K-12 Environmental Education Market Analysis for the Hampton Roads Region

Final Report Submitted to the Estuarine Reserves Division
of the National Oceanic and Atmospheric Administration.

Submitted By:

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Chesapeake Bay National Estuarine Research Reserve in Virginia

VIMS | William & Mary
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Introduction

The Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERRVA or Reserve) was established for long-term research, education and stewardship in support of informed management of the Commonwealth's and our Nation's estuaries and coastal habitats. The Reserve's Education and Outreach Program strives to increase awareness, understanding, appreciation and wise-use of coastal resources through formal K-12 education programs, teacher training, participation in college intern programs and implementation of family/community oriented programs.

In 2011, as part of a Reserve-wide effort, CBNERRVA conducted a K-12 education program market analysis within the Hampton Roads, Virginia region. A complimentary K-12 education program needs assessment was also conducted at the same time. Objectives of the market analysis were five-fold:

(1) find the current status of Virginia coastal zone and ocean science K-12 field and classroom offerings and principal providers within the study area;

(2) identify gaps in the existing programs offered to students and teachers;

(3) identify and investigate opportunities for partnerships;

(4) evaluate strategies and criteria used by other providers; and

(5) use the market analysis to modify and design Reserve K-12 instructional programs that better fill needs.

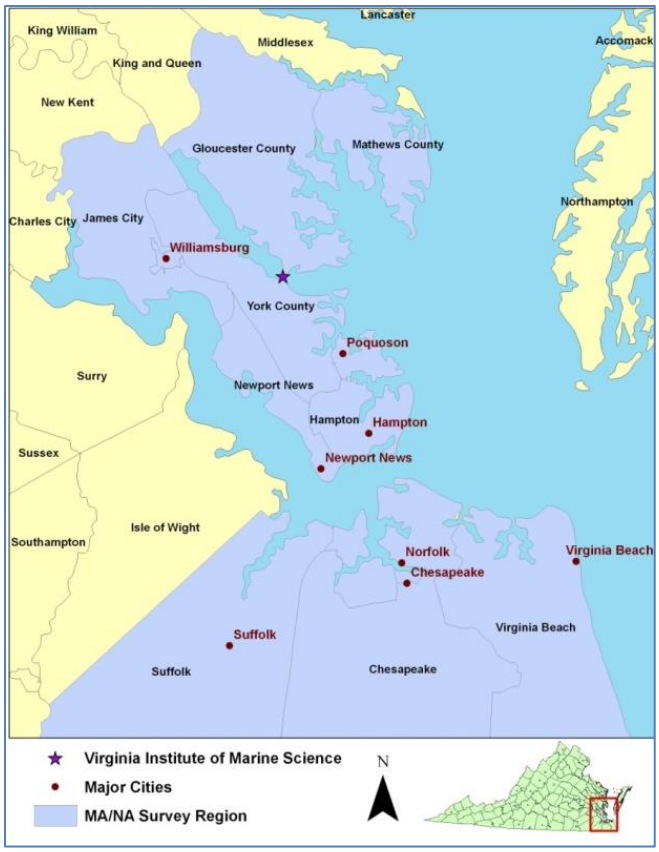

Figure 1. Geographic focus area for the CBNERRVA K-12 Education Program market analysis.

Study Area

Our study area for the K-12 education market analysis was the Hampton Roads area of Virginia, with an emphasis on Gloucester, Mathews, and York Counties (Figure 1). The current geographic focus area for Reserve education programs is concentrated within these three counties, with some students from surrounding cities such as Williamsburg, Newport News, Hampton, and Virginia Beach, attending certain programs. Given the interest in these surrounding cities by partner organizations, there was an attempt to include these regions in this market analysis to the greatest possible extent. Limited geographic and demographic information, by jurisdictional area, is provided in Table 1. There exists a high degree of diversity in population density

within the study region. The extremes include Mathews County which is characterized by a low population density and rural landscape to the highly developed City of Norfolk located at the core of the Hampton Roads metropolitan area.

Table 1. Selected geographic and demographic information by jurisdictional area within the study area. Note: (1). James City County and the City of Williamsburg are listed as one jurisdiction as the school district in that area is also combined. (2) Data source: US 2010 Census.

Jurisdictional Area	Land Area km^2	Population 2010 Census	Population Density people/km^2 (by land area)	% Population Under 18	Median Household Income $ (US) 2006-2010
Chesapeake (city)	883	222,209	252	28.8	67,855
Gloucester (county)	562	36,858	66	26.2	59,331
Hampton (city)	134	137,436	1,026	24.2	49,815
James City County and Williamsburg (county/city)	392	81,407	207	20.9	70,760
Mathews (county)	222	8,978	40	19.9	47,435
Newport News (city)	177	180,719	1,021	27.5	49,562
Norfolk (city)	139	242,803	1,747	24.0	42,677
Poquoson (city)	40	12,150	304	26.8	84,315
Portsmouth (city)	86	95,535	1,111	25.7	45,488
Suffolk (city)	1,036	84,585	82	27.8	65,104
Virginia Beach (city)	643	437,994	681	27.5	64,618
York (county)	270	65,464	242	29.1	81,055

Survey Process

An on-line survey, distributed through Survey Monkey, was used to collect information for use in this market analysis. The survey was initially developed by Reserve General Education Program staff along with required questions developed by the Estuarine Reserves Division of the National Oceanic and Atmospheric Administration (NOAA). The Reserve's Education Advisory Committee (see Appendix I for member list) reviewed all required and optional questions, while also generating additional questions. The finalized market analysis survey, consisting of 23 questions, is provided in Appendix II. The Education Advisory Committee also compiled a list of providers that would be requested to participate in the survey. Surveys were distributed and open for response from March 21, 2011 through May 13, 2011. Results were tabulated and analyzed. Only one response per organization was analyzed for the results of this survey. The Education Advisory Committee reviewed the results and participated in a focus group meeting to discuss future steps.

Results

Agency Information

Survey responses were solicited and received from federal, state and city government agencies, educational institutions and non-profit organizations (See Appendix III for a complete list of

respondents). A total of 32 responses were collected from 54 e-mail invitations for a response rate of 60 percent. Number of responses by organization type and response rates by individual organization type are provided in Table 2. Respondents were categorized by their primary affiliation, while some respondents could be further classified as nature centers, environmental education centers, and/or higher learning institutes.

Table 2. Number of invitations and response rate by primary organization type**.** Note: Organizations such as Sandy Bottom Nature Park were categorized as municipal as they are a county facility.

