

North Inlet - Winyah Bay
National Estuarine
Research Reserve

ACE Basin and North Inlet-Winyah Bay
National Estuarine Research Reserves

K-12 Estuarine Education Program Needs Assessment Survey Report of Findings

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1.0 BACKGROUND

As part of its implementation of the K-12 Estuarine Education Program (KEEP), the ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) conducted a needs assessment survey in the spring of 2013.

The Needs Assessment was intended to:

- Identify science topics for which teachers need additional educational resources
- Determine the extent to which teachers are educating students on climate change and its implications, particularly sea level rise
- Gain insight into classroom constraints in the area of technology
- Gain insight into teacher constraints in the area of field trips
- Determine the most useful formats and methods for disseminating new materials
- Assess the need for professional development among teachers and informal educators and identify preferences relating to format, timing and cost of training

The data generated from the Needs Assessment will be used to guide continued refinement of the Reserves' KEEP programs as well as their professional development offerings.

National-level (National Estuarine Research Reserve System) guidance regarding the implementation of needs assessments at the reserve level (individual KEEP programs) prescribes both required questions, to be asked verbatim to ensure that comparable data are collected across the System, as well as required data, the acquisition of which is left to the discretion of individual reserve. In accordance with national-level guidance, both The ACE Basin and NI-WB NERRs have also implemented market analyses.

2.0 METHODS

Education staff with both the ACE and North Inlet NERRS developed and created a database of science curriculum coaches and science teacher contacts for the nine coastal school districts in South Carolina. The Needs Assessment survey was developed electronically by the contractor (Survey Monkey) and delivered via email on March 26, 2013, to a total of 941 middle school and high school teachers and informal educators in the nine school districts in the eight coastal South Carolina counties: Horry, Georgetown, Charleston, Dorchester 2, Dorchester 4, Berkeley, Colleton, Beaufort, and Jasper. The survey questions were determined through data requirements as established by NOAA, ERD and the EC community, several phone meetings with the consultant (a former NERR CTP Coordinator), phone and personal meetings with district administrators, science curriculum coordinators, and each Reserve's most active teachers. NIWB NERR's Advisory Committee, including a science curriculum specialist with the Georgetown County School District, was offered the opportunity to provide input. In addition, education staff from both ACE and NIWB met together to determine additional site-specific (non-required data) questions. The link to the on-line survey was disseminated to each science teacher within the nine districts a total of four times. The survey remained open from March 26 - April 19, 2013. As incentive to complete the survey, participants had the option of entering a drawing for a package of prizes, including a field trip on the E/V Discovery, a classroom set of the South Carolina Beachcomber's Guide, and other classroom resources. A detailed record of the survey dissemination, including samples of the email communication, is available in Appendix A.

3.0 FINDINGS AND DISCUSSION

3.1 NEEDS ASSESSMENT

3.1.1 RESPONDENT DEMOGRAPHICS

The survey response rate for the Needs Assessment survey was just under 25%. Of the 231 respondents, over 36% (89 individuals) were from the Charleston district; this response rate is commensurate with the relative size of the district. The Colleton and Horry school districts were the second and third most highly represented (16.2% and 11.2% of respondents, respectively). Only four individuals—1.7% of respondents—were from the Jasper district, and no responses were received from teachers in district Dorchester 4. Each of the other five districts accounted for between four and ten percent of respondents (Figure 1).

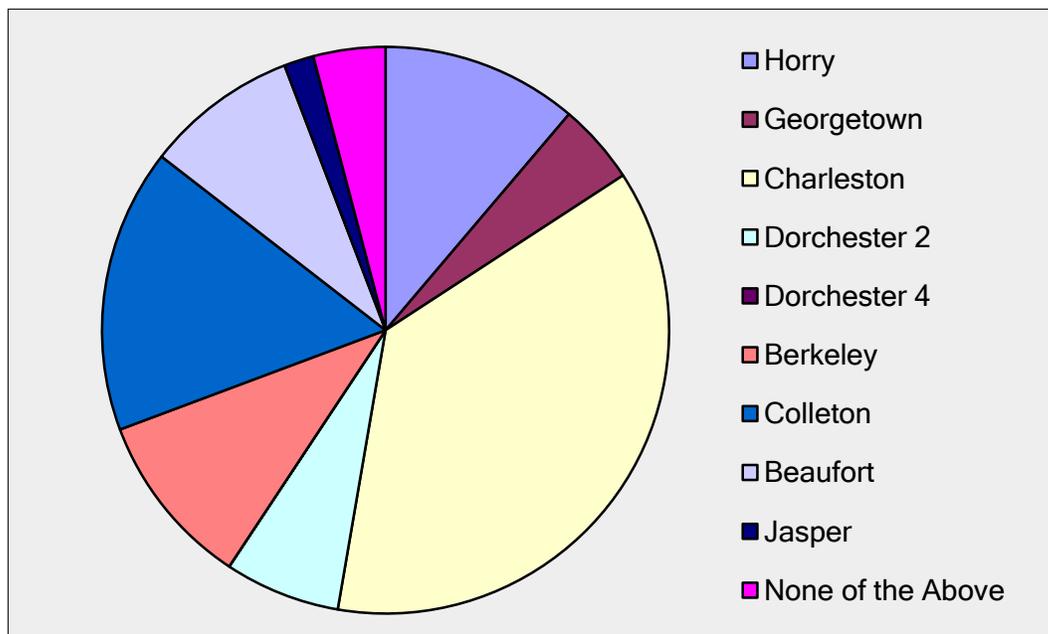


Figure 1: Counties in which Needs Assessment respondents teach

As illustrated in Figure 2, the data gathered through the Needs Assessment survey are skewed toward veteran teachers. Of the 218 respondents to Question 2, nearly 34% of respondents indicated that they have been teaching for more than 15 years. Over half (55%) of respondents reported that they had been teaching for ten years or more, and nearly 80% of respondents had at least five years of teaching experience. This distribution of respondents may reflect the influence of the economic downturn and limited state budgets on hiring practices in recent years, or it may suggest that veteran teachers are more apt to have the flexibility, or simply are more willing to invest the time, to complete such a survey.

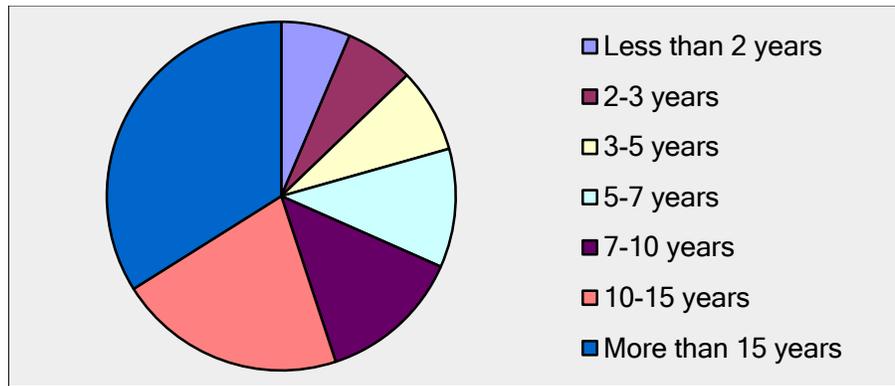


Figure 2: Teaching tenure of Needs Assessment respondents

Grades 6th through 12th are each fairly evenly represented in the Needs Assessment findings: between 20% and 30% of respondents reported teaching each of these grades. Distribution of respondents was skewed slightly toward grades 10 - 12, each of which was represented by a full 30% of respondents. Fifty respondents (23%) selected other when asked which grades (6th - 12th) they teach. A strong majority (80% or more) of these respondents indicated that they teach elementary education. This cohort of respondents also included one literacy coach (Charleston), one special education teacher (Dorchester 2), and one home school teacher (Georgetown). About 75% of target respondents reported teaching more than one grade level.

3.1.2 FAMILIARITY WITH THE ACE BASIN AND NI-WB NERRS

Only one-third of 217 respondents reported that they were aware that their state was home to two National Estuarine Research Reserves. Of these 71 individuals, only just over half (56%) reported having used the educational services or products provided by the ACE Basin and NI-WB NERRS. Professional development and field trips were the most frequently used products (27 of 40 and 25 of 40 respondents, respectively); half of the 40 respondents reported using the Reserves' website(s), and 16 of 40 reported using curriculum provided by the ACE Basin and NI-WB NERRs.

Of the 40 individuals who reported having used services or products, nearly 90% reported using more than one type of product. This finding may reflect the effectiveness of current marketing efforts to existing audiences and it reinforces the value of cross-promotion of different products and services offered by the Reserves. *Professional Development Trainings/Workshops* (the most heavily utilized offering) may provide a unique opportunity to inform participants of other offerings: the inclusion of instructional modules related to the use of specific products as part of these events might further enhance the number of participants who capitalize on other Reserve products and services.

Close to 85% of the 31 respondents who were aware of the ACE Basin and NI-WB NERRs but had not used any of the available educational services or products provided write-in explanations. Over half of those respondents who offered explanations cited a lack of awareness of program offerings; several of these respondents specifically said that they had never received marketing information to alert them of the available products. The total number of respondents indicating that they either did not know about the presence of the Reserves or were aware of their existence but unaware of their offerings suggests that there may be

meaningful gains to be realized with expanded and/or re-directed marketing efforts. What's more, the comments of several respondents imply that many teachers feel that they are too busy to seek out resources:

“I have not researched what is available to me - nothing has been sent to me through mail or email. With the usual time constraints of teaching, I have not been able to do so.”

This finding is a compelling reminder that simply creating quality offerings is not enough; the onus is on Reserve staff to market and deliver these products to target users, as they simply may not have the capacity (time or knowledge) to pursue and locate them independently.

Comments relating to scheduling or time constraints were the next most frequent (around 15% of comments). Only two comments explicitly cited funding issues, and both of these specifically reference support for field trips, implying that the respondents may not be aware of the full spectrum of products and services offered by the Reserves. The relative importance of funding as a factor limiting inclusion of field trips in science curricula will be explored more extensively in a later section of this report. Only a single comment specifically cited concerns about compatibility with state standards, yet—given the high percentage of respondents who simply weren't aware of Reserve offerings—this finding may not fully reflect the degree to which this consideration could limit teachers' use of products and services.

