

**The Associated Colleges of the South
Final Report
Mini-Grants: Introductory Science Courses for Non-
Majors Program**

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Institution: University of
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Title of Project: Making the land-sea connection
in inner-city Richmond
classrooms: Bringing the
Chesapeake to school and
bringing students to the Bay.

Date(s) of Project: 07/01/2006-06/30/07

Amount Awarded: \$14,210

**Information for Assessment of the Grant from the W. H.
Keck Foundation of Los Angeles**

1. Raw evaluation data for the courses, including institutional quantitative and qualitative course evaluations, and instructor-designed evaluations, which could include supplemental questions, pre- and post-tests, focus groups, etc., depending on the course.

Marine Biology of the Chesapeake Bay (MBCB) is being offered in the current semester. For this reason, none of the data requested is available at this time. Course evaluations will be available in May, 2007.

2. How many times and when the courses have been offered; numbers of students taking the courses.

Marine Biology of the Chesapeake Bay is being offered in the current semester (Spring, 2007). The total enrollment for the course is 31 students. This is the first offering. It is anticipated that the course will be offered every other academic year at a minimum.

3. The dissemination efforts used on-campus, regionally (meetings), and nationally (meetings, journal publications, books).

Because *MBCB* is a service-learning course, we anticipate presenting results of the learning outcomes at national meetings focused on undergraduate education. The PI hopes to publish findings from this course in *Frontiers in Ecology and the Environment's Pathways to Scientific Teaching* section. Furthermore, because we are using iPod technology in a major assignment for the course, we will present data on the effectiveness of this medium in learning involving non-science majors.

4. Whether a grantee has requested or received additional funding for the project, or is planning a proposal, and if not why.

The original grant project was part of a more expansive proposal that was submitted to the Bay Watershed Education Training program sponsored by the National Oceanographic and Atmospheric Administration. Although that grant was not funded, the reviews were extremely positive and the program officers strongly encouraged a resubmission. Reviewers suggested that a pilot program be conducted to develop the undergraduate course and

develop relationships with a single elementary school as proof-of-concept. The proposal submitted to ACS followed from those comments. All of the participants in the B-WET grant have voiced continued support for the course proposal included here. Given the success of this service-learning course and the partnership with Overby-Sheppard Elementary School, our future goals include submission of another B-WET grant (for FY2008).

5. Level of support and encouragement from the Dean/Provost throughout the project, according to grant recipient and institutional representative.

Institutional support for this project has come from a variety of areas. Most notably, I received outstanding support from the University of Richmond's Bonner Center for Civic Engagement. Dr. Amy Howard, Acting Director of CCE, has been a source of support and encouragement. Indeed, the CCE was primarily responsible for putting me in contact with the elementary schools in the Highland Park district of the city of Richmond.

6. Syllabi, laboratory and field protocols, and other relevant course materials, including assessments and evaluations, as **PDF** documents to be uploaded onto the ACS website.

See attached documents.

FINAL REPORT

1. Original Goals & Objectives

Marine Biology of the Chesapeake Bay (MBCB) was designed to introduce University of Richmond (UR) students to the biology and ecology of the Chesapeake

Bay. In addition, this new science course for non-majors was designed to be a service-learning course. A major component of the course involves getting UR students into local elementary schools to share what they've learned with local 4th and 5th graders. Our objectives include several classroom site visits and a daylong field trip to three sites along the York River to measure water quality parameters. To enhance the outreach component, students in the *MBCB* class are creating podcasts focused on specific aspects of the Virginia SOLs. These podcasts will be available to local K-6 science teachers and we hope to create a digital repository of information for teachers interested in good teaching techniques.

2. Any Changes Made in Goals/Objectives

This project originally planned on partnering with A. V. Norrell Elementary School (AVNES). A series of floods in the city of Richmond forced the closure of that school. AVNES was chosen for a number of reasons including the make-up of the student body (which is poor and >95% African American) and the location of the school (it was built over a landfill). The socioeconomic disparity in the Highland Park neighborhood where this school is located is striking when compared to the rest of the city of Richmond. The flooding of AVNES was directly related to the poor planning that went in to the construction of this building. Unfortunately, AVNES students were sent to area schools and this project lost the partner school identified in the original grant application. However, we had also been working with Overby-Sheppard Elementary School (OSES) with the same program in mind. OSES is located in the Highland Park neighborhood and has a nearly identical student body to AVNES. We have established important connections with the teachers at OSES and the switch has had no effect on the major goals of this project.

Along these lines, the original grant planned on including students in activities with the elementary school students after the class field trip. After discussing the details of this plan with the teachers at OSES, it became clear that this would not fit with their curricular needs. These teachers spend the greater portion of May focusing on the SOL test (i.e., teaching to the test) and the presence of our students, while providing a worthy educational experience, would represent a distraction away from the needs of the students and school to receive passing grades on the SOL. For this reason, the original model of 3 students working for 3 weeks is not feasible. However, there are several important tasks that must be done that would build on what the course's objectives are and would help ensure the long-term success of this class. One student will be recruited to work during the summer of 2007 on a variety of important tasks to ensure the broad access and long-term success of this course. The student will be responsible for organizing the material and supplies purchased through this grant (e.g., Probeware and the water quality test kits). They will also organize data generated during the course (e.g., water quality data, responses from the children, assessment data on whether the activities resulted in higher SOL scores) and prepare material so that the course may be taught by other faculty with minimal effort in terms of establishing partnerships and locating materials. Additionally, this student will be expected to build new partnerships with local elementary schools and science specialists. The goal will be to line up a number of K-6 partners so that we can broaden the reach of this course.

