

**MID TERM PROGRESS REPORT  
SEPTEMBER 2006  
BURROUGHS WELLCOME FUND  
STUDENT SCIENCE ENRICHMENT PROGRAM**

**SECTION ONE: COVER PAGE**

**SECTION TWO: PROGRESS REPORT/EVALUATION**

**I. Progress to Date**

**A. Project Plan:** As a brief overview of the project, its primary goal is to provide enhanced comprehension and interest in earth science among high school students in Pasquotank, Camden, and Currituck Counties. For each year of the program, 20 students and three teacher mentors are to be given instruction in problem-based learning strategies, use of geospatial technologies, and field experiences in order that the aforementioned goal may be achieved. The period after receiving the award in November of 2005, during the winter and spring of 2006, project staff met on a weekly basis to develop activities for the project's first summer workshop. The project staff also discussed ways of providing an academic year program that would reflect the experiences of students and teacher mentors at the summer workshop. The implementation of workshop activities and the students' evaluation of those activities in the Student Feedback Survey suggest that the first summer workshop was very successful. A statistical summary of the survey's results are now being compiled, and will be a part of the project's first Annual Report in September of 2007. Details of student workshop activities are presented later in this report. Personnel changes that needed to be addressed in the project involved the original Co-Director, who left the University at the end of the Spring Semester. Her departure made it necessary to find a replacement, which is described in the "Description of Project Staff" portion of this report. Also, upon recommendations from the program evaluator, Mrs. Sally Bond, adjustments were made in planning for the academic year program. We are now in the process of implementing the academic year activities, which involve two seminars in which the students return to the site of the summer workshop to review and enhance the group projects that they developed over the summer. We do not anticipate any significant changes in the planning strategies and types of activities foreseen for the second year of this project. We will, however, have a goal of recruiting 22 students for the next year's program instead of the 20 stipulated in the proposal for each year of the project. This revised goal is a result of the fact that of the 20 students who had been recruited and who had committed to participating in the first summer workshop, only 18 ended up fulfilling their commitment to participate. The two students who had

originally committed themselves to participate indicated that they could not attend the workshop for personal reasons.

**B. Student Participation:** The recruitment of students to participate in the project was based on communications with the school district offices representing each of the participating counties. The Project Director initially gave the assistant superintendent of each district a summary of the goals of the project, and, subsequently, discussed with them the logistics of determining the number and the types of students to participate in the project. Given the project goal of 20 students to participate in the project from all three school districts during the first year, these communications resulted in a decision to select ten students from each school district to be considered for participation in the first year of the project. Based on this initial premise for student selection, the following steps were taken in the recruitment process for the project's first year:

1. The workshop date of July 31 to August 11, 2006 was agreed upon based on the opening of the Fall Semester for each of the school district's public schools, which was not until August 25<sup>th</sup>.
2. After discussing with the assistant superintendent and a representative from a high school in the district concerning the number of students that would participate, it was decided that 7 students would be identified from Northeastern High School in Pasquotank County, 7 students from Camden County High School, and 6 students from Currituck County High School. This would equal to the 20 students stipulated to participate in the project's first year. In Pasquotank County, which has two high schools with the second being Pasquotank High, would alternate student participation in the workshop between Northeastern and Pasquotank County High during years two and three of the project. Both Camden and Currituck Counties have one high school. Nine students ended up participating from Pasquotank County, five students from Camden County, and four students from Currituck County.
3. With respect to the criteria for student recruitment, the following items were agreed upon:
  - a. A science coordinator would be selected from each school and that person, or some designate, would serve as teacher mentor to students participating in the workshop.
  - b. Students from all four grade levels at each high school, with a grade point average of 2.5 and above, will be considered for participation in the project based on the satisfaction of stated criteria. (at Camden High School only 9<sup>th</sup> graders were considered)

- c. In the recruitment process, diversity in student selection will be adhered to with respect to gender and race.
  - d. Focus in recruitment will be given to those students who have an interest in science as a major in college.
- 4. It was agreed upon that students be selected from a pool based on their pre-registration for the Fall Semester and who will be enrolled in Earth Science.
  - 5. A survey administered to prospective students was distributed at participating high schools and included a range of questions including those dealing with the student's ethnicity, grade level, and means of transportation to and from the workshop site.

A copy of this student recruitment survey is in ATTACHMENT A. This general process of student recruitment will continue in year two of the project.