Organization Type	No. of Invitations	No. of Responses	% Response Rate within Organization Type	% of Overall Response Rate
Federal	4	3	75	6
State	15	11	73	20
Municipal	16	7	44	13
Educational Institute	3	1	33	2
National Non-Profit	1	1	100	2
Local Non-Profit	5	2	40	4
For-Profit Business	2	1	50	2
Museums/Zoos/Aquariums	8	6	75	11
Overall	**54**	**32**		**60**

State and municipal government based programs received the highest number of invitations (N>10 each) and represented 35 and 22 percent of the total response rate, respectively. Museums/Zoos/Aquariums organizations received the next highest number of invitations (N=8 each), and with a high participation level accounted for 19 percent of the total responses. Contribution to overall response rates by the remaining organization types were 9 percent for federal government programs, 6 percent for local non-profits, and 3 percent for Institutes of higher learning, national non-profits, and for-profit businesses. Of those surveyed, 69% were not formally associated with NOAA, although several comments suggested that many of these organizations do receive NOAA funds for selected educational program implementation. Of the respondents, 41% have a place-based education center for the Hampton Roads region.

Geographic Coverage

Estimates of program coverage, defined as the percent of respondents providing education programs within a specific geographic region, provide a qualitative index of education resources potentially available to a specific region. Percent coverage of each jurisdictional area by survey respondents is shown in Figure 2. After removal of two outlier jurisdictions that exhibited the largest population densities (Cities of Portsmouth and Norfolk), there was a positive, linear relationship between population density and geographic program coverage (r^2=0.49, p=0.025)**.**

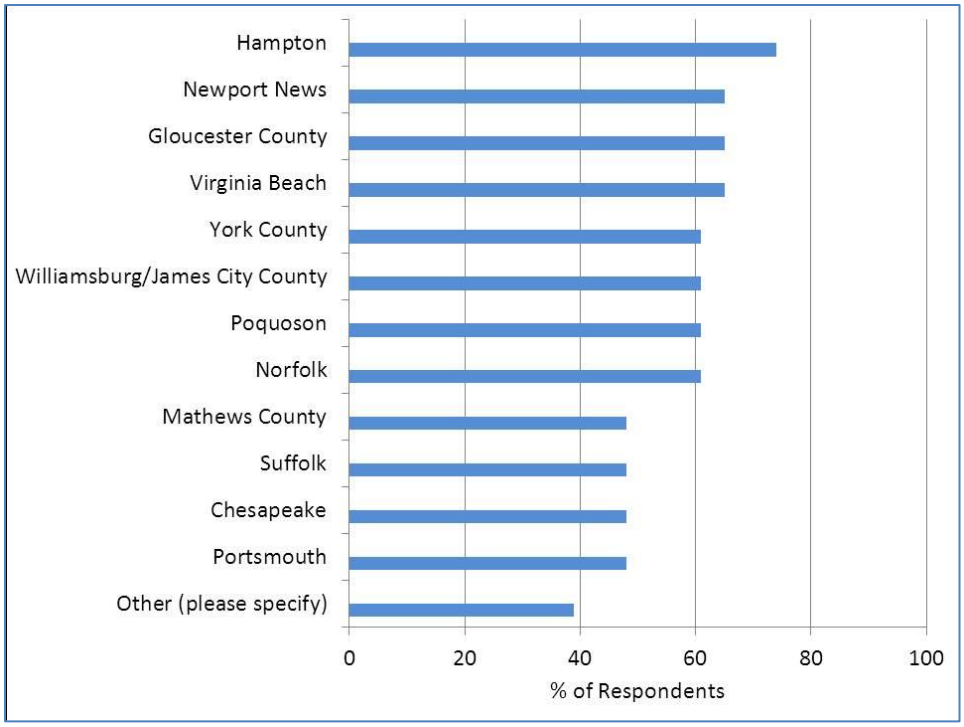

Figure 2. Percent program coverage by jurisdictional area.

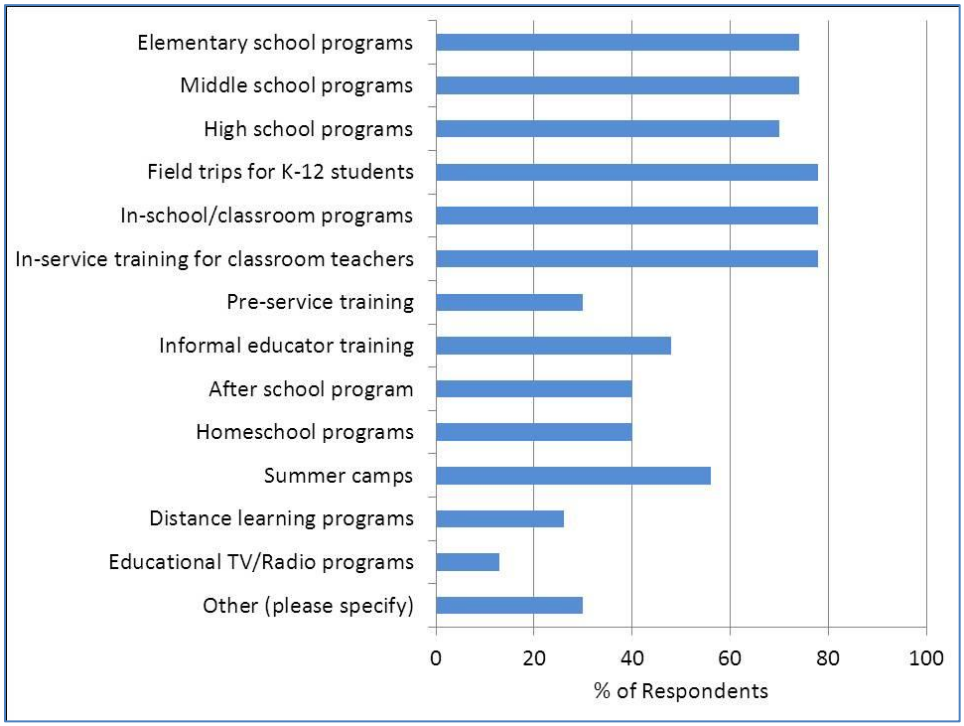

Figure 3. Types of educational programs offered by respondents.

Educational Program Types

All of the organizations that responded to the survey provide outreach of some type. The top five types of educational programming provided by the respondents were field trips for K-12 students (response rate: 78%), in-service training for classroom teachers (78%), in-school/classroom programs (78%), elementary school programs (74%), and middle school programs (74%)(Figure 3). Less than 50 percent of the respondents provide informal educator training, after-school and home school programs, pre-service training, distance learning, and educational TV/radio programs. Responses in the "other" category included pre-K, informal education through festivals, public service announcements, and youth internships.

