraduate students			
Other Sea Grant supported graduate or professional degree students (includes JD students)			
Sea Grant-supported high school students			
Volunteer students			

Number of hours provided by volunteer students on your Sea Grant project:

- b. **Project awards/honors (include any awards that you or your students received that are related to this project) This section should include items only for the period of 2/1/10-1/31/11:**

- Andrew Morrison: Alabama Water Resources Conference oral presentation award, 2nd place. [Morrison, A., L. Kalin, B.G. Lockaby, and S. Phipps (2010), “Spatial and Temporal Trends and the Role of Land Use/Cover on Water Quality and Hydrology in the Fish River Watershed”, 2010 Alabama Water Resources Conference, Sep 8-10, 2010, Orange Beach, AL]

c. **Publications**

This section should only include items that are applicable for the period of 2/1/10-1/31/11. Do **not** include publications reported in prior reports unless the peer-reviewed publication status has changed (i.e. In press to published).

Published peer-reviewed journal articles and book chapters:

- Singh, H.V., **L. Kalin**, and P. Srivastava (2010), "Effect of Soil Data Resolution on Identification of Critical Source Areas of Sediment", *Journal of Hydrologic Engineering*, doi:10.1061/(ASCE) HE.1943-5584.0000318.

In press or in prep peer-reviewed journal articles and book chapters (indicated status and when you expect it to be published and when you expect to submit to MASGC):

- Singh, H.V., **L. Kalin**, A. Morrison, P. Srivastava, B.G. Lockaby, S. Pan (2011), "Post-Validation of Swat Model for Predicting Impact of Land Use/Cover Changes on Water Quality and Quantity", *Journal of the American Water Resources Association (JAWRA)* (under review, should hear from them soon, can submit it before the end of 2011).

Technical reports:

Proceedings and symposia (report papers included or proceedings where you served as editor)

Brochures:

Fact sheets:

Posters (for educational distribution, not presented at conference):

Books, monographs:

Videos, CDs, DVDs, MP3s, software and other non-print formats:

Maps, charts and atlases:

Handbooks, manuals and guides:

Electronic publications:

Theses, dissertations (indicate status, in progress or completed and date you expect to submit to MASGC):

1. Harsh Singh, MS Thesis, August 2010. Modeling impact of Land Use/ Cover changes on Water Quality and Quantity of Fish River Watershed (completed).
2. Andrew Morrison, MS Thesis, December 2010. Spatial and Temporal Trends and the Role of Land Use/Cover on Water Quality and Hydrology in the Fish River Watershed. (completed)

Newsletters, periodicals (list by title, do not include your Sea Briefs article for research project):

Press releases:

Newspaper columns:

Media placement:

Articles submitted to partner agency newsletters:

Websites (provide site name and address):

Miscellaneous document types, i.e. posters, radio scripts, PowerPoint presentations, workshop summaries, topical Websites (summary/abstract and URL), other educational materials not listed above:

4 workshop power points

Program reports (annual/biennial, strategic and implementation plans):

Bibliographies, directories:

d. **Presentations (group and indicate category accordingly):**

This section should only include items that are applicable for the period of 2/1/10-1/31/11.

Do **not** include presentations that you reported on for a previous report.

Insert additional rows as necessary for each table.

Published abstracts presented orally at meetings:

Authors	Title	Event	Date	No. of people in session
Kalin, L., A. Morrison, H. Singh, S. Pan, C. LeBlue, R. Retzlaff	Water Quality Response to Changes in Land Use/Cover in the Fish River Watershed: A Modeling and Monitoring Synthesis	Alabama-Mississippi Bays & Bayous Symposium	Dec 1-3, 2010	

Published abstracts presented as posters at meetings:

Authors	Title	Event	Date	No. of people in session

Presentations not cited as a published abstract:

Authors	Title	Event	Date	No. of people in session
Morrison, A., L. Kalin, B.G. Lockaby, and S. Phipps	Spatial and Temporal Trends and the Role of Land Use/Cover on Water Quality and Hydrology in the Fish River Watershed	2010 Alabama Water Resources Conference	Sep 8-10, 2010	
Singh, H., L. Kalin, A. Morrison, P. Srivastava, B.G. Lockaby, and S. Pan	Can we Really Predict Effects of Changes in Land Use/Cover on Water Quality and Quantity?	2010 Alabama Water Resources Conference	Sep 8-10, 2010	

Conference displays and posters not published as an abstract:

Authors	Title	Event	Date	No. of people in session

Community outreach program presentations:

Authors	Title	Event	Date	No. of people in session
Kalin, LeBleu, Retzlaff & Morrison	Low Impact Development Workshop and Charrette for Coastal Sustainability	Workshop and Charrette	9/16/10	30

e. **Professional meetings, conferences, and workshops organized (give titles, dates and approximate attendance):**

List only events in which Sea Grant support was integral (e.g., planning/financial/personnel contributions)

This section should only include items that are applicable for the period of 2/1/10-1/31/11.