3.1.3 ATTENTION TO WATERSHED, ESTUARIES AND OCEAN/MARINE TOPICS

In general, the length of time that individual respondents indicated they had been teaching each of the three listed topics (watershed, estuaries, ocean/marine) was equivalent, suggesting that many teachers approach these topics as integrated parts of a larger focus on coastal ecology or aquatic science or that their understanding and/or treatment of these topics is coarse enough that they do not differentiate clearly between the them. A few notable exceptions emerged, wherein a respondent reported having taught one of the subjects for 15 years or more but never having addressed the other subjects.

Around 40% of respondents reported they have never taught about Estuaries or Watersheds; this percentage was just below 30% for Ocean topics (Figure 3). When only data from elementary education teachers are analyzed, the ratio of teachers reporting that they have never taught about Estuaries or Watersheds changes very little (decreases modestly); only 20% of elementary teachers reported having never taught about Oceans topics—notably lower than the percentage reporting the same among the broader pool of respondents. These findings alleviate concerns that data from those respondents who teach younger students might be skewing findings for this particular question.

The roughly 8% of respondents who indicated that they had been teaching each of the topics for 15 or more years were distributed around the surveyed districts, suggesting that the inclusion of these subjects in teachers' curricula is not simply a function of district-specific guidance.

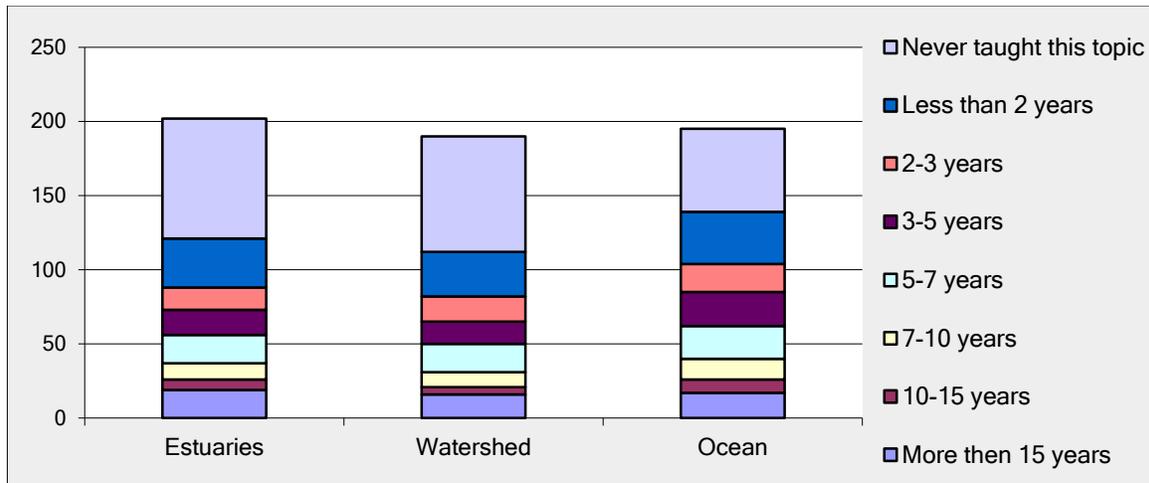


Figure 3: Length of time that respondents have been teaching about watersheds, estuaries, and ocean/marine topics

The percentage of respondents who reported that they do not plan to allocate any class time to teaching about Estuaries, Watersheds, and Ocean topics mirrors the percentage who reported having never taught about these topics. In the case of all three subjects, the second highest percentage of respondents (just below 20% for Estuaries and Watersheds and just above 20% for Ocean topics) indicated that they would devote between three and five full classroom periods to the subject (see Figure 4).

The percentage of respondents who intend to devote one or more full classes to teaching Ocean topics is over ten percent higher (63%) than the percentage who intends to devote an equivalent amount of time to teaching about Watersheds or Estuaries (Figure 4). This discrepancy could be a function of categorization—i.e. respondents simply have a broader interpretation of what constitutes an Ocean topic—or may reflect a more ubiquitous treatment of Ocean topics (as compared to Estuaries or Watersheds) in state and/or standard science curriculum. Targeted follow up with select respondents might help elucidate this finding, and might help determine whether the availability of additional resources would influence teachers’ willingness or ability to devote classroom time to lessons specific to Estuaries and Watersheds.

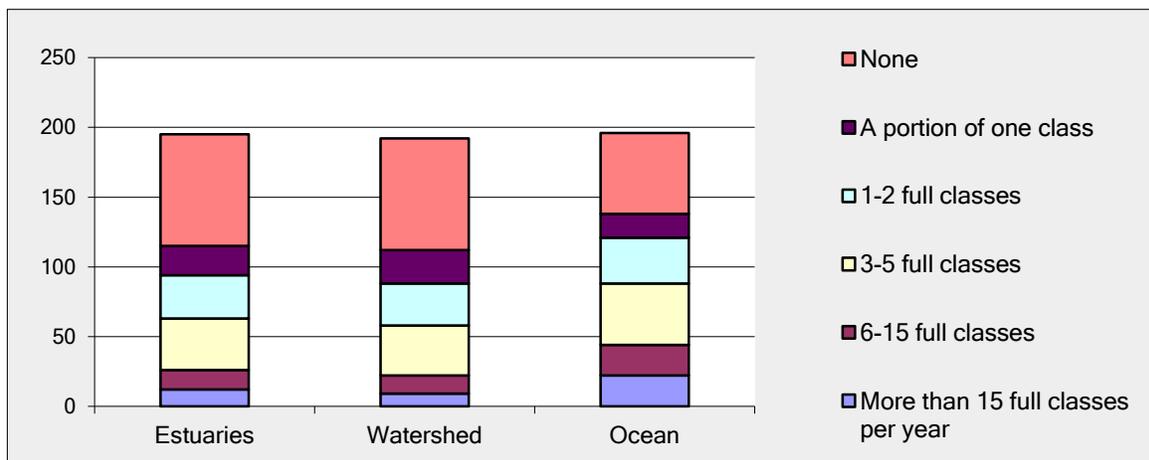


Figure 4: Respondents' allocation of classroom time to watersheds, estuaries, and ocean/marine topics

Of the 201 individuals who addressed Question 10, one-third indicated that they saw a need for new educational materials related to Estuaries, Watersheds, and Ocean topics in languages other than English. Respondents may have not differentiated between the need for new materials in general and the need for new materials in other languages specifically, as half of the 47 who wrote in preferred languages for new materials indicated “English.” Table 1 lists the other languages identified by respondents:

LANGUAGE	% OF RESPONDENTS
Spanish	63% (29 of 47 respondents)
Portuguese	4% (2 of 47 respondents)
Chinese	2% (1 of 47 respondents)
Tajic	2% (1 of 47 respondents)
Russian	2% (1 of 47 respondents)
French Afrikaans	2% (1 of 47 respondents)

Table 1: Languages other than English in which respondents see a need for educational materials related to Estuaries, Watersheds, and Ocean topics.

About 25% of 200 respondents indicated that they had had training in watershed, estuary, or ocean/marine topics in the past 3 years. There was no clear correlation between the lengths of time that teachers had been teaching and whether they had attended training in the past 3 years. A positive correlation was evident between the respondents’ participation in recent (past 3 years) training on watershed, estuary, or ocean/marine topics and their commitment of class time to instruction on these topics. Close to 80% of respondents who reported having attended training also reported devoting at least three full classes to one or more of the three topics in a typical year. In comparison, only just over 40% of respondents who had not attended training on these subject areas in the last three years reported that their students receive three or more class periods of exposure to these topic areas.

Of those respondents who reported having attended training in the last three years, close to 40% of respondents indicated that they had received less than eight hours of training on watershed or estuary topics (Figure 5). For these two topics, another 40% of respondents reported having attended between one and three days of training. The percentage of respondents reporting between one and three days of training on ocean topics was higher than that for either of the other two subject (just over 50%). This discrepancy could be a function of categorization, i.e. respondent’s interpretation of the breadth of the subject, or might reflect the relative availability of different types of professional development.

The finding that most respondents attended a total of three days or less of training on any of the three subjects in the last three years may indicate that single, one to two day, training events represent the best value (in terms of time and accessibility) for classroom teachers. This conclusion is corroborated by the fact that the average ranking for professional development activities of different formats was inversely correlated to the length of the training. Sixty percent of respondents described a focused one-day workshop as a *preferred* or *very strongly preferred* format for professional development (4 out of 5 or higher).

Of the nine individuals who reported having attended four or more days of training on at least one of the three topics presented (estuaries, watersheds, and ocean), five of them were from the Beaufort district, even though responses from Beaufort teachers only accounted for about nine percent of total survey respondents. This finding suggesting that training—or the flexibility to attend training—may be inequitably available to teachers in different districts.

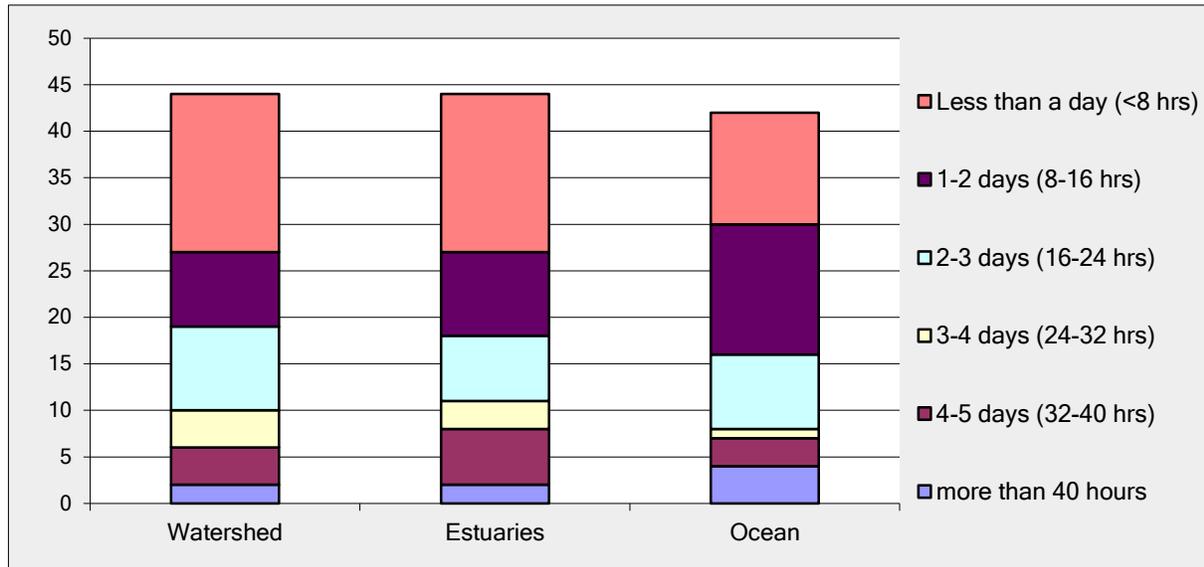


Figure 5: Professional development received by respondents related to watersheds, estuaries, and ocean/marine topics

3.1.4 CURRICULUM PRIORITIES AND SOURCES OF INFORMATION

As depicted in Table 2, a *COSEE or Sea Grant Workshop* was reportedly taken by about 38% of the 47 individuals who had had training in estuary, watershed, or ocean/marine topics in the past three years. The next most frequently taken training, *ACE Basin Adventure*, was taken by around 23% (11 individuals) of these respondents. *The Jason Project Professional Development* was reportedly attended by the fewest respondents (3, or just over 6%). Around half of the respondents who indicated that they had taken a non-Reserve training (including write-in responses) also reported participating in at least one Reserve-sponsored training.