Targeted Grade Levels and Number of Students Reached

With respect to grade levels served, 83 percent of the respondents reported that they served all grade levels. The other grade categories (K-2, 3-5, 6-8 and 9-12) had similar response rates varying from 9 to 13 percent. The rather uniform response rates by grade categories suggest that Question 7 was misinterpreted by respondents and results should be viewed with caution. It is still apparent that the majority of respondents work with all grade levels. Three respondents reported "Not Applicable" suggesting they do not work with students.

The approximate number of students reached on an annual basis by responding K-12 education programs is shown in Figure 4. A large percent (40%) of the respondents indicated that their education programs had the capacity to reach over 2000 students on an annual basis. Response rates of 26 percent were provided for the ranges of 0-1000 and 1000-2000 students per year.

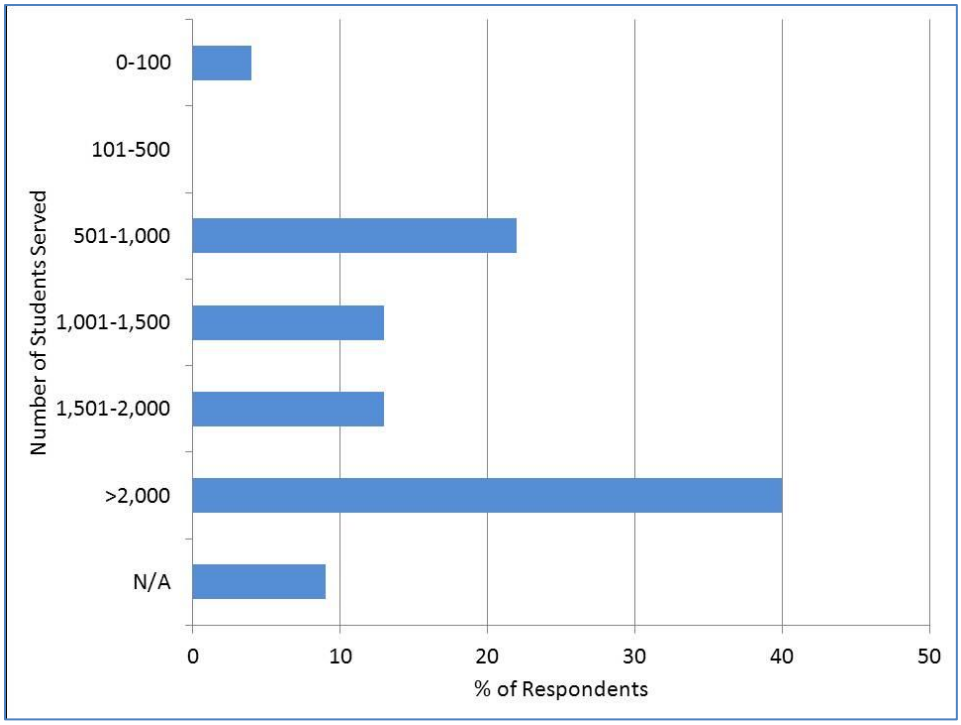

Figure 4. Number of students reached on an annual basis.

Topics Addressed

Priority objectives of this study were to identify what topics were being addressed by providers of environmental education within the region and to determine if any gaps existed at specific grade levels. Overall, incorporating all grade levels, the five most addressed topics were rivers/watersheds (59 responses), marine/aquatic habitats and wildlife (52 responses), actions people can take (50 responses), life cycles and food webs (47 responses), and values of estuaries (47 responses). For elementary school programs, rivers and watersheds (83%), life cycles and food webs (78%), actions people can take (78%), marine/aquatic habitats and wildlife (74%), and biodiversity and adaptation (65%) were the top five topical responses (Figure 5). Top five topical responses for middle school programs were similar to the overall results; rivers/watersheds (83%), marine/aquatic habitats and wildlife (78%), biodiversity and adaptation (70%), value of estuaries (70%), and actions people can take (70%)(Figure 6). Top five topical responses for high school were rivers and watersheds (78%), actions people can take (70%), marine/aquatic habitats and wildlife (61%), water chemistry (61%), and value of estuaries (61%)(Figure 7). Of interest is that the three least-addressed topics remained the same for all age groups but response rates increased with age group, these were basic statistics (9 to 22%), case studies of research projects (4 to 13%), and probability (9 to 13%).

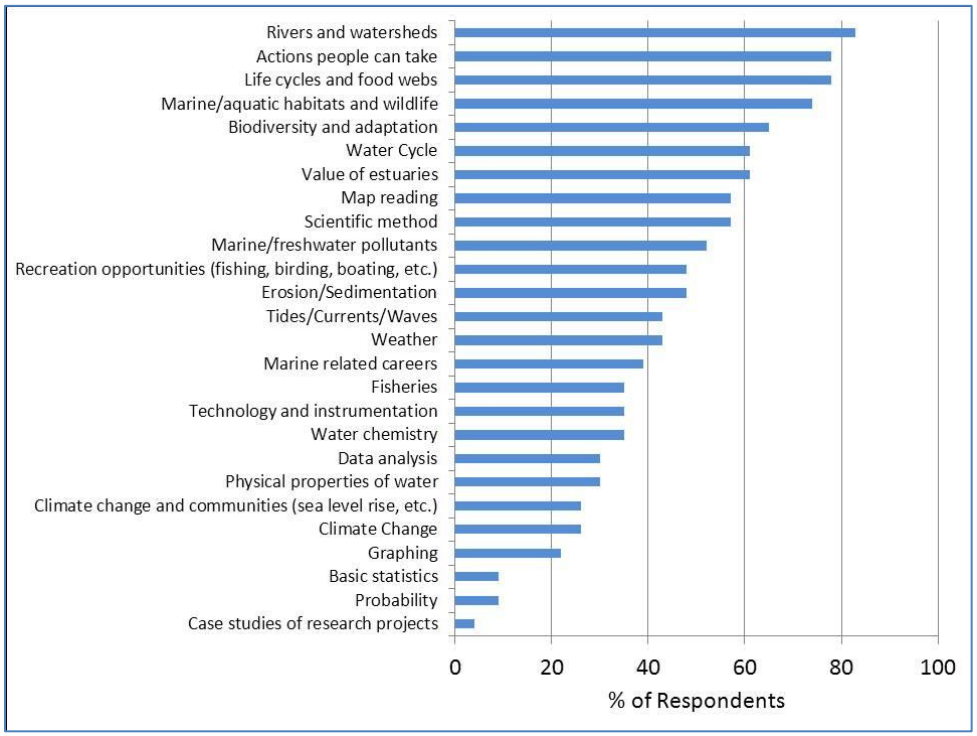

Figure 5. Topical areas addressed by elementary school education programs.