**C. Activities:** The project's activities were conducted primarily in the summer workshop's home base, the Center of Excellence for Remote Sensing Education and Research (CERSER) on the campus of ECSU. The project staff recognized a high level of interest among the 18 student participants in the various activities that were developed for their training during the project's first year summer workshop (access to project website in ATTACHMENT B). While each activity addressed in part all of the goals stipulated by the BWF, the following activities were placed beneath one of the three project goals that seemed most fitting for that goal.

**1. Improve competence in science:**

- a. Day 1: Students were given a Problem-based learning (PBL) activity developed by staff member Dr. Jim Botti. In an attempt to evaluate the students' present knowledge of their local environment, an important aspect of PBL, they were mailed a scenario which dealt with Elizabeth City and the surrounding northeastern North Carolina region two weeks prior to the workshop and were asked to read thoroughly the scenario. A copy of the scenario is in ATTACHMENT C. A major focus of the scenario was a description of Elizabeth City as the economic center of the region and the nature of the region as a wetlands environment. It was expected that the students would know, through their observation and experience in living in

the area, certain facts of the area and communicate those facts in response to the scenario. The students' response to this scenario was returned to project staff day one of the workshop, and will be compared to a second copy of the same scenario the students responded to on day nine of the workshop after their training by project staff. The objective of this activity is to determine how much additional information the students were able to communicate about the local environment and the quality of their responses after their workshop participation based on their training in and comprehension of the scientific method, and how it can be applied to their knowledge of the region. Initial findings from their second response to the same scenario revealed that students communicated a more thorough review of the scenario. A copy of these responses is shown in ATTACHMENT D. A more complete analysis of this pre- and post- evaluation of this PBL activity will be given in the Annual Report.

- b. In day 2 the students were divided into teams where they delivered power point presentations regarding problems they defined relative to the local environment and recommendations were given as the possible solution to these problems.
- c. In day 3 of the workshop students were introduced to Geographical Information Systems (GIS) in which they were led, by Mrs. Julie Stamper, the Pasquotank County GIS Coordinator, through a tutorial within the GIS software ArcView. This activity may have been placed in the "Nurture enthusiasm for science" category because the students seemed very interested in the technology and how it connected to the earth science content training they were receiving. However, it was placed in the competence section because students had no knowledge of this technology prior to the workshop, but ended up being quite proficient in GIS after the training. In this part of the workshop the students were instructed in the types of land use found in Elizabeth City and surrounding areas. GIS allowed students to utilize their computer skill by analyzing spatial data. Students were allowed to demonstrate hands-on on GIS procedures where they constructed layers of spatial data which ultimately led to map products of the local area, including an examination of such physiographic features such as tree-types in forested areas and urban land use patterns surrounding Elizabeth City. Examples of GIS procedures performed by the student are shown in ATTACHMENT E.

- d. Also in day 3 students learned the mechanics of deciphering locations by using Geographical Positioning Systems (GPS). Students accomplished this field-work with the assistance of staff members Julie Stamper and Elizabeth Noble. Strategic locations of campus landmarks, such as buildings, trees, statues, were identified and, through mapping, their relative locations determined.
- e. In day 4 of the workshop students took a field trip to the Great Dismal Swamp. They participated in observational activities where they took notice of the local swamp environment. Water quality data that were collected included PH, water temperature, salinity, and dissolved oxygen.

## **2. Nurture enthusiasm for science:**

- a. Day 4, on Thursday, activities focused on a field trip to the Dismal Swamp. A review of the activities and the logistics of this trip is in ATTACHMENT F. The enthusiasm that students had on the trip was evident through their expressions of interest of the natural setting of a swamp environment. Students examined a variety of plant species and a few animals in their natural habitat as well as birds and insects native to the area. A rather large snake was also spotted in the distance on a log in Lake Drummond. Lake Drummond, the largest natural lake in Virginia, was one of three data acquisition sites where research was conducted on such aspects of the aquatic environment as water temperature, salinity, and PH. Project students also visited the U.S. Fish and Wildlife Service Dismal Swamp Refuge and were given a lecture on the history and characteristics of the swamp by one of the directors of the facility.
- b. Day 5, the following Friday, activities focused on a review of the data that were collected the previous day in the Dismal Swamp in the CERSER lab, the home base for the workshop. Wetland plants that were collected were identified and mounted for viewing and analysis. Students also downloaded pictures that had been taken in the swamp into their respective group's power point. With the guidance from project staff, students analyzed the readings on the various instruments used to collect the data. Staff members also reviewed with students GPS readings that were obtained on the previous day, including a review of longitude/latitude designations. Among the instruments that students utilized were the Secchi Disk, which is a

measure of water depth; the Beaufort Scale, an indication of wind intensity; and GPS readings. Students were also given large scale topographic maps of the swamp and identified the locations where data were collected. Even though this activity was placed in the “nurture interest” category the students receive much content information relating to topographic maps and their relation to what was observed in the local environment. Important map properties such as map scale, contours, and map symbols also were discussed. For the remainder of the day the groups formed earlier worked to enhance their power point presentations.