Twenty percent (9 individuals) of respondents who reported having received training in the past three years indicated that they had not taken any of these offerings listed. To the extent that the list provided was a comprehensive list of regional offerings, this result may reflect a certain degree of confusion about which regional entities provide which training and resources. Only one of these respondents (i.e. those who reported having received training but indicated that they hadn't taken any of the offerings listed) was among the 14 individuals who indicated that they'd attended training other than those listed. The most common of the write-in responses were:

- Master Naturalist classes (3 respondents)
- Programs through the SC Aquarium (3 respondents)
- National and/or SC Marine Educators Association meetings (3 respondents)
- SC and/or GA DNR programs (2 respondents)

Answer Options	Response Percent	Response Count
COSEE or Sea Grant Workshop	38.3%	18
ACE Basin Adventure	23.4%	11
None of the Above	19.1%	9
Project Wild Aquatic	14.9%	7
Green Eggs and Sand Workshop	12.8%	6
NOAA/NERRS Teachers on the Estuary (TOTE)	10.6%	5
Project WET	10.6%	5
Poems, Pencils, Photographs, and Pluff Mud	10.6%	5
The Jason Project Professional Development	6.4%	3
Other	29.8%	14
<i>answered question</i>		47
<i>skipped question</i>		194

Table 2: Trainings taken by respondents related to watersheds, estuaries, and marine/ocean topics

When asked to assess the emphasis that they would place on specific types of activities over the entire school year, *Scientific inquiry skills* was the class of activity given the most emphasis by respondents, 73% of whom selected “Heavy Emphasis.” *Lab or field work/data collection* was given the second highest emphasis overall by respondents, suggesting that there may be an opportunity for the ACE Basin and NI-WB NERRS to support these educators by providing lesson or activity plans for the lab or field. About 38% of respondents reported that they give “Heavy Emphasis” to both *Lab or field work/data collection* and *Data analysis, statistics and probability*.

Roughly the same proportion (between 38 and 40%) of the 170 respondents selected “Little or No Emphasis” and “Moderate Emphasis” with regard to *Stewardship projects or activities*; Given that NERRs directive to promote stewardship activities, targeted follow up with respondents may be appropriate to elucidate the factors limiting teachers’ attention to such activities. In all cases, 6% or fewer of respondents indicated that the activity category was not applicable to their curriculum (Figure 6), suggesting that there is no fundamental programmatic barrier to improving participation in these activities.

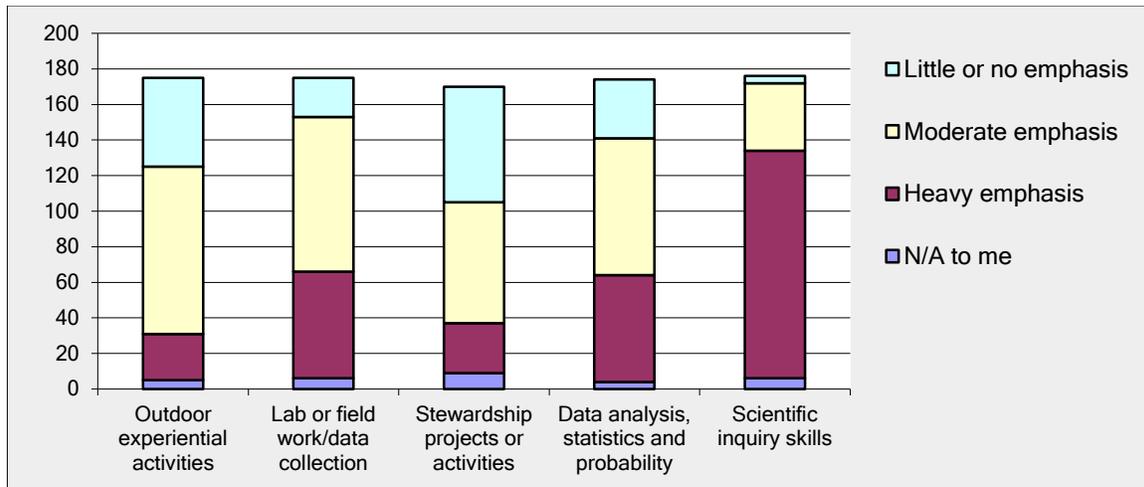


Figure 6: Relative emphasis that respondents' expect to place on various activities over the course of the school year

Of the Web sites listed in question 15, *SC Department of Natural Resources* and *NOAA Education* were the only two reportedly used by over 50% of respondents (56% and 51%, respectively). The *Environmental Protection Agency* site, the next most frequently used source, is used by 32% of respondents. *Wikipedia* is reportedly the next most frequently used source (21%), followed by the *NOAA Estuary Education* site (just under 20%); no other single source is used by more than 20 percent of respondents.

Eighteen percent of respondents reported that they do not use Web resources to obtain watershed, estuary, and ocean/marine information reflecting the importance of delivering information through a variety of channels. No clear correlation emerged between the length of time teachers had been teaching and their use of Web-based sources of information, which suggests that use of Web resources is more likely to be determined by the relative accessibility of computers or availability of free time rather the age/era of the educator. Likewise, the teachers who reported that they do not use Web resources are distributed across the school districts represented in the survey, suggesting that this finding is not simply a reflection of inequitable distribution of computer resources across the districts. In an attempt to unpack this further, NERR staff may wish to follow up with these respondents to quantify their access to technology and to inquire as to whether they use the Web to source information on other subjects but simply don't pursue materials related to watershed, estuary, and ocean/marine information or whether they do not use the Web at all.

Fourteen percent of respondents indicated that they use Web sites other than those listed in the question, including:

- SC Aquarium
- Public Broadcasting Service (PBS)
- National Geographic
- Department of Health and Environmental Control (DHEC)
- National Wildlife Federation
- National Audubon Society
- Mote Marine Laboratory
- Bermuda Biological Station

- Clemson University
- Teacher's Domain
- Center for Ocean Science and Education Excellence (COSEE) SC's Amazing Coast Elementary Science Education Program
- Seeds to Shoreline

Of the sites written in, only *SC Aquarium*, *National Geographic*, and *PBS* were cited by more than one respondent, which speaks to the diversity of Web resources that are available.

According to these data, the ACE Basin and NI-WB NERR websites are among the least frequently used of those sites listed in the question: 13% of respondents (22 of 168 individuals) reported using the ACE Basin NERR Website, but only just over 4% (7 individuals) reported using the NI-WB NERR site. This finding speaks to an opportunity for enhanced marketing of the SC Reserves' Web-based resources; NERR staff might consider including demonstration of these Web resources as a standard part of all NERR education activities as part of a broader effort to increase awareness.

3.1.5 USE OF REAL TIME/ARCHIVED DATA

When asked to identify those topics for which they have used real world science data in their teaching, 25% of respondents indicated that they don't use real-time/archived data in the classroom (Table 3). One-third of these 45 individuals were among the respondents who reported that they do not use Web-based resources.

Temperature: air, pH, and temperature: water were the three topics for which the greatest percentages of respondents reported having used real world data in the past (between 30 and 36% each). *Salinity* and *Fish species and abundance*, selected by 22% and 23% of respondents, respectively, were the only other topics for which over 20% of respondents indicated having used real world science data.

About 10% of respondents indicated that they have used real world science data about other topics, including:

- Tides and moon phases
- Soil types
- Earthquakes
- Sea turtles
- Whales
- Phytoplankton species
- Salt marsh surveys
- Bird counts
- Great garbage patch
- Volcanoes
- Sunrise/sunset and seasonal change
- ACE Basin's shorebird data
- Population

Answer Options	Response Percent	Response Count
temperature: air	36.1%	61
pH	31.4%	53
temperature: water	30.2%	51
I don't use real-time/archived data in the classroom	24.9%	42
salinity	23.1%	39
fish species & abundance	21.9%	37
atmospheric carbon dioxide	17.8%	30
currents	16.6%	28
dissolved oxygen (DO)	15.4%	26
sea level rise	14.8%	25
waves	14.8%	25
tagged animal tracking	13.6%	23
algal blooms	13.0%	22
zooplankton species	13.0%	22
bathymetry/topography	12.4%	21
water contaminants	12.4%	21
nutrients	10.7%	18
water turbidity (clarity/cloudiness)	10.1%	17
water depth	9.5%	16
I use real-time/archived data, but not related to any of these topics	9.5%	16
ocean color	4.7%	8
Other	10.1%	17
answered question		169
skipped question		72

Table 3: Topics for which respondents indicated that they have used real time/archived data in their teaching

The overall low percentage of respondents who reported using real-time or archived data as well as the character of the write-in responses suggests that this topic—assimilating real-world science data into the classroom—is still somewhat nebulous and inaccessible to teachers, particularly given the constraints of the contemporary classroom and curriculum requirements.

As depicted in Table 4, *Fish Species and Abundance*, *Temperature: water*, and *Sea Level Rise* were the topics for which the greatest percentages of respondents (36%, 34%, and 33%, respectively) indicated that they would need real time/archived data synthesized into age-appropriate learning materials. *Temperature: air* and *pH* were the only other two topics for which over 30% of respondents indicated that they would need real time/archived data synthesized into age-appropriate learning materials. *Ocean color* received the lowest percentage of responses (just over 13%).