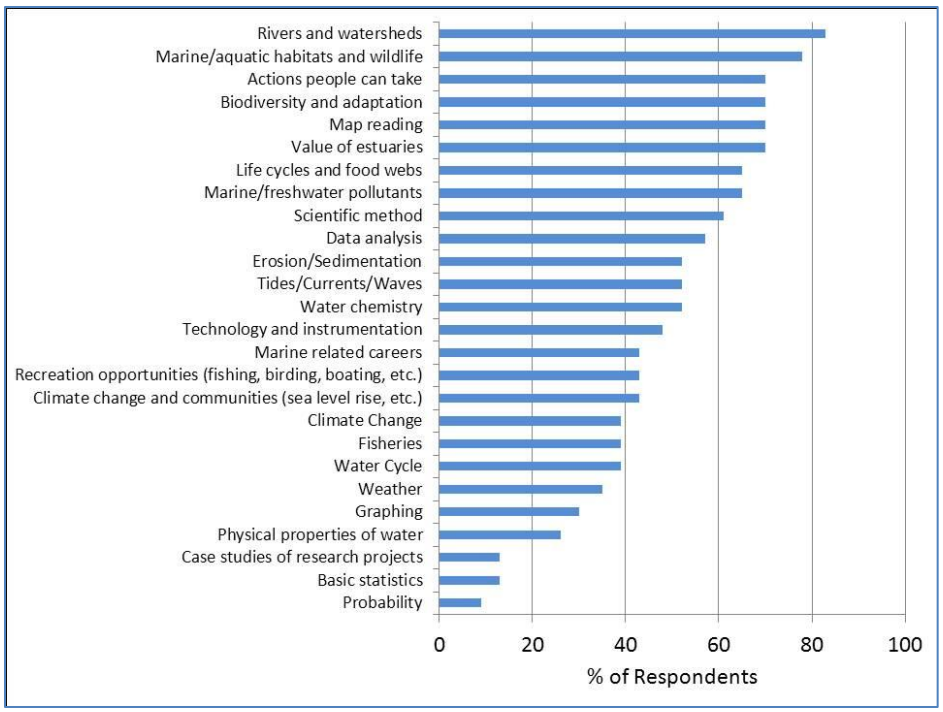

Figure 6. Topical areas addressed by middle school education programs.

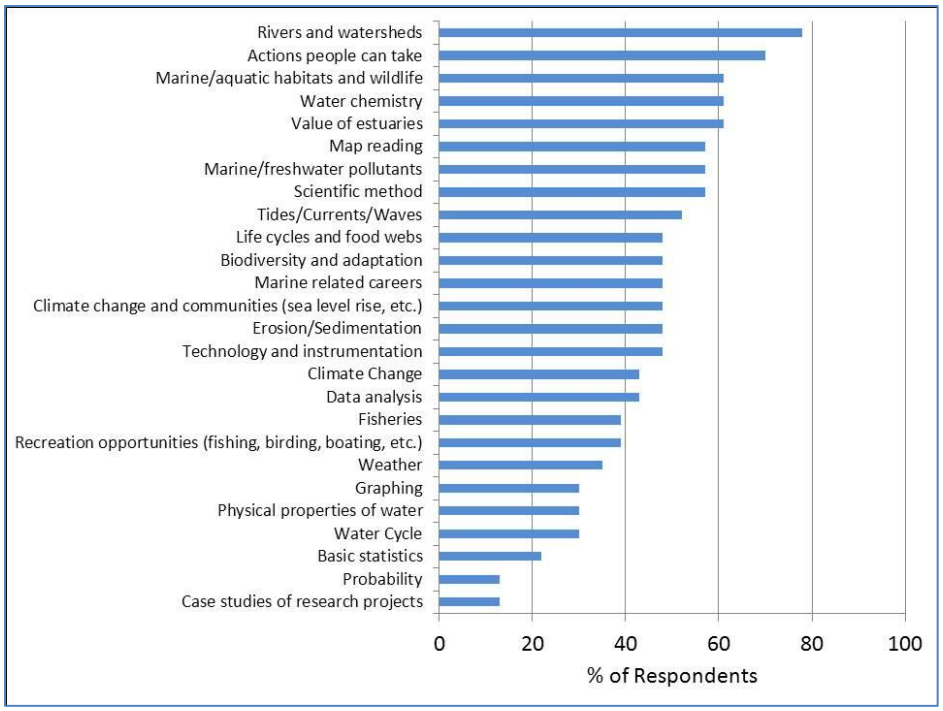

Figure 7. Topical areas addressed by high school education programs.

Topics Requiring Greater Emphsis

Respondents were asked to identify topical areas that they think requires a greater emphasis by environmental education program providers. Overall responses indicated some level of additional attention was required in all categories (Figure 8). The five highest responses were climate change and communities (48%), climate change (48%), stewardship projects (48%), map reading (39%) and value of estuaries (35%). Topics which fewer than 10% of respondents felt needed more attention included physical properties of water (9%), other (9%), fisheries (4%), and probability (4%). Other suggestions for topics that need more attention that were not provided in the survey included ocean resources/habitats/acidification, storm water, general human impacts, litter, recycling, and sustainable living. Value of estuaries ranked consistently in the top percentage of topics that are currently offered by educational programs, yet was also ranked as one of the topics that needs more addressing.

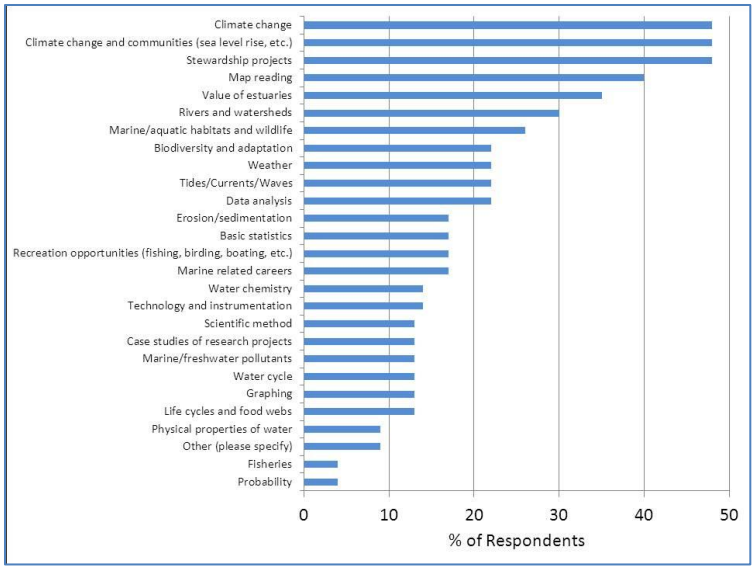

Figure 8. Topical areas, not grade specific, identified as needing greater attention by environmental education programs.

Staff Training and Teacher Professional Development

Respondents were asked two questions regarding their education staff and training of those staff. Results indicated that most organizations (> 80%) provide some level of training for their staff and that there is a desire for some level of additional staff training. Most respondents also provide some level of professional development opportunities for grade school teachers. Respondents' target grade school levels were highest for elementary school (74%), followed by middle school (65%), and high school level (60%). For those agencies providing professional development for teachers, the largest number of respondents (31%) reported an average of 0-25 teachers trained annually

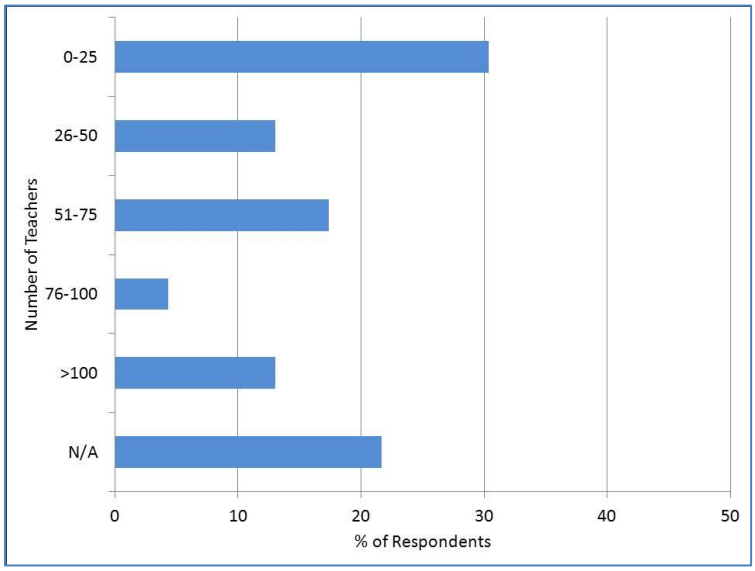

Figure 9. Annual number of teachers attending professional development programs.

(Figure 9). A number of organizations (13% of the respondents) showed an elevated capacity to train greater than 100 teachers on an annual basis. Most respondents (52%) also provide some type of educational/professional/recertification points for attending professional development programs.

Program Fee Structure

We were also interested in whether environment education providers charged fees for their programs for students, teachers, and the general public. We found that the majority (70% - teacher programs, 65% - student programs, and 56% - public outreach programs) of respondents do not charge for programs. Those programs that do charge for programs tend to charge for all types whether it is for teachers, students, or the public.

Program Marketing

The most commonly utilized means of advertising programs are school district coordinators, websites, word of mouth (personal communication), directly to individual school teachers, and an organizational newsletter (Figure 10). The least utilized methods were local television, newspapers, and list-serves. Marketing methods were used for student, teacher, and public outreach programs.

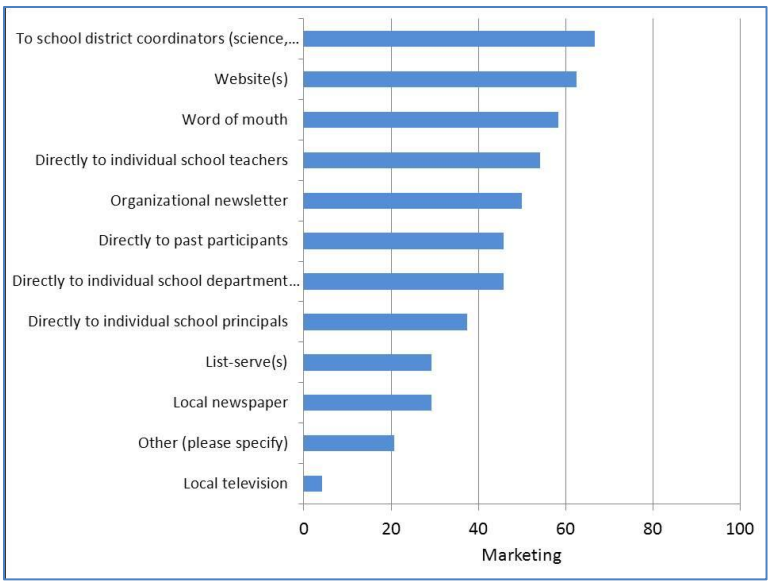

Figure 10. Methods used to market education programs.

Discussion

Study Area Demographics and Program Coverage

This market analysis was undertaken to find the current status of K-12 environmental education programs within the Hampton Roads region and to provide insight on how to improve delivery of programs to the region. The geographic coverage for this survey included the Hampton Roads region (see Figure 1). This region presents both challenges and opportunities given its high diversity of population demographics such as population density and economic status. Population density, defined as number of people per land unit area (km^2), in high density urban regions can be many times greater (up to 44 times) than the most rural county jurisdiction. The under the age of 18 group contribution to total population generally was ≥ 24 percent within all jurisdiction except for James City County/City of Williamsburg (21%) and Mathews County (20%). The College of William and Mary has a significant influence on James City County/City of Williamsburg, whereas Mathews County is becoming more recognized as a retirement area. With respect to median household incomes, five of twelve jurisdictions were below the national median level ($51,914) and one-half were below the state median ($61,406)(US Census 2006-2010 data). Median household incomes above the state average occurred in regions of moderate population density (>80 and <700 people/km^2) as compared to the low density rural and high density city jurisdictions.

Given the broad geographic coverage represented by the respondents and the relatively high (60%) response rate of the identified environmental education providers, it is felt that this market analysis gives a fair representation of the Hampton Roads region. Jurisdictions receiving the highest level of program coverage (≥ 65%) included the cities of Hampton, Newport News and Virginia Beach, and Gloucester County. With the exception of Gloucester County, these cities exhibit moderate to high population densities (681-1026 people/km^2) that could support environmental education programs and possibly education centers. The cities of Hampton and Newport News are also centrally located in the defined Hampton Roads study area, thereby potentially benefiting from overlap of areas targeted by individual education programs. The relatively high rate of program coverage for Gloucester County would be expected to be influenced, to some degree, by programs associated with or partnering with the Virginia Institute of Marine Science whose main campus is located at Gloucester Point, Va. Jurisdictions with program coverage rates below the study median of 61 percent included the cities of Portsmouth, Suffolk and Chesapeake and Mathews County. With the exception of the City of Portsmouth, these jurisdictions exhibited relatively low to moderate (range: 40-252 people/km^2) population densities. Exhibiting the second highest population density (1111 people/km^2) within the Hampton Roads region, the City of Portsmouth (along with the City of Norfolk) did not follow the general positive relationship observed between program coverage and population density. These metropolitan jurisdictions may be under-served and further efforts targeting this area may be warranted.

Geographically, the CBNERRVA focus areas of Gloucester, Mathews and York Counties share or are in close proximity to similar water bodies which include the York River, Mobjack Bay and Chesapeake Bay. Because water contribution to the total area of these counties is high, ranging from 25 to 66 percent, these counties will continue to share dependence to tidal waters for both commercial and private activities. These counties exhibit relatively low (40-242 people/km^2) population densities, and with the exception of York County, have a strong rural character. York County differs from Mathews and Gloucester in that the expansive federal government holdings in the central portion of York County contribute to its overall low population density. Elevated population densities in York County are associated with the southern (adjacent to the City of Newport News) and northern (adjacent to the City of Williamsburg) portions of the county. Additionally, a significant range in annual median household occurs within the CBNERRVA focus area, from a high of approximately $81,000 in York County to $47,500 for Mathews County. In contrast to York (61%) and Gloucester (65%) Counties where program coverage was at or slightly above the median for this survey, program coverage in Mathews County (48%) was relatively low. Factors influencing the lower program coverage rate would include the overall low population density, the relative low percent of population of K-12 grade age, and the somewhat geographic isolation from large population centers. Funding, school system priorities, and initiative and interest of school districts must also be taken into account as their participation is needed for education providers to reach them.

Education Program Providers, Targeted Audiences and Focus Topics

As with regional demographics, environmental education is being delivered to the Hampton Roads region by a broad variety of organizations. This diversity of environmental education providers allows for a wide variety of program offerings and potential development of strategic partnerships. Based on the survey results, a large percent of the environmental education is currently being provided by state and municipal government organizations, and museums/zoos/aquariums. Together, these organization types accounted for 75 percent of the survey responses. The value of place-based education or nature centers allowed for organizations to increase their capacity for education programs and reach. Over a

third of the respondents have place-based education or nature centers. Those identifying themselves as a federal agency, Institute of higher education, national and local nonprofit, and profit for industry organization types comprised the remaining 25 percent of organization response. Sixty-nine percent of the responding organizations were not part of NOAA or a formal NOAA partner, although several comments suggested that many of these organizations do receive NOAA funding for some of their programs. Principal NOAA partnership organizations include CBNERRVA and Virginia Sea Grant Advisory Services that are administered by the Virginia Institute of Marine Science, the Monitor National Marine Sanctuary in partnership with the Mariners' Museum, NOAA's southern Chesapeake Bay Office located at Nauticus, and Virginia's Coastal Zone Management Program administered by the Virginia Department of Environmental Quality.

Most respondents have a large range in the types of environmental education programs offered. The top program areas, all with greater than 70 percent response rates, target field programs and traditional formal elementary through high school programs including in-service training for classroom teachers. Response rates between elementary, middle and high school programming were fairly uniform (66-70%) suggesting no single school category was neglected from an overall regional perspective. The more informal student education program types, such as distance-learning, home school and after school programs, received a lower response rate (≤ 40%); summer camps were an exception. Expansion into informal education programs may present an opportunity for regional education providers. Over a majority of the education providers within the region served greater than 1,000 students on an annual basis, with 40 percent reaching over 2,000 students. Of the organizations that reach over 2,000 students per year, all but two (CBNERRVA and CBF) Chesapeake Bay Foundation have an education center in the region where students, teachers, and the public can visit for an education program. The majority of facilities were operated by museums/zoos/aquariums, with some representation from state and federal government, national and local non-profit organizations, and a municipal facility. Approximately one-fourth of the education providers charge a fee for student programs. Those charging a fee generally reach large numbers of students and teachers per year and can be categorized as either a museum, zoo, aquarium or nature center along with a few state government entities.

While CBNERRVA supports an educational lab and annually reaches over 2,000 students, it does not charge a fee or utilize a visitor center in contrast to most other large regional programs. Current CBNERRVA programs are supported by external grants and donor support. If expansion of environmental education programs within CBNERRVA's focus area is a priority, the feasibility of a more local education facility should be considered in the strategy development process. At the national level, most NERRS (71%) maintain and utilize a visitors/learning center and/or trail system for education purposes. Also, a number of the NERRS charge a nominal fee for access and programs.

Topics addressed by education providers follow the state Standards of Learning (SOL), with elementary programs focusing rivers and watershed, aquatic habitats, and water and life cycles. Middle school programs place a greater emphasis on biodiversity and adaptations, values of estuaries along with the aquatic habitats and rivers and watersheds subject areas. In high school programs, subject matters highlighting water chemistry, marine careers and technology, and climate change impacts play a greater role. When comparing science topics, there is a trend towards more general science topics with the younger students to more skill-based education programs with higher level students.

Education providers were asked to provide feedback on topics that they thought could use additional attention. Climate change and sea level rise impacts on coastal communities, in addition to stewardship related projects were the highest scoring topical areas requiring additional attention. Additional topics

of interest identified as needing more attention included map reading and several topics (i.e., rivers/watersheds, values of estuaries) that were identified as topics currently being addressed at a relatively high level. A comparison with the needs assessment results will confirm if teachers are also interested in having a greater emphasis placed on the priority topics identified by the education providers.

Topics that are addressed by CBNERRVA education programs are based on SOL requirements and therefore similar to those commonly addressed by other organizations. However, expertise at the Reserve may assist education providers with expanding into topic areas that were suggested as needing more attention. These include climate change, value of estuaries, and stewardship projects. CBNERRVA's stewardship and science programs has continued to build upon its capacities to address the challenges of enhancing awareness and understanding of ecological impacts of a changing climate, and in particular, sea level rise. CBNERRVA is an approved NERRS Climate Change Sentinel Site and an integral component of the broader NOAA/National Ocean Service Sentinel Site Program (Chesapeake Bay Cooperative) focusing on sea level rise.

Professional Development

Most respondents provide some level of professional development opportunities and credit system for teachers attending professional development programs. Response rates for targeted grade school levels were relatively similar (response range: 60-74%) between elementary, middle and high school. In contrast to student programs, most respondents were involved in smaller scale (50 or less teachers per year) professional development programs. Education programs serving greater than 100 teachers per year were varied and included an educational institute, a national and local non-profit, and a museum organization type. While most respondents provide some type of professional development or recertification points for attending professional development programs, it does not seem to be a limiting factor in attracting teachers to these programs. CBNERRVA currently does not offer recertification points through the College of William and Mary, but does offer a certificate of completion that teachers may then submit to their respective school districts to apply for credit. With respect to cost of professional development programs, the majority of respondents do not charge for their programs. Those charging a fee are most likely associated with a museum, zoo or aquarium and these fees are typically minimal.

Partnerships

Developing partnerships is a key strategy in developing comprehensive environmental education programs and increasing program capacity. By far, the vast majority of respondents partner with other education providing organizations and are aware of the CBNERRVA. However relatively few organizations, on the order of 10 percent, currently use Reserve sites as part of their education programming. Limited use of reserve sites is a function of logistic complications due to water only access at selected sites, site visitation restrictions and available time. CBNERRVA has made efforts to increase land access to its Reserves or adjacent property in hopes of supporting education activities. CBNERRVA works with a number of partners that participated in this survey through other means, such as hosting teacher workshops, participation on regional marine educator associations, and public outreach events such as festivals. A list of respondent identified potential partner organizations, not included in this survey, is provided in Appendix IV.

Summary

The market analysis results are expected to help CBNERRVA and other Hampton Roads education providers to shape their programs, fill niches as they see fit, and hopefully identify some partnership opportunities. The Hampton Roads region presents both challenges and opportunities given its high diversity of population demographics and broad geographic scale. There was a general trend between education program coverage and jurisdictional population density with end members and outliers possibly indicating under-served communities.

Topics currently addressed by education providers align with state Standards of Learning for elementary, middle and high school grade levels. Topics identified as requiring additional attention included climate change and sea level rise impacts on coastal communities, in addition to stewardship related projects. As with student programs, there was a broad focus across all grade levels with respect to professional development programs for teacher. Most organizations surveyed appreciate the importance of partnering with other organizations and this document may help Hampton Roads organizations connect with others in the area.

Appendix I: Education Advisory Committee Members

Vicki Clark, Virginia Sea Grant, Marine Advisory Program, Virginia Institute of Marine Science

Shannon Ricles, NOAA National Monitor Marine Sanctuary

Andrew Larkin, NOAA Chesapeake Bay Office, Nauticus

Susan Walton, Natural History Museum of Virginia, retired teacher Peasley Middle School

Appendix II. Survey Instrument

Market Analysis 2011

1.

The Chesapeake Bay National Estuarine Research Reserve in Virginia is conducting a K-12 market analysis of agencies within Hampton Roads, Virginia that provide formal education, informal education and/or outreach related to estuaries and the coastal environment. Our objective is to identify gaps in the existing programs offered to the teachers and students of Hampton Roads.

You have been chosen because you represent one of these organizations. The survey should take about 10-15 minutes to complete.

The results of the survey will be available to YOU to help with your program planning, networking, and identifying potential partners.

***1. Name of organization**

***2. Email Address**

3. Title of person who completed this survey

***4. How would you classify your organization?**

- ◯ Federal government agency
- ◯ State government agency
- ◯ Municipal agency/department
- ◯ Educational institution (University, Community College, etc.)
- ◯ National non-profit organization
- ◯ Local non-profit organization
- ◯ For profit business
- ◯ Museums/Zoos/Aquarium
- ◯ Nature centers/Environmental education center
- ◯ Other (please specify)

***5. Are you NOAA or a NOAA partner?**

- ◯ No
- ◯ Yes, I work for Sea Grant
- ◯ Yes, I work for National Marine Sanctuaries
- ◯ Yes, I work for NOAA fisheries
- ◯ Other: Yes, I work for

Market Analysis 2011

2. Educational Programs

***6. What types of educational programs does your organization provide? Check all that apply.**

- [ ] Elementary school programs
- [ ] Middle school programs
- [ ] High school programs
- [ ] Field trips for K-12 students
- [ ] In-school/classroom programs
- [ ] In-service training for classroom teachers
- [ ] Pre-service training
- [ ] Informal educator training
- [ ] After school program
- [ ] Homeschool programs
- [ ] Summer camps
- [ ] Distance learning programs
- [ ] Educational TV/Radio programs
- [ ] Other (please specify)

***7. If your organization does K-12 education, what grade levels do you serve? Check all that apply.**

- [ ] K-2
- [ ] 3-5
- [ ] 6-8
- [ ] 9-12
- [ ] All
- [ ] N/A

Market Analysis 2011

***8. What is the annual average number of students that are reached directly through your program (through attending programs, field trips, lectures, etc by your staff)?**

- ◯ 0-100
- ◯ 101-500
- ◯ 501-1,000
- ◯ 1,001-1,500
- ◯ 1,501-2,000
- ◯ >2,000
- ◯ N/A

***9. Are your educators trained before providing outreach to teachers, students, and the public?**

- ◯ Yes
- ◯ No
- ◯ N/A

***10. Are you interested in more opportunities to train your staff?**

- ◯ Yes
- ◯ No
- ◯ N/A

Market Analysis 2011

***11. Which of the following are addressed by your educational programs and for what grade levels?**

	Elementary	Middle	High	N/A
Water Cycle	☐	☐	☐	☐
Biodiversity and adaptation	☐	☐	☐	☐
Life cycles and food webs	☐	☐	☐	☐
Marine/aquatic habitats and wildlife	☐	☐	☐	☐
Weather	☐	☐	☐	☐
Tides/Currents/Waves	☐	☐	☐	☐
Rivers and watersheds	☐	☐	☐	☐
Climate Change	☐	☐	☐	☐
Physical properties of water	☐	☐	☐	☐
Water chemistry	☐	☐	☐	☐
Scientific method	☐	☐	☐	☐
Technology and instrumentation	☐	☐	☐	☐
Case studies of research projects	☐	☐	☐	☐
Data analysis	☐	☐	☐	☐
Marine/freshwater pollutants	☐	☐	☐	☐
Fisheries	☐	☐	☐	☐
Erosion/Sedimentation	☐	☐	☐	☐
Climate change and communities (sea level rise, etc.)	☐	☐	☐	☐
Value of estuaries	☐	☐	☐	☐
Recreation opportunities (fishing, birding, boating, etc.)	☐	☐	☐	☐
Marine related careers	☐	☐	☐	☐
Actions people can take	☐	☐	☐	☐
Graphing	☐	☐	☐	☐
Probability	☐	☐	☐	☐
Basic statistics	☐	☐	☐	☐
Map reading	☐	☐	☐	☐

Other (please specify)