- c. Day 6, on Monday of the second week of the workshop, activities involved a field trip to the Currituck Sound to study the aquatic environment of the region and more specifically to examine submerged aquatic vegetation (SAV) in surrounding wetlands. The day was highlighted by a visit to the Outer Banks Center for Wildlife Education. The main exhibit of this facility was a review of the rich natural and cultural history associated with northeastern North Carolina. It includes a 12,000-gallon aquarium stocked with native species found in the Currituck Sound. The center also features 5,000 square feet of exhibits, displays and artifacts that the students examined. The students were provided with a 20-minute presentation of “Life by the Water Rhythms,” which explores the important influence of water on the natural and cultural history of the region. The students also visited the Currituck Lighthouse, and got an aerial view of the surrounding area.
- d. Day 7 dealt with a review of the data that was collected in the Currituck Sound field trip the previous day. Among the instruments used in the analysis of the local area were the Beaufort Scale and the Secchi Disk that was mentioned earlier. Students were involved in the identification of SAV and the examination of critical factors to their existence such as exposure to sunlight in which plants are allowed to form and develop.

### **3. Interest students in research or science careers:**

- a. Day 8 of the workshop dealt with activities that were largely related to student careers in earth science and related areas of study. In the morning students visited the

Department of Geological, Environmental, and Marine Science (GEMS), the host of this project. The chairman of the Department, Dr. Francisco San Juan, reviewed with the group the GEMS curriculum and career opportunities in the earth sciences. Dr. San Juan delivered a power point presentation of former students who had graduated from the Department and who had experienced successful careers in graduate school, in state, local and federal government agencies, and in private industry. Dr. San Juan also gave the students a tour of the Department's facilities in the Jenkins Science Complex. Students seemed very interested because they raised several questions about earth science as a career option, such what are the starting salaries in the field and opportunities to travel.

- b. In the afternoon students visited the Museum of the Albemarle and Port Discovery. Port Discovery is a community-based, non-profit organization established to enhance the public's understanding and enjoyment of science through engaging programs, activities, and exhibits. ECSU and the Elizabeth City Area Chamber of Commerce initiated the project and have attracted broad community support. Specific activities that workshop students experienced at this facility include computer airplane flight simulation, observance of sea life, and the examination of rocks and minerals. At the Museum of the Albemarle Mrs. Charlotte Patterson, staff educator, informed the group of the various facilities in the museum, including the "Jackson House," which was under construction within the museum, and nature of the local environment during the early days of the country's development. The tour also provide students with the rich history of the Albemarle region, including many aspects of earth science that includes such topics as the Underground Railroad, the effects of recent storms such as Hurricane Fran and Floyd, and subsequent flooding in the region that altered the physical landscape.
- c. In Day 9, on Thursday, the next to the last day of the workshop, students were taken to the University's planetarium. The Administrative Assistant to this facility, Ms. Jennifer Thoms, presented earth science as it interacts with other disciplines such as astronomy, meteorology, and environmental science.
- d. In Day 10, Friday and the last day of the workshop, students delivered their power point presentations, received certificates for their workshop participation, and a portion of their stipend.