The rough distribution of the more pedestrian topics (e.g. *temperature*, *fish species and abundance*, *sea level rise*) toward the top of the list and the more esoteric topics (e.g. *bathymetry/topography*, *water turbidity*, *zooplankton species*) toward the bottom suggests that respondents may have gravitated toward those topics that they considered to be most accessible (both in terms of the availability of age-appropriate materials and in terms of their comfort level in teaching the topic).

The distribution of responses also loosely reflects respondents’ past use of real-time/archived data, perhaps reinforcing the notion that teachers are principally looking for additional tools and products related to those topics with which they already have a fundamental level of comfort. This finding may be indicative of an opportunity for the NERRs and their partners to focus training and resource development on those topics perceived to be too technical or inaccessible so as to diversify the range of estuarine and marine science topics that are addressed in the classroom.

Eighteen percent of respondents indicated that they would not need real time/archived data synthesized into age-appropriate learning materials for any of the listed topics (Table 4).

Answer Options	Response Percent	Response Count
fish species & abundance	35.9%	56
temperature: water	34.0%	53
sea level rise	32.7%	51
pH	31.4%	49
temperature: air	31.4%	49
salinity	28.8%	45
atmospheric carbon dioxide	27.6%	43
currents	27.6%	43
nutrients	26.3%	41
tagged animal tracking	25.6%	40
water contaminants	25.0%	39
waves	24.4%	38
dissolved oxygen (DO)	23.1%	36
algal blooms	21.8%	34
zooplankton species	20.5%	32
water depth	16.7%	26
water turbidity (clarity/cloudiness)	16.0%	25
bathymetry/topography	15.4%	24
ocean color	13.5%	21
none of the above	17.9%	28
Other	5.1%	8
<i>answered question</i>		156
<i>skipped question</i>		85

Table 4: Topics for which respondents indicated that they would need real time/archived data synthesized into age-appropriate learning materials

3.1.6 FIELD TRIPS AND OUTDOOR ACTIVITIES

Fifty-nine percent of 173 respondents indicated that they had incorporated opportunities for outdoor exploration into their curricula for the year. Two-thirds of these 107 respondents provided examples, including:

- Various activities affiliated with keystone education providers, including SC Aquarium, SC DNR, Hobcaw Barony, and ACE Basin NERR activities
- Visits to various environmental education destinations, including: Camp Seewee, Frances Beidler Forest Wonderworks, Kiawah Beach Park, St. Christopher Barrier Island Outdoor Education Center
- Various specific marsh-related activities, including: kayaking, animal census (seine net), shell bagging/reef building, water quality sampling, fish identification, phytoplankton collection
- Various specific barrier island-related activities, including: beach exploration, plant species identification, shell collection and identification

Many respondents cited activities that could be conducted on school grounds or within walking distance (e.g. “Gardening,” “Species collection in areas around our school,” “pH of the pond outside school,” and “Observing the sky and weather”), suggesting that they may be attempting to circumvent travel expenses and/or coordinating logistics for off-site travel.

As illustrated in Table 5, when asked to what degree various types of assistance would facilitate the incorporation of outdoor education into their curricula, *Lesson plans that incorporate field-based hands on, or inquiry-based activities* received the highest ranking (4.23 out of 5). *Case studies on scientific field data collection and associated activities for incorporation into curricula* received the lowest average ranking (3.76 out of 5) but still garnered an overall positive response (3 being the neutral response value). For all responses, the highest proportion of respondents described the offering as “Extremely Useful” (between 38 and 52% of respondents).

Each offering was ranked as either a 4 or 5 out of 5 by a strong majority of respondents (over 60% in all cases), indicating clearly that all of the types of assistance listed would be of value to the target population. *Institutional support from school administration* was described as “Not Useful” by more respondents (12 individuals) than any of the other 6 offerings.

There was not an obvious correlation between respondents’ district affiliation and their reported perception of the relative utility of either *Better access to natural habitats* or *Institutional support from school administration*.

Answer Options	1-Not Useful	2	3-Somewhat Useful	4	5-Extremely Useful	Rating Average	Response Count
Lesson plans that incorporate field-based hands on, or inquiry-based activities	3	8	24	46	88	4.23	169
Opportunities to partner with organizations that specialize in outdoor education	6	10	25	38	92	4.17	171
Better access to natural habitats or other suitable sites for outdoor learning	9	10	27	49	75	4.01	170
Training on how to conduct outdoor education activities	8	15	27	45	73	3.95	168
Tools and equipment (e.g. backpacks, field guides, magnifying glasses)	11	14	35	36	71	3.85	167
Institutional support from school administration	12	15	33	45	62	3.78	167
Case studies on scientific field data collection and associated activities for incorporation into curricula	10	18	37	38	63	3.76	166
<i>answered question</i>							173
<i>skipped question</i>							68

Table 5: Degree to which various types of assistance would aid respondents in incorporating more outdoor education into their curriculum

Over half (just under 57%) of respondents indicated that they take their students on field trips as part of their science curricula. Of the 98 respondents who answered in the affirmative, a very clear majority indicated that they take one to two indoor and one to two outdoor field trips per year (73 and 60, respectively). A total of 20 individuals (22%) indicated that they take 3-4 outdoor field trips per year (Figure 7). Nine individuals reported taking between five and ten outdoor field trips per year. While this Needs Assessment survey provides thorough treatment of the factors limiting off-site field trips, NERR staff may wish to follow up with some of the individuals who have been most successful at incorporating field trips into their curriculum in an attempt to identify successful strategies for funding and coordination that may be of use to other educators.

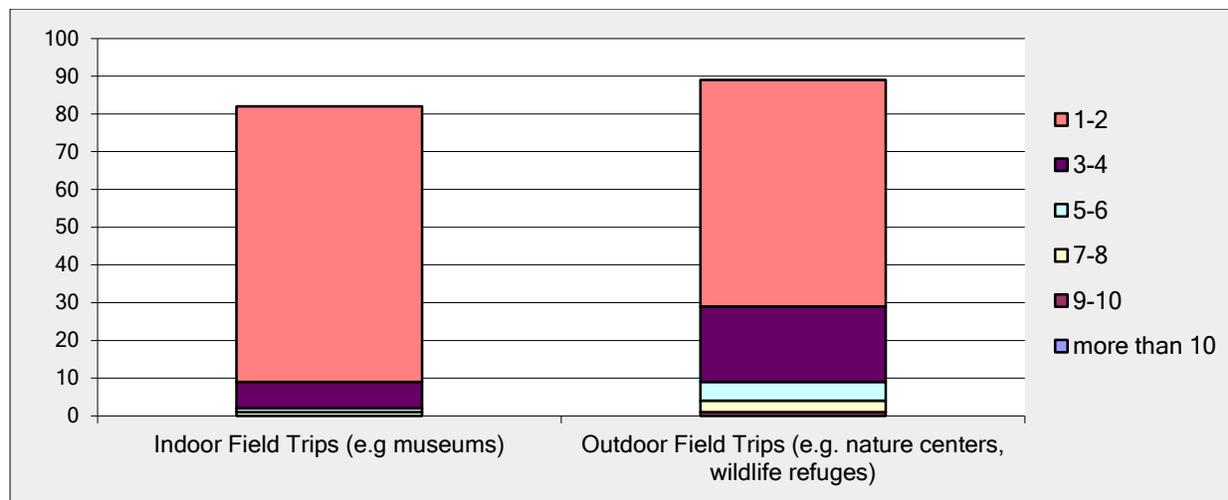


Figure 7: Number of field trips taken per year as part of respondents' science curricula

As illustrated in Figure 8, 40% of respondents indicated that they are able to travel up to 50 miles to bring students to a half-day, outdoor, hands-on environmental education experience. Ability to travel decreases dramatically (to 17% of respondents) when the distance is increased beyond 50 miles, and less than 5% of respondents are willing/able to travel more than 75 miles for this type of opportunity. Thirty-two percent of respondents indicated that they would be able to travel less than 25 miles to participate.

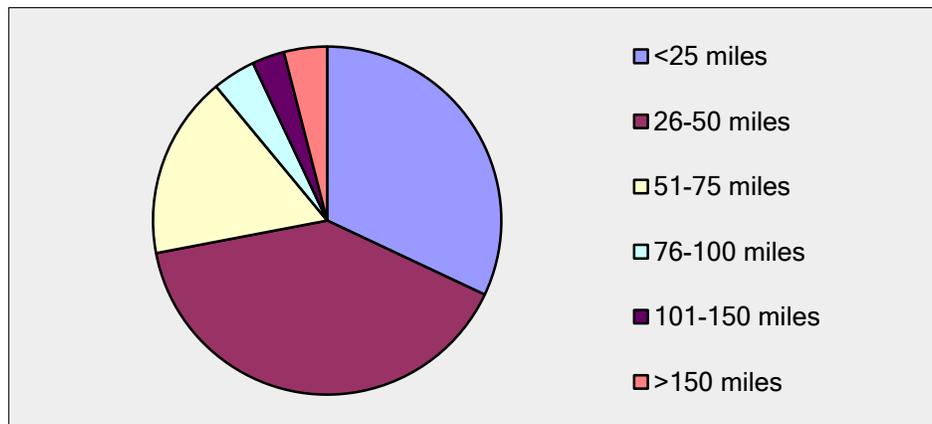


Figure 8: Number of miles respondents are willing to travel for half-day, outdoor, hands-on field trips

Around 76% of respondents indicated that they bring 70 or fewer students on field trips: 38% of respondents reported that they bring between 26 and 40 students on field trips. Just under 20% of respondents bring 25 or fewer students, and an equivalent percentage bring between 41 and 70. The finding that an appreciable percentage of respondents (around 24%) bring more than 70 students for field trips corroborates teachers' input from other sections of the survey that accommodating large numbers (multiple hundred) of students is one of their biggest constraints in trying to incorporate field trips. NERR staff may opt to follow up with individual respondents who indicate that they bring over 70 students in order to strategize special accommodations.

