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### 1. INTRODUCTION

The Consortium for Oceanographic Research and Education (CORE) was established in 1994 to bring a voice to Washington, DC for the ocean sciences community. CORE staff members are engaged in the operation of several programs that support research and education and lead efforts to raise the visibility of ocean sciences within the Congress. An outgrowth of the organization's work has been the development of the National Oceanographic Partnership Program (NOPP). NOPP was established by law to facilitate new interactions among Federal agencies, academia and industry; to raise the visibility of ocean issues on the national agenda; and to enable better coordination across the broad oceanographic community. NOPP is a collaboration among fourteen Federal agencies to provide leadership, coordination and support of national oceanographic research and education programs.

Several programs to be presented during AMS' 11<sup>th</sup> Symposium on Education have been supported through NOPP. These educational efforts were chosen for support not only because of the excellence of the individual programs, but also because their success actively relied upon building new partnerships among educators and scientists at academic institutions, government agencies, non-governmental organizations, and industry.

### 2. NATIONAL OCEAN SCIENCES BOWL

NOPP also sponsors the National Ocean Sciences Bowl (NOSB), a high school academic competition focusing on ocean-related topics that is managed by CORE in partnership with 34 institutions that serve as hosts to 22 regional competitions. Since it began in 1998, the NOSB has involved roughly 5700 students and approximately 1000 teachers nationwide.

The program's mission is to enrich science teaching and learning across the United States through a high-profile national competition that increases high school students' knowledge of the oceans and enhances public understanding and stewardship of the oceans.

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The NOSB's primary objectives are to:

- Broaden students' and teachers' awareness of the latest scientific research on the oceans and the critical impact of the oceans on global climate, weather, economic well-being, history and culture;
- Help teachers use the oceans as a tool for cross-disciplinary science education and as a vehicle for teaching biology, physics, chemistry, geology and mathematics by giving them access to the latest marine science education and science professionals;
- Give oceanographic research programs the opportunity to develop new links with their local pre-college community and open student's eyes to ocean-related career options; and
- Reach out to new students and communities to boost participation by minorities, women and disadvantaged students.

Any high school student can compete in the event as part of a team of four with one alternate and a coach, who is typically a science teacher. Regional sites mail notices or advertise in their area to attract participants. In 2001, NOSB selected 19 sites for the regional competitions. Last winter, about 1700 students and teachers representing 310 high schools competed in all the competitions. Some states, such as California and Texas, host more than one regional competition. Other sites are composed of a multi-state region. Each site is given some flexibility to establish the process that determines their winning team. All regional sites must conduct a standard competition, similar to the final competition's format (see below). However, some regions also require the students to present papers or design scientific posters in addition to participating in the standard question-and-answer competition. The regional winning teams are invited to participate in the final competition, which is held each April.

At the final competition, students are asked three types of questions. The first is a 5-second toss-up factual question, which, if the quickest student answers correctly, his/her team proceeds to the second question which is a 20-second bonus factual question. The team then confers on the bonus question and the captain gives the answer. At the end of the first half, both teams tackle the third type of question, a 2-4 minute team challenge question. The team must work together to answer the question, which is then reviewed and scored by a scientific judge. The score is based on the

quantitative and qualitative aspects of the team's answer.

Teams are divided into divisions for the preliminary "round-robin" rounds. Teams then advance from the preliminary rounds to the double-elimination round. The team that wins the last double-elimination round is the team finishes in first place in the final competition.

Each regional competition site has a designated staff member who serves as the primary coordinator for the region. The regional coordinators are trained by CORE staff on how to organize and administer the regional competition. Each regional competition and the finals are staffed and run by numerous volunteers. Science teachers volunteer their time outside the classroom to prepare students in biology, chemistry, geology, physics of the oceans, navigation, geography and related history and literature.

In addition to the on-site support at the regional level, CORE draws on graduate students and ocean science professionals from a wide variety of institutions to write, review and edit the questions, that are used in the regional and final competitions each year. These questions cover seven categories: biology, chemistry, geography, geology, physics, social sciences, and technology.

All NOSB teams receive appropriate recognition and prizes for participating in the regional and final competitions. Past prizes for the national finalists include educational trips to Lisbon, Portugal; Monterey & Catalina Island, California; the Florida Keys; opportunities to work shoulder-to-shoulder with leading scientists; cruises on research vessels; visits to oceanographic institutions and aquaria; scholarships; scientific equipment and books. These prizes are intended to extend the impact of the program beyond the competitive event itself by providing experiences that complement the students' and coaches' interest in ocean sciences and by offering material resources to their school science departments.

### 3. NOSB'S IMPACT

The National Ocean Sciences Bowl underwent a comprehensive assessment of the program's impact on its high school participants during 2000. Data from the evaluation provide evidence that the NOSB is deemed by students and teachers to be a well-organized, challenging, but enjoyable event that is making a positive impact on their understanding of the ocean sciences and their general interest in the oceans. Its effects can be seen most dramatically in an increased interest in marine science-related careers by 90% of the students and an increased incorporation of marine science-related topics into 84% of the coaches' classroom teaching. This last point is particularly remarkable because not all NOSB coaches are science teachers. To a lesser extent, the National Ocean

Sciences Bowl is reinforcing 52% of the participating students' interest in science and is helping 45% of them prepare for non-marine science classes.

We anticipate beginning a longer-term look at the affects of the NOSB on its participants during the 2002-2003 school year. This study will be designed to follow teachers and student participants to determine what impact the NOSB has had three to five years after their initial participation in the program.

### 4. FUTURE PLANS FOR NOSB

In addition to conducting a longer-term study of the program's impact, CORE and its regional partners are in the process of implementing a five-year strategic plan, which is serving as the blueprint for expanding and enhancing the existing NOSB program by 2006-2007. One of the main objectives of the plan is to increase the number of regional NOSB competition sites in order to reach 3000 students and teachers annually, with an emphasis on recruiting from populations of students typically under-represented in the ocean sciences. The overall program structure is being altered to support enhanced teaching and learning for both coaches and students. Pilot projects that are being tested within the existing NOSB program structure include developing summer internship programs for NOSB participants and establishing local mentoring programs to support the coaches and teams that do not have adequate resources within their own schools to prepare. In order to increase program visibility and engage a larger student audience, existing forms of information technology, including web-based communications, are being integrated into the administration of the program. Finally, CORE has re-allocated its internal resources to undertake an aggressive approach to diversifying NOSB's funding base with the goal of ensuring long-term sustainability, development and growth of the program.

### 5. ACKNOWLEDGMENTS

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