**D. Project staffing:** The project staff originally included Dr. Kathleen Fischer as the Co-Director, but she departed the University at the end of the Spring Semester 2006. Thus, efforts were made to replace Dr. Fischer with comparable staff to continue what was originally proposed for this program. After review of potential individuals who could serve effectively in the completion of project goals, Mrs. Elizabeth Noble, an instructor in Remote Sensing in the GEMS Department, was selected to replace Dr. Fischer. Her role in the project is similar to what Dr. Fischer's role would have been if she had remained at the University. Mrs. Noble was the principle coordinator of the field trip portion of project including setting appointments with appropriate agencies and study sites, lead instructor in the field experience, and overseeing the student's analyses of data collected. In addition to Mrs. Noble, Dr. Thomas Rossbach was added to the team to help compensate for the loss of Dr. Fischer. Dr. Rossbach, who is Associate Professor of Geology in the GEMS Department, led discussions on various geologic processes such as volcanoes and mountain building. His role is complimentary to the main thrust of the workshop training, which is on the local marine environment of the Elizabeth City area, and contributes to a more comprehensive overview of the earth science field of study. Dr. Leon Pringle, instructor in the GEMS Department, was also added to the staff and was a leader in the discussion of the biology and chemistry of terrestrial and aquatic aspects of the local environment. Dr. Pringle has also taken the responsibility of project photographer, which is vital in the documentation of various workshop activities. Another change from the original project plan with respect to staffing is the acquisition of Mrs. Reequita Walston, Administrative Assistant in the GEMS Department. The role of Mrs. Walston is to oversee the logistical and administrative aspects of the project. Staff members already in place include Mrs. Julie Stamper, the Pasquotank County GIS Coordinator. Mrs. Stamper provides the project with training in GIS. Mr. Ernest Hughes and Ms. Jacklyn James are coordinating the development of the project's web page. Mr. Hughes is Web-developer in the Department of Education on the campus of ECSU and Ms. James is a technical assistant in the science area and a recent graduate in the University's Mathematics and Computer Science Department. This work is important for the wider dissemination of the project and may work to help future recruitment of project participants.

## **II. Evaluation**

The primary evaluation of this program, with respect to the three program goals, will come from BWF Student Science Survey. Tables will be constructed from the statistical summaries of the survey administered to the students. The data will be analyzed and presented in the Annual

Report. In addition to this main vehicle of evaluation, the following itemizes the kinds of other data that have been collected, the population from which the data were or will be collected, and the manner in which these data will be analyzed with respect to the three program goals:

**Goal # One: Competence in science**

- a. In addition to the BWF/SSEP Student Science Survey, another evaluation vehicle used in this project is a “Scientific Methods Concept Map,” which is shown in ATTACHMENT G. This evaluation instrument represents a survey of the students’ knowledge of the specific stages of the scientific method prior to and after their workshop training. The data from the concept map is currently being compiled and will be ultimately analyzed and presented in the Final Report. This tool will be used to determine the extent to which the students have gained an improved comprehension of the scientific method as a result of their workshop experience.
- b. Another vehicle used to assess the students’ comprehension of science was their response to a “Quality and Quantity Comparison of Pre and Post-Summer Workshop Scenario Responses.” This vehicle is a measure of the students’ ability to comprehend earth science as presented in a written description of a portion the local environment. As mentioned earlier, the scenario can be found in ATTACHMENT C. In this evaluation, the students were given the scenario prior to their beginning the summer workshop. They were given the same scenario to respond to a day before the last day of the workshop. The student’s pre- and post- workshop responses are shown in ATTACHMENT D. An initial review of these responses suggests that the students were more thorough in their second response to the scenario after the workshop training. The Scenario Response Survey was conducted by staff member Dr. James Botti. Dr. Botti, who traveled from his home in Pennsylvania to participate in the early stages of the workshop, departed the workshop after day three, The student’s response to the scenario were forwarded to him and his response to their work is shown in ATTACHMENT H. A more thorough analysis of the scenario response data will be included in the Annual Report for the project’s first in September of 2007.

## **Goals # Two: Enthusiasm for science**

- a. One vehicle of evaluation that was used to measure Students' enthusiasm for science was the Parent/Guardian Survey (ATTACHMENT I). Students were given this survey, at the beginning of the second week of the workshop, to take home and have their parents or guardian complete. In this survey the parents/guardians were asked what they perceived was the level of interest of their children before they started attending the workshop compared to their interest after the workshop had begun. They also were asked to make comments about their child's participation in the workshop. In addition to measuring the students' interest in and enthusiasm for the program, this vehicle also allows the project staff to gauge the parent's involvement and interest in their child's education. Studies have shown that there is a positive relationship between parental involvement in their child's education and the child's level of interest and achievement in classroom learning (Bainbridge and Sundre, 2000). The data from the survey will be organized in tabular form, and presented, with analysis, in the Annual Report.
- b. The second vehicle of evaluating the students for science interest and enthusiasm was through observation by the project staff of student work in various workshop activities. This is a qualitative measure, but probably affords the best estimate of how well the students are receiving the training they are getting through various activities and their motivation for learning. These observations are currently being summarized and will be included in the Annual Report for the project's first year.