The *Availability of resources* (49%) and *Curriculum*, i.e. when specific topics are addressed (33%), together account for the strong majority of the responses given when teachers' were asked to identify the single biggest determinant of when they take field trips. *Time of year*, *Availability of a field trip provider*, and *No single factor, scheduling is arbitrary* were all selected by seven or fewer individual respondents.

The distribution of respondents' preferred months for scheduling field trips is somewhat bimodal, indicating that avoidance of early and late school year and the months around the winter holidays is paramount (Figure 9). The single preferred month for field trips among this pool of respondents is October (average ranking 4.07 out of 5). September and November received average ranking above neutral but well below the October ranking (3.22 and 3.48, respectively). March and April both received an average ranking of just over 3.8 out of 5. February and May also received rankings that were modestly above neutral.

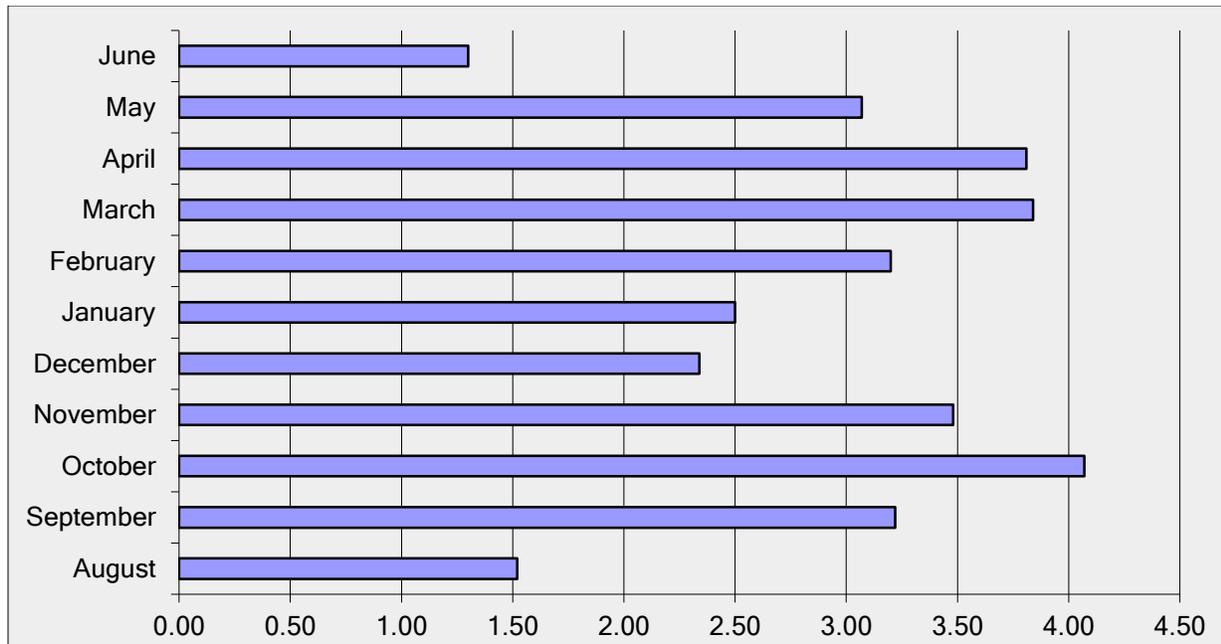


Figure 9: Respondents' preferred month(s) for scheduling field trips.

The data captured in question 27 provide a clear picture of respondents' perception of barriers to taking outdoor field trips. Ninety-nine of 161 respondents indicated that *Teacher comfort level in an outdoor setting* was "Not a Barrier" to taking field trips, and this consideration received the lowest average rating of relative significance (1.75 out of 5) by a meaningful margin.

Administration concerns about students outdoors, *Alignment with curriculum*, and *Suitable partners specializing in outdoor education* each had an average score that was less than neutral (less than 3 out of 5); of particular interest, over 25% of the respondents (42 out of 163) indicated that *Alignment with curriculum* was "Not a Barrier."

Transportation costs and *Program fees* were rated as "Very Significant Barrier" by the highest number of individuals (48% and 40% of respondents, respectively), and these were the only two answer options for which "Very Significant Barrier" was the most commonly selected answer (Table 6). *Lack of time* was the third answer option that received an average score that was above neutral.

Of the write-in responses provided, several common themes emerged:

1. The challenge of accommodating large class/group size
2. Schedule/time constraints
3. Administrative (school and/or district) support (e.g. permission process and/or relative priority given to non-academic field trips)

The specific school and/or district affiliation of individual write-in respondents may be of use to NERR staff if developing marketing strategies for specific segments of their target audiences.

Answer Options	1-Not a Barrier	2	3-Somewhat of a Barrier	4	5-Very Significant Barrier	Rating Average	Response Count
Transportation costs	13	6	36	30	79	3.95	164
Program fees	12	9	43	35	65	3.80	164
Lack of time	24	16	48	34	42	3.33	164
Suitable partners specializing in outdoor education	30	27	58	23	21	2.86	159
Alignment with curriculum	42	34	40	22	25	2.72	163
Administration concerns about students outdoors	57	33	35	17	21	2.46	163
Teacher comfort level in an outdoor setting	99	23	25	8	6	1.75	161
Other							16
<i>answered question</i>							168
<i>skipped question</i>							73

Table 6: Degree to which various factors represent barriers to taking outdoor field trips

An overwhelming majority of respondents (over 91%) reported that they would be at least “Somewhat interested” in participating in a multi-session program involving a mix of classroom and outdoor education activities that spans the school year (average ranking of 3.88 out of 5).

3.1.7 CLIMATE SCIENCE

As illustrated in Figure 10, a majority of respondents (79.1%) indicated that they incorporated lessons or discussions of climate change into their curricula to some degree: about 20% reported that it is a regular topic of discussion, about 39% indicated that they address climate change minimally in their classroom and would like to address it more, and just under 20% address climate change only to the extent that standards require them to do so. Twenty-four of 168 respondents (just over 14%) indicated that they do not yet address the topic but would like to incorporate it in the future. Eleven of 168 individuals (6.5%), representing Horry (four individuals), Charleston (four individuals), Colleton (two individuals), and Georgetown (one individual) counties reported that they do not address the topic and don’t plan to unless required.

While no clear correlation emerged between district and the degree to which respondents currently (or wish to) address climate science, correlating these data to individual respondents at a later date would enable NERR staff to target those audience cohorts with the most need for (or interest in, depending on the objectives of the outreach) climate science information.

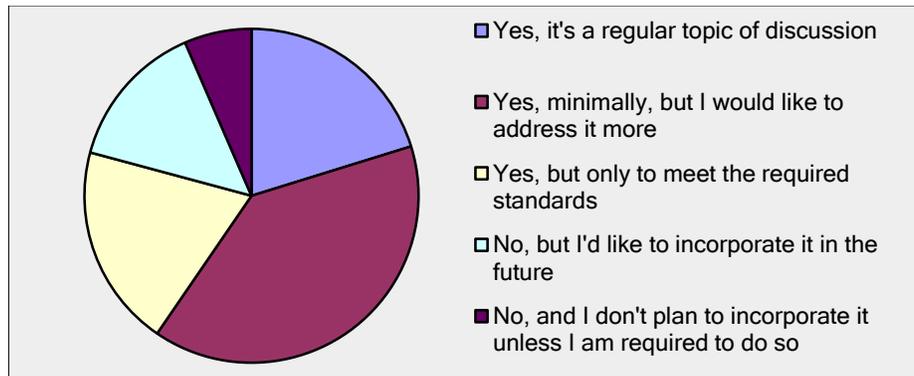


Figure 10: Respondents' treatment of climate change-related topics

When asked to evaluate the utility of various resources in incorporating more discussions about the effects of climate change, all of the offerings listed received average ratings between 3.17 and 4.29 (Table 7). In the case of all answer options save for *Institutional support from school administration*, the majority of respondents indicated that the offering would be “Extremely Useful.” *Pre-packaged experiment classroom kits* and *Availability of expert guest speakers* were the two most highly ranked offerings (4.29 and 4.23 out of 5, respectively).

Sixty-five percent of respondents indicated that *Enhanced content knowledge of the subject* would be “Extremely Useful,” suggesting that climate change science might be appropriate fodder for future teacher training offerings. Although it received a positive average ranking (3.35 out of 5), *Institutional support from school administrators* was the offering rated “Not Useful” by the greatest number of respondents, suggesting that internal political influences may not be as significant of a barrier as other, more tangible considerations (i.e. the availability of lesson plans).

Additional resources identified in the write-in section included:

- (Materials aligned to) 8th grade curriculum standards
- Videos
- Summertime teacher workshops
- Lessons modified for students with intellectual disabilities

Answer Options	1-Not Useful	2	3-Somewhat Useful	4	5-Extremely Useful	Rating Average	Response Count
Pre-packaged experiment classroom kit	4	5	23	40	92	4.29	164
The availability of expert guest speakers	3	3	28	48	81	4.23	163
Lesson Plans on the subject	5	7	36	36	82	4.10	166
Access to real-world climate or sea level data	5	5	35	43	72	4.08	160
Enhanced content knowledge of the topic	8	10	37	40	64	3.89	159
Institutional support from school administration	20	18	50	30	42	3.35	160
Other	9	0	3	2	10	3.17	24
<i>answered question</i>							167
<i>skipped question</i>							74

Table 7: Degree to which various types of assistance would aid respondents in incorporating more discussions about the effects of climate change on coastal areas into their curriculum

3.1.8 TOPICAL INTEREST

When asked to evaluate their interest in seeing select science topics turned into education materials, all of the science topics presented received a positive average rating (3.0 out of 5 or higher) with a single exception (*Commercial fishing and fisheries*). *Experimentation and the scientific method* received the single highest score (4.3 out of 5), followed by *Human Impact and the Environment* and *Lab or field work techniques*, both of which scored just about 4.0 out of 5. Each of the five highest ranking topics pertains to general science, as apposed to aquatic science, suggesting that respondents may be hungry for basic science tools and resources and might in fact prioritize these resources over resources specific to aquatic science topics.

Salinity, Water Density, Recreation, Cultural Heritage, and Fisheries Issues are the only topics for which the greatest number of respondents indicated that they were “Somewhat Interested;” for all other topics, the greatest number of respondents indicated that they were “Extremely Interested” in seeing the topic developed into educational materials (Table 8).