Market Analysis 2011

***12. What topics do you think need more attention? Check all that apply.**

- [ ] Water cycle
- [ ] Biodiversity and adaptation
- [ ] Life cycles and food webs
- [ ] Marine/aquatic habitats and wildlife
- [ ] Weather
- [ ] Tides/Currents/Waves
- [ ] Rivers and watersheds
- [ ] Climate change
- [ ] Physical properties of water
- [ ] Water chemistry
- [ ] Scientific method
- [ ] Technology and instrumentation
- [ ] Case studies of research projects
- [ ] Data analysis
- [ ] Marine/freshwater pollutants
- [ ] Fisheries
- [ ] Erosion/sedimentation
- [ ] Climate change and communities (sea level rise, etc.)
- [ ] Value of estuaries
- [ ] Recreation opportunities (fishing, birding, boating, etc.)
- [ ] Marine related careers
- [ ] Stewardship projects
- [ ] Graphing
- [ ] Probability
- [ ] Basic statistics
- [ ] Map reading
- [ ] Other (please specify)

Market Analysis 2011

3. Professional Development

***13. If your organization provides teacher professional development, what are your program's targeted grade levels? Check all that apply.**

- [ ] Elementary School
- [ ] Middle School
- [ ] High School
- [ ] Do not offer professional teacher development
- [ ] Other (please specify)

***14. Do you offer teachers educational/professional development credits/recertification points?**

- ( ) Yes
- ( ) No
- ( ) Don't know
- ( ) N/A

***15. What is the average number of teachers that attend professional development training through your organization (yearly total)?**

- ( ) 0-25
- ( ) 26-50
- ( ) 51-75
- ( ) 76-100
- ( ) >100
- ( ) N/A

Market Analysis 2011

***16. How do you market your programs? Check all that apply.**

- [ ] Directly to individual school principals
- [ ] Directly to individual school department head/coordinators
- [ ] Directly to individual school teachers
- [ ] To school district coordinators (science, curriculum, etc)
- [ ] Word of mouth
- [ ] Organizational newsletter
- [ ] Local newspaper
- [ ] Local television
- [ ] Directly to past participants
- [ ] Website(s)
- [ ] List-serve(s)
- [ ] Other (please specify)

***17. Do you charge fees for your programs?**

	Yes	No
Teachers	○	○
Students	○	○
Others/Public	○	○

If yes, how much are the fees per student/teacher?

***18. Which of the following counties/cities do you serve? Check all that apply.**

- [ ] Gloucester County
- [ ] York County
- [ ] Mathews County
- [ ] Williamsburg/James City County
- [ ] Newport News
- [ ] Hampton
- [ ] Poquoson
- [ ] Norfolk
- [ ] Virginia Beach
- [ ] Suffolk
- [ ] Chesapeake
- [ ] Portsmouth
- [ ] Other (please specify)

Market Analysis 2011

***19. Are you familiar with the Chesapeake Bay National Estuarine Research Reserve in Virginia?**

- ◯ Yes
- ◯ No

***20. Have you conducted an education program within the boundaries of one of the Chesapeake Bay National Estuarine Research Reserve sites? These sites include Goodwin Islands, Catlett Island, Taskinas Creek at York River State Park, and Sweet Hall Marsh.**

- ◯ Currently
- ◯ Previously
- ◯ Never
- ◯ Unsure

***21. Do you currently partner with other groups or institutions to offer your programs?**

- ◯ No
- ◯ Yes

If yes, with whom do you partner?

***22. How interested are you in partnering with other organizations to provide coastal training and education?**

- ◯ Very interested
- ◯ Somewhat interested
- ◯ Not at all interested

***23. Data from this survey will be available to participants. Would you like to be contacted when the results are available?**

- ◯ No
- ◯ Yes

If yes, confirm email address

Appendix III. List of Organizations Completing Survey

1. Bluebird Gap Farm, Hampton, VA
2. Chesapeake Bay Foundation, Norfolk, VA
3. Chesapeake Bay National Estuarine Research Reserve in Virginia, Gloucester Point, VA
4. Chesapeake Experience, Yorktown, VA
5. City of Hampton – Sandy Bottom Nature Park, Hampton, VA
6. City of Suffolk, Suffolk, VA
7. Hampton Clean City Commission, Hampton, VA
8. Hampton Roads Planning District Commission, Chesapeake, VA
9. James City Service Authority, Williamsburg, VA
10. Lynnhaven River NOW, Virginia Beach, VA
11. Monitor National Marine Sanctuary, Newport News, VA
12. Nauticus, Norfolk, VA
13. NOAA Chesapeake Bay Office, Norfolk, VA
14. Norfolk Collegiate School, Norfolk, VA
15. Oyster Reef Keepers of Virginia, Virginia Beach, VA
16. Southeast 4-H Educational Center, Wakefield, VA
17. The Mariner's Museum, Newport News, VA
18. The Virginia Living Museum, Newport News, VA
19. US Fish and Wildlife Service, Back Bay Wildlife Refuge, Virginia Beach, VA
20. Virginia Air and Space Museum, Newport News, VA
21. Virginia Aquarium and Marine Science Center, Virginia Beach, VA
22. Virginia Association of Science Teachers, Richmond, VA
23. Virginia Beach Parks and Recreation, Virginia Beach, VA
24. Virginia Coastal Zone Management Program (VA Department of Environmental Quality), Richmond, VA
25. Virginia Cooperative Extension, Hampton, VA
26. Virginia Dare Soil and Water Conservation District, Virginia Beach, VA
27. Virginia Department of Forestry, Richmond, VA
28. Virginia Institute of Marine Science, Gloucester Point, VA
29. Virginia Office of Environmental Education, Richmond, VA
30. Virginia Sea Grant Advisory Services (Virginia Institute of Marine Science), Gloucester Point, VA
31. Waterman's Museum, Yorktown, VA
32. York River State Park (Va. Department of Conservation and Recreation), Croaker, VA

Appendix IV. List of Potential Partnership Organizations Completing not Included in the Survey

Back Bay Restoration Foundation, Virginia Beach, VA
Catholic University, Washington, DC
Chesapeake Bay Gateways Foundation, Yorktown, VA
City of Virginia Beach, Virginia Beach, VA
Department of Game and Inland Fisheries, Richmond, VA
Elizabeth River Project, Portsmouth, VA
Graveyard of the Atlantic, Hatteras, NC
Hampton Roads Water Efficiency Team, Newport News, VA
Home Educators Association of Virginia, Richmond, VA
Mary Baldwin College, Staunton, VA
Nansemond River Preservation Alliance, Suffolk, VA
National Institute of Aerospace, Hampton, VA
North Carolina Aquariums, Manteo, NC
Northrop Grumman, Newport News, VA
Virginia Beach Public Schools, Virginia Beach, VA
Virginia Commonwealth University, Richmond, VA
Virginia Department of Education, Richmond, VA
Virginia Resource Use Education Council, Richmond, VA
Virginia Soil and Water Conservation Districts, Richmond, VA
Virginia Tech University, Blacksburg, VA