## **Goal # Three: Interest in earth science careers**

- a. To assess the students' interest in science careers, their facial expressions and reactions were observed when given information by the GEMS department chair on the subject. Several students seemed to have an interest in science as a possible career option. During the academic year seminars the students will be interviewed to gain further insight as to their intentions in pursuing a career in science.

A formative evaluation was given at the end of each day's workshop activities for the purpose of assessing the students' receptiveness and understanding of the logistical details of activities and procedures (ATTACHMENT J). Thus, any issues worthy of the staff's concern were dealt with in a timely manner in which the goal was to enhance the over the overall operation of the workshop while in session. Tabular data will be compiled from this evaluation and \ presented in the Annual Report.

### **Reference**

Bainbridge, W.L. and Sundre, S.M. 1990. Parents as consumers of public education. *The Education Digest*, 56:41-42.

### **SECTION THREE: FINANCIAL REPORT**

Very few changes are anticipated in the budget of the project for the second year. Project staff will meet to identify allocations in supplies based on what was spent for the first year activities and projected expenditures for year two. Among the supplies purchased in this year's budget include three Magellan Expoport 400 GPS (\$689.85), two Olympus SP-320 71MP Digital Cameras (\$519.98), an assortment of supplies used in the field work, such as Soil PH Test Kit, Sand Gauge, field guides, and USGS topographic maps (\$513), five 256 MB Micro cruzer USBEA Flash Drives (\$500), and a variety of computer related accessories including mapping software and data cards for storing map data (\$309). The three GPS units were for the purpose of each school system (Pasquotank, Camden, and Currituck) being allowed to obtain a unit for their respective districts to be used in the local high school(s). Assuming that student project activities will be similar in the project's second year as in the first year, one additional unit may be purchased so that each one of the four groups established for student project presentation during the summer workshop will be able to utilize this instrument during the workshop period. In addition to the items cited above, various supplies necessary for the efficient functioning of the workshop such as notepads, pencils, pens, paper, etc. were obtained through the University's "petty cash" fund where items are purchase directly from a vendor instead of the standard requisition process. Receipts for these items were retained for record-keeping and review.

Adjustments will also need to be made in the area of allocations to student participants and teacher mentor allocations, as well as project staff. These adjustments were necessary because not all students and teacher mentors recruited to the program ended up participating. As mentioned in the Project Plan section of this report, of the 20 students anticipated to participate in the project's first summer workshop, only 18 ended up attending. Therefore, the program's second year appropriations will accommodate 22 students to make-up for the two that were expected to participate but did not in the 2006 summer workshop. Also, one of the three teacher mentors who committed to participating the workshop fail to attend. The funds which were not used for this person in year one because of their absence will be spent for supplies in the second year. With respect to project staff, allocations are similar to those that were given in the original proposal; an exception was that the original Co-PI, Dr. Kathleen Fischer, left the University at the end of the Spring Semester 2006. As indicated in the Project Staff section of this report, the compensation she would have received for her services, had she remained with the project, were reallocated to three other persons who were not originally designated as such. There was little change in the budget as a result of revisions in the project staff from what was originally proposed.

The following is the SSEP Financial Report Guide summation of expenditures which was prepared by our project staff administrative assistant, Ms. Reequita Walston. This summation is a reflection of actual receipts, travel documents and purchase orders, with expenditures, which have been reported in the "Fiscal Year Actual" and the "Budgeted for Fiscal Period" columns in the University's accounting system, the Banner Financial

System's Organizational Budget. Copies of this system's accounting of project expenses are presented in ATTACHMENT K.

## **SECTION FOUR: ATTACHMENTS**

- A. STUDENT RECRUITMENT SURVEY**
- B. PROJECT WEB-SITE: <http://nia.ecsu.edu/bw/>**
- C. PROBLEM-BASED LEARNING SCENARIO**
- D. RESPONSES TO PBL SCENARIO**
- E. EXAMPLES OF GIS PROCEDURES PERFORMED BY STUDENTS**
- F. DISMAL SWAMP FIELD TRIP/DATA ACQUISITION INSTRUMENTS**
- G. SCIENTIFIC METHOD CONCEPT MAP**
- H. DR. BOTTI'S RESPONSE TO STUDENT SCENARIO REVIEW**
- I. PARENT/GUARDIAN SURVEY**
- J. DAILY EVALUATION**
- K. ECSU'S FINANCIAL SYSTEM'S ORGANIZATIONAL BUDGET**