When respondents were asked to rate their interest in receiving professional development materials on a similar list of topics, average ratings were very similar to those provided when they were asked about their interest in educational materials. *Environmental Conservation* and *Human Impacts on Aquatic and Coastal Ecosystems* were the two topics that received the highest average ratings (Table 9). *Fisheries issues* was the single topic for which the average rating was below the neutral score of 3.0, even if barely so (2.98 out of 5).

Answer Options	1-Not Interested	2	3-Somewhat Interested	4	5-Extremely Interested	Rating Average	Response Count
Experimentation & the Scientific Method	6	7	17	24	94	4.30	148
Human Impact on the Environment	7	10	21	41	74	4.08	153
Lab or Field Work Techniques	8	8	24	40	68	4.03	148
Biodiversity and Adaptation	11	7	25	35	69	3.98	147
Technology & Instrumentation	9	7	32	39	63	3.93	150
Actions you can take	7	9	25	37	51	3.90	129
Wetlands/Marshes	8	15	28	31	65	3.88	147
Conservation	10	10	31	34	60	3.86	145
Marine/Aquatic Habitats	13	9	28	35	63	3.85	148
Water Pollution	8	14	31	42	56	3.82	151
Nutrient Cycles and Food Webs	18	7	30	27	65	3.78	147
Water Cycle	11	17	33	31	58	3.72	150
Weather	15	18	24	34	58	3.68	149
Climate Change/Sea Level Rise	13	13	31	43	47	3.67	147
Real estuary measurements and data (temperature, dissolved oxygen, salinity, etc.)	15	18	30	27	58	3.64	148
Life Cycles of Marine/Aquatic Organisms	15	14	32	33	50	3.62	144
Animal Migration	16	8	41	34	44	3.57	143
Tides, Waves & Currents	14	15	38	34	47	3.57	148
Interdisciplinary Research	16	17	30	33	48	3.56	144
Estuaries as Nurseries for Marine Life	17	20	28	28	52	3.54	145
Invasive Species	18	16	29	36	48	3.54	147
Water Quality & Health	13	19	35	35	44	3.53	146
Rivers and Watersheds	17	18	33	34	44	3.48	146
Physical Properties of Water	14	19	38	28	44	3.48	143
Erosion and Sedimentation	16	18	39	34	40	3.44	147
Marine Related Careers	17	18	34	32	41	3.44	142
Earth Systems	16	21	35	36	39	3.41	147
Heat Transfer	14	25	37	28	43	3.41	147
Coastal Hazards	17	19	34	35	38	3.41	143
Water Chemistry	18	24	35	28	39	3.32	144
Geologic Change	21	22	30	30	39	3.31	142
Salinity	18	29	35	32	30	3.19	144
Water Density	17	30	41	29	25	3.11	142
Recreation (Fishing, Birding, Boating, etc.)	20	26	46	22	27	3.07	141
Cultural Heritage	27	26	36	25	28	3.01	142
Commercial Fishing & Fisheries	26	28	43	23	23	2.92	143
<i>answered question</i>							160
<i>skipped question</i>							81

Table 8: Respondents' interest in seeing various topics developed into education materials

Answer Options	1-Not Interested	2	3-Somewhat Interested	4	5-Extremely Interested	Rating Average	Response Count
Environmental Conservation	15	10	26	38	60	3.79	149
Human Impacts on Aquatic & Coastal Ecosystems	16	12	23	37	58	3.75	146
Aquatic & Coastal Habitats	15	15	22	32	59	3.73	143
Life cycles of Aquatic & Coastal Organisms	15	16	30	29	53	3.62	143
Changing Climate	15	12	39	31	49	3.60	146
Weather	19	15	27	31	54	3.59	146
Aquatic & Coastal Biodiversity	18	19	24	29	50	3.53	140
Invasive Species	18	18	37	32	40	3.40	145
Tides, Waves & Currents	18	19	34	33	40	3.40	144
Marine Science Careers	19	17	37	22	44	3.40	139
Coastal Erosion	22	18	35	30	43	3.36	148
Water Quality and Aquatic Chemistry	19	21	36	33	34	3.29	143
Watersheds	22	20	38	24	39	3.27	143
Submerged Aquatic Vegetation	23	25	43	26	23	3.01	140
Fisheries Issues	30	20	34	35	21	2.98	140
<i>answered question</i>							156
<i>skipped question</i>							85

Table 9: Respondents' interest in receiving professional development on various topics

3.1.19 DISTANCE LEARNING

When asked about their interest in various distance learning products, the majority of respondents indicated that they were “Very interested” (5 out of 5) in each of the four products mentioned. *Short video segments on coastal environmental topics* received an average rating that was notably higher than any of the other offerings. While each of the other three offerings received a positive average rating, there did not appear to be a meaningful difference in respondents' interest in them, as the average ratings and the distribution of individual ratings for each were very similar (Table 10). Respondents expressed marginally more interest in a *live, interactive, real-time virtual field trip* over a *taped virtual field trip*, suggesting that the interactive dimension and spectacle might be of more interest and value than the flexibility to use the resource at their convenience.

Answer Options	1-Not interested	2	3-Somewhat interested	4	5-Very interested	Rating Average	Response Count
Short (5 minutes or less) video segments on coastal environmental topics (available year round on the web).	7	14	26	31	74	3.99	152
A live, interactive, real-time virtual field trip (offered at a fixed, specified time once per year).	11	19	37	27	58	3.67	152
Longer (45-60 minutes) video segments on coastal environmental topics (available year round on the web).	12	19	34	29	58	3.67	152
A taped virtual field trip (available year round via the web).	16	12	40	27	54	3.61	149
<i>answered question</i>							156
<i>skipped question</i>							85

Table 10: Respondents’ interest in various distance learning products

3.1.10 PROFESSIONAL DEVELOPMENT

When asked about their interest in professional development to build specific skills, *Conducting hands on activities* received a notably higher average rating (4.2 out of 5) than any of the other offerings. *Facilitating inquiry based activities* was the next most highly rated skill. The other five training offerings received roughly equivalent average rating. All eight of the listed skills garnered an average rating of 3.8 out of 5 or higher, and in all cases the majority of individual respondents indicated that they were “Extremely interested” in the skill building opportunity (Table 11). No write in suggestions were provided.

Answer Options	1-Not interested	2	3-Somewhat interested	4	5-Extremely interested	Rating Average	Response Count
Conducting hands-on activities	3	8	25	38	81	4.20	155
Facilitating inquiry-based activities	6	9	33	37	67	3.99	152
Using computer-generated visualizations of data	6	9	39	36	57	3.88	147
Facilitating field work/data collection	6	13	38	33	60	3.85	150
Analyzing data	9	9	35	37	56	3.84	146
Using real-time or archived data	4	13	44	33	56	3.83	150
Identifying and accessing scientific content on the Web	6	13	42	31	56	3.80	148
Other							0
<i>answered question</i>							156
<i>skipped question</i>							85

Table 11: Respondents’ interest in professional development to build specific skills

Focused one-day workshops were respondents’ preferred format for receiving professional development (Table 12). Twice as many respondents rated this format as “Very strongly

preferred” (5 out of 5) than did so for the second most preferred format (*Focused (drive to) 2-3 workshop*), and only two individuals rated *Focused one-day workshops* as “Not Acceptable.”

Both after school and extended (four days or more) workshop formats received ratings below the neutral score of 3 out of 5, and in the case of these offerings, more individual respondents rated the format as “Not acceptable” than as “Very strongly preferred.”

Respondents were neutral overall on *afterschool workshops* (single and series), as “Acceptable” was the most popular rating for both of these offerings. While the average rating for *online training* was slightly higher than for *afterschool workshops*, the greatest number of respondents to this question indicated that *online training* was an “Acceptable” format (Table 10).

Respondents did differentiate between *drive to* and *stay over* 4-5 day meetings, demonstrating a slight preference for staying over for longer events. Even so, the greatest number of respondents to each of these questions indicated that 4-5 day training events were “Not Acceptable.”

Answer Options	1-Not Acceptable	2	3-Acceptable	4	5-Very Strongly Preferred	Rating Average	Response Count
focused 1 day workshop	2	7	41	32	60	3.99	142
focused 2-3 day workshop (drive to)	16	18	42	27	31	3.29	134
online training	16	33	35	19	29	3.09	132
focused 2-3 day workshop (stay over)	27	24	34	24	27	3.00	136
single after school workshops	25	26	46	22	20	2.90	139
series of after school workshops	37	26	44	18	10	2.54	135
extended 4-5 day workshop(stay over)	40	31	32	12	17	2.51	132
extended 4-5 day workshop(drive to)	44	31	33	9	14	2.37	131
Other							0
<i>answered question</i>							150
<i>skipped question</i>							91

Table 12: Respondents’ preferred formats for receiving professional development

Respondents expressed a very clear preference for *hands-on activities* and *field work at natural sites* as methods for receiving professional development (Table 13), as both of these delivery methods received average ratings of just under 4.5 out of 5. Of the other proposed delivery methods—all of which received appreciably lower average ratings (between 2.9 and 3.33)—*small group discussion* was the highest ranked. While the number of individuals who rated *online* delivery as “Very Strongly Preferred” (21) was slightly higher than the number who rated *small group discussion* the same way (19), the distribution of the responses were very different. While responses were skewed toward a positive rating for *small group discussion*, the data for *online* delivery assume a nearly perfect bell-shaped distribution around the neutral (“Acceptable”) rating. *Online* delivery is also the proposed method for which the greatest number of individuals (24) selected a rating of “Not Acceptable.”

Answer Options	1-Not Acceptable	2	3-Acceptable	4	5-Very Strongly Preferred	Rating Average	Response Count	
hands-on activities	1	3	20	33	87	4.40	144	
field work at natural sites (observing, gathering specimens, collecting data)	1	7	19	28	87	4.36	142	
small group discussion	6	18	59	39	19	3.33	141	
large group discussion	9	21	61	28	12	3.10	131	
online	24	24	40	23	21	2.95	132	
lecture	13	22	77	13	11	2.90	136	
Other								0
<i>answered question</i>							148	
<i>skipped question</i>							93	

Table 13: Respondents’ preferred delivery methods for receiving professional development

Each of the four proposed methods for receiving professional development materials received positive average ratings (between 3.54 and 3.94 out of 5). *Downloading materials from website* and *DVD/CD format* had very similar average ratings and distribution of individual responses (Table 14). Only a total of 14 of 141 respondents—just under 10%—rated *Downloading materials from website* as less than “Acceptable” (3 out of 5). Only three of these respondents were among 18% of respondents indicated (in a prior question) that they do not use Web resources to obtain watershed, estuary, or ocean/marine information for use in the classroom, which suggests that respondents’ use of the Web to pursue information or download materials may be more a matter of preference than lack of technological resources.