Do **not** include meetings that you reported on for a previous report

Your project meetings, conferences and workshops:

Project meetings:

Outreach meeting; conference call, 3/17/10, 5 people

Outreach meeting, Fairhope, AL, 7/6/10, 4 people

Outreach meeting; conference call, 7/19/10, 4 people

Outreach meeting, Fairhope, AL, 7/27/10, 4 people

Outreach meeting in Fairhope, AL, 9/10/10, 4 people

Low Impact Development Workshop and Charrette for Coastal Sustainability, 9/16/10, 30

Landscape Architects, Planners, Arborists, Civil Engineers, and Forest Hydrologists.

Outreach meeting; Fairhope, AL; 10/19/10; 12 people

f. **Extension and Outreach Events**

Researchers should only fill in this section if your project has supported a Sea Grant outreach event between 2/1/10 and 1/31/11.

Event	Number of Events or Volunteers	Total (or Best Estimate) Number of Participants or Volunteer Hours
SG-Sponsored meetings, workshops and conferences**	1	30
Volunteer hours**		

**The numbers for the SG-Sponsored meetings, workshops and conferences should be the sum of the numbers reported in section 5e, above.

*Volunteer hours: The estimated number of hours that citizens volunteer without payment for their time and services to help MASGC accomplish the goals and objectives of our plan (co-sponsored events/trainings). For example, app volunteer hours from a beach clean-up that is sponsored by Sea Grant could contribute. If you reported your volunteer students in the student tracking chart above (Section 5a) do not report them here.

Certification Programs	Number of Events (this Reporting Year)	Number of People Certified this Reporting Year	Cumulative Number of People Certified
Clean Marina Program			
Dolphin Smart			
Nature Tourism			
C-FISH			

Master Naturalist			
Oyster Gardening			
HACCP			
Other (Please list)			

g. Education Metrics

PIs should only fill in this section if your project has supported a K-12 education event between 2/01/10 and 1/31/11.

Education Metrics	Elementary School	Middle School	High School	Total
Number of K-12 Students Reached by Educators*				
Total number of curricula developed**				

*K-12 Students Reached by Educators (Defined by the National Sea Grant Office as the estimated number of K-12 students who attend a Sea Grant sponsored workshop or training (i.e., by an educator/extension agent), as well as the number of students reached by teachers who have utilized information from a Sea Grant workshop/training.) If you do not have an actual count, you may estimate based on 25 students per class.

** Total Number of Curricula Developed (Defined by the National Sea Grant Office as the number of curricula developed with Sea Grant support, assistance or influence. Curricula include formal education courses, school or university instructional materials, lesson plans, audio-visual materials, teacher guides and textbooks.)

h. Leveraged funds (list source, amount and years)

List funds leveraged (funds influenced by this project) during the reporting period of 2/1/10-1/31/11 from non-Sea Grant sources (but managed by Sea Grant) which are not used as match. Leveraged funds may be from NOAA, other federal, state or local resources. Some examples of leveraged funds are workshop fees, sponsorships, donations and cost recovery. Leveraged funds can also include other funds or awards that are a direct result of your existing Sea Grant funded project.

Only report on portions of funds that were allocated for use from 2/1/10-1/31/11.

Do **not** include funds listed in previous reports.

Insert additional rows as necessary:

Leveraged Project	Source of Funds	Amount in Dollars
Workshop	Registration	\$805.00
Center for Forest Sustainability	MS student stipend	15,550 per year for 2.5 years

i. Partners. Researchers must list all of the partners engaged in their MASGC project for this reporting period. Please spell out the names of each agency (no acronyms). You should identify each partner as federal, regional, state, local, non-governmental, international, industry/business, school system, secondary school, junior college, university or a Sea Grant program, etc. Use the partners list in the supplemental document for reference. (Example: Mississippi Department of Marine Resources - State):

1. Auburn University Marine Extension & Research Center (State)
2. Weeks Bay Reserve and Foundation (Federal/State)
3. Mobile Bay National Estuary Program (Federal)
4. Auburn University Center of Forest Sustainability (State)

j. Other benefits not captured above:

k. Problems encountered:

l. Other comments regarding your project or this annual report form: