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**Testimony for the Subcommittee on
Early Childhood, Elementary and Secondary Education**

Committee on Education and Labor
US House of Representatives

Field Hearing: *Environmental Education: Teaching Our Children to
Preserve Our Future*

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Introduction

Good Morning Chairman Kildee, Congressman Sarbanes and members of the Subcommittee. Welcome to Maryland! I am delighted to share with you today information regarding the vibrant and robust Environmental Education program we have in Maryland. You have observed a small piece of that this morning with some of our wonderful students.

Background

In 1990, the Maryland State Board of Education adopted a State Regulation (COMAR13A.04.17) requiring the teaching of Environmental Education in Maryland schools. The Regulation outlines the major concepts that are to be included in the curriculum and it promotes a focus on investigating environmental issues. The Regulation does not mandate an outdoor experience because, in Maryland, and I am sure in most of your states, decisions relating to specific instructional activities fall within the purview of local Boards of Education. However, in our role as the state education agency, we strongly encourage our school systems to provide every child with a meaningful watershed experience each year. Our school systems have responded and they enthusiastically embrace the incorporation of outdoor experiential learning as an integral part of the curriculum. Students benefit from learning about their local environment as well as environmental issues at the state, regional, national and global levels.

Voluntary State Curriculum

The Maryland State Department of Education (MSDE) has developed a Voluntary State Curriculum that defines what students should know and be able to do at each grade level. The science curriculum was developed by professional science educators, is based on national science standards and was evaluated by Achieve, Inc. Environmental concepts are integrated throughout the Maryland Voluntary State Curriculum in environmental science, life and earth systems science, economics, geography, and public policy and government. The language in the Environmental Science learning indicators and objectives are adopted directly from the North American Environmental Education Association. Our 24 school systems have adopted the Maryland Voluntary State Curriculum. Additionally, as required by No Child Left Behind, science is assessed statewide once in elementary school, once in middle school and once in high school.

Further, MSDE provides curriculum review and support for many environmental organizations from all over the state in order to help them align their activities with the

appropriate curriculum topic at the appropriate grade level. More importantly, the school systems have engaged these environmental organizations to provide their professional expertise to enhance the existing school system curriculum. This approach has fostered thriving partnerships between school systems and their environmental education partners and organizations.

Outdoor Environmental Experiential Learning

Currently, 390,000 Maryland students (45% of our public school population) participate in outdoor environmental learning experiences each year. Some Maryland school systems have been offering outdoor environmental education experiences for almost 40 years.

The Stewardship provision of the Chesapeake Bay 2000 Agreement calls for a “meaningful watershed experience for all students before they graduate from high school.” State Education Agencies in the Bay watershed are required to report student participation numbers to the Chesapeake Bay Program as a measure of their progress towards the fulfillment of the Stewardship Provision. The Chesapeake Bay Program independently calculated a participation rate for Maryland of 96%. A separate independent poll of the student body conducted by a student at the University of Maryland College Park campus, also found that 96% of the graduates from Maryland schools reported participating in such an experience.

Because Maryland schools were already close to the Bay 2000 goal when the Agreement was signed, lacking only a full experience in Baltimore City at the time, we set a more rigorous goal for our school systems – that they provide a meaningful watershed experience at least once during the elementary school years, once during the middle school years, and once during the high school years. With Baltimore City’s implementation of an experience for all students in 2006, we are once again approaching our goal. Therefore, we have recently ratcheted up our goal once again - to “Every Child, Every Year”. While ambitious, this goal has become the rallying cry for Maryland’s environmental education coordinators, teachers and providers.

Maryland students currently participate in outdoor environmental learning experiences in a variety of ways, including:

- as part of the regular science curriculum
- as part of Maryland’s Student Service Learning Program. Maryland has received a 3-year federal Learn and Serve grant, which funds community-based environmental experiences for our students. This program has provided additional grade level experiences in 17 school systems.

Providers of Outdoor Environmental Experiential Learning

- Nine (9) of Maryland’s 24 school systems fund and operate their own outdoor environmental education centers, sponsoring day trips and residential experiences. School systems that do not have such a facility, partner with state and federal parks, local community groups and non-profit providers to use their sites for similar activities.

- Maryland is fortunate in that we have a large number of informal education institutions that provide opportunities for environmental education, including outdoor experiences. The State provides funding to many of these institutions through the State-Aided Educational Institution Program, so that they may offer free services and/or reduced-price entrance/participation fees to Maryland students. This program provides funding for 50,000 students to participate in programs at organizations such as the Maryland Science Center, the National Aquarium in Baltimore, the Maryland Zoo, and the Chesapeake Bay Foundation.
- The State provides \$1.5 million each year for sixth graders from across the state, particularly those who are economically disadvantaged, to attend a week-long residential environmental experience at NorthBay.

The North Bay Experience

As one example of the many excellent environmental programs we have across the state, I would like to tell you about the NorthBay program. NorthBay is an environmental education center located in Cecil County in northeastern Maryland. The program provides a week long residential experience for economically disadvantaged students. All sixth graders from Baltimore City, Somerset, Allegany, Caroline, Garrett, and Cecil counties attend, as well as students from Title I schools in other school systems. For many students, it is the first time they have traveled away from home.

The NorthBay curriculum, developed with professional educators, provides a systematic, meaningful watershed experience. The curriculum the students experience *is* the Grade 6 Voluntary State Curriculum in Science, so teachers do not have to worry about time away from their classroom. NorthBay *is* the classroom. Life science and environmental science goals are the major focus, however the experience also integrates earth sciences, chemistry, reading, writing, and health objectives, where appropriate. Scientific skills and processes form the framework of the experience, and the content pieces can be changed to address the issues, interests, and needs of the particular student group. The visit to NorthBay is a seamless part of the instructional year.

Students begin their experience in school by identifying and listing school and community issues. They take their issues list to NorthBay. At NorthBay, daily instruction is based on a particular skill. For example, on Day 1, students, no matter what activity they are engaged in, discuss the qualities of a good scientific question. On subsequent days, they discuss data collection methods, hypothesizing, using technology to collect data, data analysis and interpretation, decision- problem-solving, and communication of results.

When they return to school, students review the issues they identified before their experience, and then choose a problem to address. They apply the scientific skills learned at NorthBay to design and implement a school or community project. Technical support for community and school projects will come from partners within the schools' district.

Students can monitor the data collection throughout the year from their home school to provide follow-up experiences throughout the year. Students learn that they can influence the quality, health, and safety of their own home environment, have the confidence to act, and have the knowledge and skills to do so.

A major focus of the program is on character development and leadership, using the students' environmental experiences as analogies of their life situations. For example, students may learn about invasive species in their environment, but also reflect on the "invasives" in their own lives.

Research on Student Achievement

The effect of environmental education on student achievement and stewardship behaviors has been the subject of several studies.

A longitudinal study being conducted by Dr. Marc Stern, Assistant Professor, College of Natural Resources, Virginia Tech uses the NorthBay site to research long-term effects of environmental education experiences on student achievement, preliminary. The study evaluates program effectiveness in three major areas: character development and leadership, environmental responsibility, and academic performance. Dr. Stern submitted the following summary of the findings to date.

"At the outset of our program, NorthBay contracted with an experienced external evaluation team from Yale, Virginia Tech, and Clemson to measure how well we would achieve our goals and to help us continually improve our programs to maximize the positive impacts we could have on visiting students and teachers. The first year's evaluation report (*NorthBay Evaluation: Results from 2006-2007 School Year*; Robert B. Powell, Marc J. Stern, and Nicole M. Ardoin; October 2007) investigates our 3 primary goals: Character Development & Leadership, Environmental Responsibility, and Academic Performance & School Culture. The evaluation system looks at short-term and longer-term impacts of our non-formal residential educational programs, which take place during the school year, upon these goals.

The evaluation of the first year of the program clearly indicates statistically significant short-term achievements within all three categories of outcomes. Students exhibited significantly higher scores on survey elements associated with enhanced character development and leadership, environmental responsibility, and academic performance immediately following their NorthBay experiences. Surveys and interviews with teachers confirmed these gains and revealed additional positive impacts upon the educators that attend our programs, including better relationships with their students and the acquisition of new techniques for better motivating their students.

Follow-up surveys conducted with students three months after their visits to NorthBay indicated that statistically significant gains in character development and leadership remained, while most gains related to environmental responsibility and academic

performance faded over time. Thus, the evaluation revealed the importance of implementing effective follow-on programs to enhance the positive impacts of our program. We've used the evaluation results to develop our follow on program, which we have been actively implementing in over 25 schools throughout the 2007-2008 year. We've also used the survey and interview results to improve specific aspects of our program on-site, ranging from specific educational lessons to the logistical execution of our programs.

The evaluation system is an ongoing program designed to continually improve our performance. We regularly use the results to adapt our programs. We'll also be systematically evaluating the quality of our follow on programs in an effort to ensure that it, along with all of our programming, is the best that it can be".

This research indicates that students need to engage in multiple experiences in order to develop a stewardship ethic. The study is also significant in that it uses data to improve, not merely justify, environmental education program.

A second study indicates that students not only need multiple experiences; they also need a variety of experiences.

Dr. Tom Marcinkowski, Associate Professor of Science and Math Education, Florida Institute of Technology, a nationally recognized researcher in environmental literacy and behavior, states that "We must talk about the different kinds of curriculum content and organization, program organization, and modes of teaching ... because different kinds of environmental education programs have different kinds of effects on learning. A 1997 review of research pertaining to environmental literacy by Volk and McBeth for EPA clearly indicates that different kinds of programming resulted in effects on different environmental literacy outcomes. For example, Hungerford et al.'s issue-and-action instruction and action research affect problem-solving/issues skills, but not ecological knowledge or environmental sensitivity. Field instruction at schools sites, nature centers, and camps can influence ecological knowledge and environmental sensitivity but have little affect on issue and action skills".

In light of these studies and others, it is clear that students need to engage in a variety of activities over a period of many years.

Global Competitiveness

There are larger issues facing us in science education as reflected in the report *Rising Above the Gathering Storm*. There is concern that the United States is not preparing a sufficient number of teachers and students in science, technology, engineering and mathematics, and this shortage will affect the United State's ability to compete in an increasingly competitive global economy. Environmental education programs are motivating and engaging for both teachers and students and can be an important part of guiding students to these careers.

The most recent federal Base Realignment and Closure (BRAC) is expected to bring 25,000 new households and 60,000 new employment opportunities to Maryland. In January 2007, Governor O'Malley convened a BRAC Subcabinet, with Lt. Governor Anthony Brown serving as chair, to coordinate planning for this initiative. The Maryland State Department of Education is committed to ensuring our schools are preparing our students for these challenging, and in many cases, highly technical jobs.

In light of these significant initiatives, it is time to take Environmental Education to a new level. Now is the time for us to move beyond awareness and knowledge to action and synthesis.

Today, our focus has been on Outdoor Experiential Learning. But, there is much more happening in Maryland school systems related to Environmental Education. Environmental education can contribute to addressing the challenges we face both culturally and academically.

We have an extremely effective program in our State. We have more work to do.
Every Child, Every Year!