Printed hard copy was the only format for which the majority of respondents selected a ranking of something other than “Very strongly preferred,” although the average ranking for this format was still positive. The positive average ranking for all five offered formats could be interpreted to indicate that preferences about material format are secondary to content, quality, and availability. Even so, the findings from this and other questions about training and material formats will help NERR staff and partnering resource providers optimize their offerings.

Answer Options	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred	Rating Average	Response Count	
Download materials from website	6	8	38	26	63	3.94	141	
DVD/CD format	6	10	38	29	60	3.89	143	
Activity Kit format (loaned)	6	13	43	28	51	3.74	141	
Printed hard copy	8	12	56	32	37	3.54	145	
Other								0
<i>answered question</i>							148	
<i>skipped question</i>							93	

Table 14: Respondents’ preferred formats for receiving professional development materials

As seen in Table 15, respondents were unambiguous about the importance of avoiding weekends when scheduling professional development workshops, as “Not Acceptable” was the most popular response by individual respondents (nearly 33% of the 131 respondents); this option received the lowest average rating of the options provided (2.53 out of 5). In contrast, “Acceptable” was the most common rating for *During the school day* and *After school*. *During the school day* received the highest average rating of the three options for weekly scheduling options, but all three answer options garnered negative average responses (2.53 – 2.86 out of 5).

Summer was the most highly rated of the seasonal scheduling options provided and was the only seasonal option for which “Very strongly preferred” was the most popular response. This finding corroborates respondents’ input that there is no preferred time for training during the work week.

Answer Options	1-Not Acceptable	2	3-Acceptable	4	5-Very Strongly Preferred	Rating Average	Response Count
Summer (June-August)	16	11	37	32	41	3.52	137
Fall (September-November)	13	13	53	27	32	3.38	138
Spring (March-May)	11	19	55	30	17	3.17	132
Winter (December-February)	16	15	62	23	17	3.08	133
During the school day	25	26	44	16	21	2.86	132
After school	27	27	46	18	15	2.75	133
Weekends	43	26	29	15	18	2.53	131
<i>answered question</i>							149
<i>skipped question</i>							92

Table 15: Respondents’ scheduling preferences for receiving professional development

When asked about their scheduling preferences for events held during the summer, respondents showed a strong preference for early summer (Table 16). The month of *June* received the only positive average rating (3.37 out of 5). Double the number of respondents rated *July* as “Not acceptable” (25%) than did so for *June* (12%). More respondents rated *August* as “Not acceptable” for scheduling professional development than any other rating category.

Answer Options	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred	Rating Average	Response Count
June	17	16	46	25	39	3.37	143
July	34	15	44	21	24	2.90	138
August	43	27	39	16	12	2.47	137
<i>answered question</i>							145
<i>skipped question</i>							96

Table 16: Respondents’ preferences for scheduling professional development workshops during summer months

When respondents were asked to evaluate the importance of various factors on their decision to participate in professional development training, average rating for each of the seven factors presented was positive (3.5 out of 5 or higher), indicating that all of the factors are meaningful considerations to the audience pool. The *Availability of Continuing Education Units* was the lowest priority (average rating of 3.51 out of 5) of the considerations listed. *Training topic* and *Scheduling/available time* were identified as the two most influential factors, both receiving average ratings of above 4 out of 5. This finding confirms the importance of assessing—by way of needs assessment survey such as this one—the specific preference for training topics of discrete target audiences prior to designing professional development offerings (see Table 17). Each of the three write in responses received pertained to scheduling constrains, reinforcing the importance of this factor in respondents’ decision to participate in training.

Answer Options	1-Not a Factor	2	3-Somewhat of a Factor	4	5-Very Significant Factor	Rating Average	Response Count	
Training topic	1	4	23	40	74	4.28	142	
Scheduling/available time	2	7	34	37	65	4.08	145	
Travel/transportation considerations	3	7	43	36	54	3.92	143	
Food/lodging considerations	2	5	51	32	53	3.90	143	
Registration fees	3	3	58	25	56	3.88	145	
Stipend/compensation	13	10	34	36	48	3.68	141	
Availability of Continuing Education Units (CEUs) or Professional Learning Units (PLUs)	14	15	34	42	37	3.51	142	
Other								3
<i>answered question</i>							149	
<i>skipped question</i>							92	

Table 17: Degree to which various factors influence respondents’ participation in professional development training

Slightly more than 60% of respondents, spread proportionately across the sampled districts, indicated that their school or organization funds professional development. There may be a correlation between the availability of school/institutional support and the relative importance that individual respondents placed on *Registration fees* or *Stipend/compensation* as factors influencing their decision to participate in professional development training: 78% (18 of 23) of those respondents who rated the importance of a stipend a 2 out of 5 or below were from schools that fund professional development. However, the teachers from schools that do not fund professional development proved no more likely to rate the availability of a stipend as a “Very significant factor” than those whose organizations do support professional development.

Data from Question 42 indicate that the ability of respondents (whose organizations pay for professional development) to pay decreases incrementally once the cost of the single-day workshop goes above \$30. Even so, about 13% of respondents indicated that they were able to pay up to \$90 for single day training event. Almost 16% of respondents indicated that they are able to pay the *Cost of meals and snack only* (Figure 11).

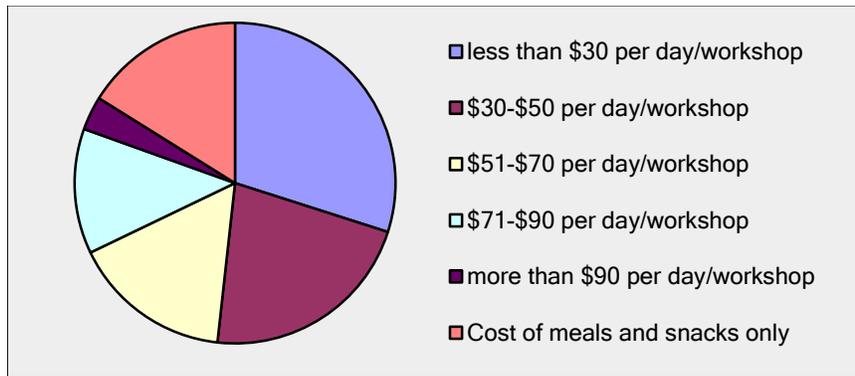


Figure 11: Respondents' ability to pay for a single day-long training event

Data from Question 43 confirm that respondents' willingness to pay (out of pocket) for training is inversely related to cost (Figure 12). There appears to be a critical price threshold for a single-day training event at \$50, as less than 15% of respondents indicated that they are willing to spend more than this for a single-day event. Around 29% of respondents cited \$50 as their maximum, and over 40% of respondents indicated that they are unwilling to spend over \$30. Nearly 16% reported that they were unwilling to pay out of pocket for anything other than the *Cost of meals and snacks*.

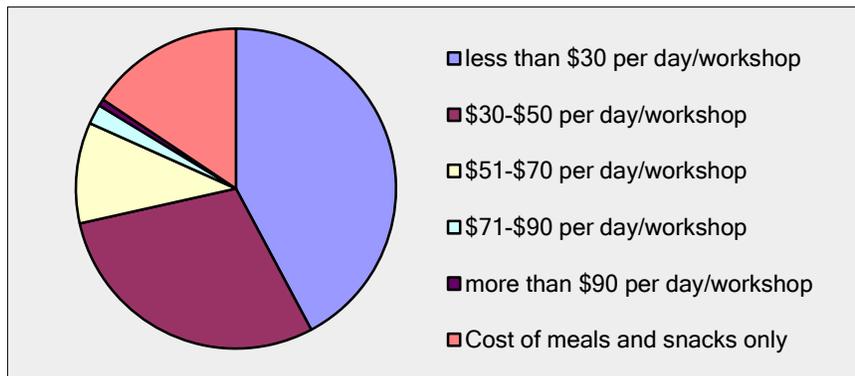


Figure 12: Respondents' willingness to pay out of pocket for a single, day-long training event

Survey data also delineated a clear threshold in the distance that respondents are willing to travel for training, as over 50% of respondents identified 50 miles as the maximum distance that they are willing to travel for a single, day-long training event (Figure 13).

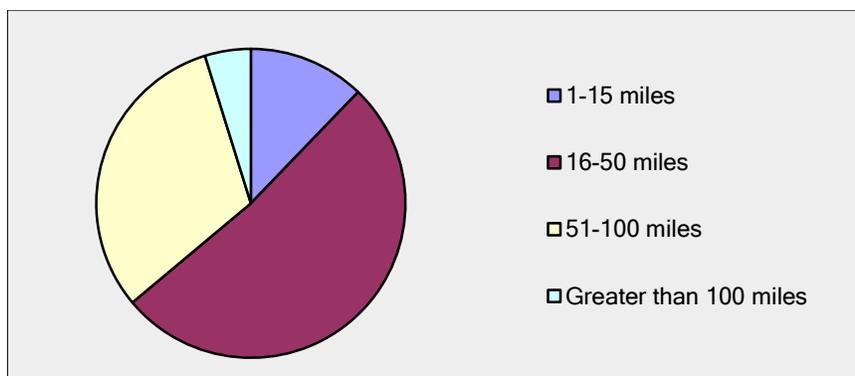


Figure 13: Respondents' willingness to travel for a single, day-long training event

As detailed in Table 18, when asked to assess their use of various sources of information about professional development opportunities, respondents indicated clearly that *Direct email* is the single source of the options presented on which they depend most heavily. Over 90% of respondents indicated that they at least “Rely Somewhat” upon *Direct email*, and over half of all respondents indicated that they “Rely Heavily” on this source.

Curriculum coordinator was the second most relied upon source and was the only other answer option to receive a positive (above 3 out of 5) overall rating, yet close to 23% of respondents indicated that they “Do not rely upon” this source at all.

The data indicate that respondents rely only minimally on *Organizational newsletters*, *Websites*, *the COSEE-SE listserv*, and *Other listserves*, as more respondents selected “Do not rely upon” than any other rating for each of these sources.