Finally, Sue McGinnis, of UR's Instructional Technology group, was supposed to support all aspects of curricular development associated with a virtual explorer known as "Vern." Vern was a character created by Sue while she was a 4th and 5th grade teacher in

Chesterfield County, Virginia. Sue was an expert web designer but left UR before the start of the Spring semester. We have been working with Betsy Miles, who has similar outstanding technical skills, to help us set up an infrastructure around iPod technology. Betsy has worked with the class extensively, and we have a series of podcasts in creation.

3. Activities Underway and/or Completed

MBCB was approved for inclusion in the university's curriculum at the beginning of the fall semester of 2006. We are currently mid-way through the course and have had unqualified successes in several areas.

First, University of Richmond students are being exposed to a variety of issues surrounding the Chesapeake Bay and its watershed using some traditional and non-traditional methods. We had a weekend field trip and visited three sites to describe the different geological, biological and oceanographic characteristics present in the Bay. This was a highpoint for the students, and we have another trip planned for March 31, at which time we will pilot some of the activities that we will conduct with the 5th graders at OSES when they take their field trip. Furthermore, the students in this class will create and oversee a booth at a community fair in the Highland Park neighborhood where OSES is located. This will follow the visit to the class that our students will take part in (see below). We have also incorporated IT in this course through the use of a software package (EcoBeaker™) that allows inquiry-driven, self-directed exploration of a variety of ecological and environmental scenarios that directly relate to the Chesapeake Bay.

Second, we are also preparing for a substantial podcast project that will create material of service to local

elementary school teachers as they plan their science curricula. To achieve this goal, I have worked closely with Dr. Tricia Stohr-Hunt, who is the elementary science specialist in the Education Department at the University of Richmond. She gave a guest lecture in the course and worked with students in the *MBCB* class to inform them of the history and current state of "Standards of Learning" that guide the vast majority of instruction in Virginia classrooms. I have also recruited a senior Biology and Education double major to help coordinate many of our course activities.

Third, Dr. Bill Portluck, the lead educator from the Chesapeake Bay Foundation (CBF), will be a guest speaker in April. He will provide information about the State of the Bay and ways that the lay population can help manage this ecosystem. Along these lines, a subset of the class will participate in a research cruise in the Bay with the CBF.

Fourth, we worked extensively with Ms. Jessica Winslow (the science teacher at OSES) to ensure that our activities match with their curricular goals. We also worked with math and art teachers at OSES to attempt to integrate the sciences throughout their curriculum. We have coordinated two class visits for the spring semester (occurring on March 27 and 29, 2007). Undergraduates in this class helped develop the modules that will be implemented during our class visits. The modules include:

- Introduction to SCUBA equipment and demonstration of the uses of this equipment in marine research. Students will try on gear, and learn the basics of how SCUBA diving works.
- Introduction to microscopes and the planktonic populations in the Bay. The goal of this station is to introduce concepts associated with food webs.
- Introduction to some of the common invertebrates in the Bay. The Virginia SOLs stress the ability to distinguish between and among vertebrates and

invertebrates. Organisms that will be used include crabs (mud and blue crabs), clams (e.g., quohog, stout razor clam), cnidarians (anemones, jellyfish), sponges, and tunicates.

- Introduction to some of the common vertebrates in the Bay. The Virginia SOLs stress the ability to distinguish between and among vertebrates and invertebrates. Organisms that will be used include fish (anchovies, silversides, pipefish, sea bass) and turtles (diamond backed terrapin).

Fifth, we secured a date for our field trips with OSES (May 3, 2007) and are negotiating details concerning the buses. OSES students will conduct water quality analyses at two sites in the Chesapeake Bay. The first site is at the York River State Park. It is in a region where salinities rarely exceed 10ppt. This is a site with a long pier and public boat ramp. Numerous shells can also be collected, crabs can be observed, nesting osprey live, and pelicans are common. A narrow beach and mud bank are prominent features at this site. The second site is at a public beach adjacent to the Virginia Institute of Marine Science. This is a sand beach where salinities are closer to 18ppt. The site also has a long pier and prominent wrack line. At both sites, OSES students will conduct plankton tows, seine netting, water quality analyses, and faunal surveys.

4. Any Snags or Unanticipated Delays

The primary issue was overcome dealt with the closure of AVNES. This, however, has not resulted in any delays. Furthermore, Sue McGinnis left UR, but Betsy Miles has assumed the role of technology liason for *MBCB*.

5. Approved Budget:

The approved budget included:

Stipends for students to run workshops in May, 2007
(\$3600)

Travel (\$1131)

Water sampling supplies and equipment (\$8579)

Student housing (\$900)

6. Financial Accounting from Receipt of Funds Through March 15, 2007

As of 3/15/07, the following funds have been spent:

Water sampling supplies and equipment

- Books and videos and lamination for use in the course (\$112.39)

- Hydromania's Probeware Complete Bundle (X3)
(\$2,637)

- LaMotte Water Pollution Detection Kit and Refill
(X3) (\$871)

The following funds will be spent by June, 2007:

Travel

- The remaining ACS funds will be used to rent buses for our trip to the Bay with the Overby Sheppard Elementary School students. The estimated cost for three buses is approximately \$1000 but may be higher.

Stipends and housing:

- One student will be recruited to work on this project during the summer of 2007 to organize existing materials and build new K-6 partnerships. The housing allowance and stipends that were proposed to be used were combined to create a \$4500 stipend that is in line with University of Richmond policy for students working and living on campus during the summer months.

Water sampling supplies and equipment

- Equipment and supplies that are left to purchase includes hip waders, water bottles, seine nets, plankton nets, and organisms for 5th grade student use, which will exhaust this budget line.

7. Other Information

None

This project is supported by the W.M. Keck Foundation
of Los Angeles