The National Science Teachers Association (NSTA) was the most frequently listed source for information about professional development training among the write in responses.

Answer Options	1-Do Not Rely Upon	2	3-Rely Somewhat	4	5-Rely Heavily	Rating Average	Response Count	
Direct email	10	3	31	26	76	4.06	146	
Curriculum coordinator	32	8	39	34	28	3.13	141	
School principal	35	13	43	25	23	2.91	139	
Word of Mouth	24	23	53	17	16	2.83	133	
Organization newsletters	54	29	21	13	8	2.14	125	
Websites	57	19	17	10	10	2.09	113	
COSEE-SE listserv	68	18	26	6	13	2.07	131	
Other listserv	75	19	15	4	4	1.66	117	
Additional specification							9	
							<i>answered question</i>	149
							<i>skipped question</i>	92

Table 18: Degree to which respondents rely on various sources of information about professional development opportunities

Sixty-eight percent of the respondents who indicated that they do not want to be added to the ACE Basin and NI-WB NERRS email list also reported that they at least “Rely Somewhat” on direct emails as a source of information about professional development. This discrepancy suggests that there may be other challenges (e.g. available time, general disinterest) in reaching them about such opportunities.

4.0 CONCLUSION

The Needs Assessment implemented by the K-12 Estuarine Education Program (KEEP) at the ACE Basin and North Inlet-Winyah Bay National Estuarine Research Reserves in the spring of 2013 was a thorough, targeted survey. This Needs Assessment generated nuanced findings, summarized in the table below, about formal and informal educators' experience, access to continuing education, curriculum priorities, relative treatment of various science topics, and preferences for the delivery of professional development. These findings will enable KEEP staff at both Reserves to better anticipate and address obstacles that educators face when trying to incorporate new science content and activities—particularly those involving real world science data and hands-on outdoor experiences—into their curricula.

The high resolution of the findings generated from this effort reaffirms the importance of capturing the specific needs and preferences of target audiences—and of the discrete segments of those audiences—to maximize the efficacy of any program offering.

4.1 SUMMARY OF KEY FINDINGS

Respondent Demographics

- 36% of the 231 respondents were from the Charleston district; Colleton and Horry school districts were the second and third most highly represented (16.2% and 11.2% of respondents, respectively).
- Data gathered through the Needs Assessment survey are skewed toward veteran teachers:
 - Over half (55%) of respondents have been teaching for ten years or more
 - Nearly 34% of respondents have been teaching for more than 15 years

Familiarity with the ACE Basin and NI-WB NERRs

- Only one-third of respondents reported that they were aware that their state was home to two NERRs
 - Of these individuals, only just over half reported having used the educational services or products provided by the two NERRs
 - Professional development and field trips were the most frequently used products
 - Of those who reported having used services or products, nearly 90% reported using more than one type of product
 - Professional Development Trainings may provide key opportunity to inform participants of other product/service offerings, including Reserves' websites
 - Data suggest that onus is on Reserve staff to market and deliver products to target users; they simply may not have the capacity (time or knowledge) to pursue and locate them independently

Attention to Watershed, Estuarine, and Ocean/Marine Topics

- Around 40% of respondents reported they have never taught about Estuaries or Watersheds
- Around 30% of respondents reported they have never taught about Ocean topics

- Distribution of responses suggests that inclusion of these subjects in teachers' curricula is not simply a function of district-specific guidance
- One-third of respondents saw a need for new educational materials related to Estuaries, Watersheds, and Ocean topics in languages other than English; Spanish was suggested by 63% of these respondents
- About 25% of 200 respondents have had training in watershed, estuary, or ocean/marine topics in the past 3 years
 - Close to 80% of respondents have attended training also reported devoting at least three full classes to one or more of the three topics in a typical year
 - Five of the 9 individuals who reported having attended four or more days of training on at least one of the three topics presented (estuaries, watersheds, and ocean) were from the Beaufort district, even though Beaufort teachers only accounted for about nine percent of total survey respondents

Curriculum Priorities and Sources of Information

- *A COSEE or Sea Grant Workshop* was taken by about 38% of the 47 individuals who had had training in estuary, watershed, or ocean/marine topics in the past three years
- *The Jason Project Professional Development* was attended by the fewest respondents
- 73% of respondents give "Heavy Emphasis" to teaching *Scientific inquiry skills*
- *Lab or field work/data collection* was given the second highest emphasis by respondents
- Close to 80% of respondents reported giving only "Moderate Emphasis" or less to *Stewardship projects or activities*
- *SC Department of Natural Resources* and *NOAA Education* were the only two websites of those listed that are used by over 50% of respondents
- ACE Basin and NI-WB NERR websites are among the least used of those sites listed

Use of Real Time/Archived Data

- 25% of respondents indicated that they don't use real-time/archived data in the classroom
- *Temperature: air, pH, and temperature: water* were the three topics for which the greatest percentages of respondents reported having used real world data in the past
- *Fish Species and Abundance, Temperature: water, and Sea Level Rise* were the topics for which the greatest percentages of respondents indicated that they would need real time/archived data synthesized into age-appropriate learning materials
- 18% of respondents indicated that they would not need real time/archived data synthesized into age-appropriate learning materials for any of the listed topics

Field Trips and Outdoor Activities

- 59% of 173 respondents indicated that they had incorporated opportunities for outdoor exploration into their curricula for the year
- Many respondents cited activities that could be conducted on school grounds or within walking distance, suggesting that they may be attempting to circumvent travel expenses and/or coordinating logistics for off-site travel
- *Lesson plans that incorporate field-based hands on, or inquiry-based activities* received the highest ranking of the listed types of assistance that might facilitate incorporation of outdoor education

- *Institutional support from school administration* was describes as “Not Useful” by more respondents than any of the other 6 offerings
- Over half (just under 57%) of respondents indicated that they take their students on field trips as part of their science curricula
 - Clear majority indicated that they take one to two indoor and one to two outdoor field trips per year
 - Data suggest that 50 miles is a critical travel threshold for participation in a half-day, outdoor, hands-on environmental education experience
 - Around 76% of respondents indicated that they bring 70 or fewer students on field trips
 - Data suggest that accommodating large numbers of students on field trips is a major constraint for a meaningful percentage of teachers
 - Single preferred month for field trips among this pool of respondents is October; avoidance of early and late school year and the months around the winter holidays is paramount
 - Ninety-nine of 161 respondents indicated that *Teacher comfort level in an outdoor setting* was “Not a Barrier” to taking field trips; *Transportation costs* and *Program fees* were rated as “Very Significant Barrier” by the highest number of individuals
- Over 91% of respondents reported that they would be at least “Somewhat interested” in participating in a multi-session program involving a mix of classroom and outdoor education activities that spans the school year

Climate Science

- 79.1% of respondents indicated that they incorporated lessons or discussions of climate change into their curricula to some degree
- No clear correlation emerged between school district and the degree to which respondents currently (or wish to) address climate science
- Data suggest that climate change science might be appropriate fodder for future teacher training offerings
 - Each of the resources proposed to aid in incorporating more discussions about the effects of climate change received positive average ratings
 - *Pre-packaged experiment classroom kits* and *Availability of expert guest speakers* received the highest ranking
 - Data suggest that internal political influences may not be as significant of a barrier as more tangible considerations (i.e. the availability of lesson plans), as *Institutional support from school administration* rated as “Not Useful” by the majority of respondents

Topical Interest

- *Experimentation and the scientific method, Human Impact and the Environment, and Lab or field work techniques* received highest average ratings of potential topics to be turned into education materials
- *Commercial fishing and fisheries* received lowest average rating
- Respondents’ interest in professional development on various topics mirrors their interest in having those topics turned into educational materials

- *Environmental Conservation and Human Impacts on Aquatic and Coastal Ecosystems* received highest average rating of potential topics for professional development

Distance Learning

- Majority of respondents were “Very interested” in each of the distance learning products listed
- *Short video segments on coastal environmental topics* received highest average rating
- Respondents expressed more interest in a *live, interactive, real-time virtual field trip* than a *taped virtual field trip*, suggesting that the interactive dimension might be of more interest/value than the flexibility to use the resource at their convenience

Professional Development

- Majority of individual respondents were “Extremely interested” in all eight of the skill building opportunities presented
- *Conducting hands on activities* and *Facilitating inquiry based activities* received higher average rating than other skill building topics
- *Focused one-day workshops* were respondents’ preferred format for receiving professional development
- Both after school and extended (four days or more) workshop formats received ratings below the neutral score of 3 out of 5
- Respondents expressed a very clear preference for *hands-on activities* and *field work at natural sites* as methods for receiving professional development
- Each of the proposed methods for receiving professional development materials received positive average ratings; *printed hard copy* received lowest average rating
- Weekends should be avoided when scheduling professional development workshops
- *Summer* was the most highly rated of the seasonal scheduling options provided; respondents showed a strong preference for early summer (June)
- *Training topic* and *Scheduling/available time* were identified as the two most influential factors in respondents’ decision to participate in professional development, confirming the importance of assessing the specific preference for training topics of discrete target audiences prior to designing professional development
- The *Availability of Continuing Education Units* was the lowest priority in terms of respondents’ decision to participate in professional development
- Around 60% of respondents indicated that their school funds professional development
 - Data suggest a threshold in terms of ability to pay at around \$30
 - Almost 16% of respondents indicated that they are able to pay the *Cost of meals and snack only*
- Less than 15% of respondents are willing to spend more than \$50 out of pocket for a single-day training event
- Over 50% of respondents identified 50 miles as the maximum distance that they are willing to travel for a single, day-long training event
- *Direct email* is the single source on which respondents depend most heavily to learn about professional development opportunities
- Respondents rely minimally on *Organizational newsletters, Websites, the COSEE-SE listserv, and Other listserves*

Appendix A: Introductory Letter of Transmittal and Survey Dissemination Emails

Introductory Letter of Transmittal

Dear Educator,

The staff of the ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) are seeking input from South Carolina's educators about professional development and curriculum needs.

As two of the country's 28 NERRs, these living laboratories are jointly funded by the National Oceanic and Atmospheric Administration (NOAA) and a state partner. The ACE Basin NERR is administered through the South Carolina Department of Natural Resources, and the NI-WB NERR is administered through the University of South Carolina.

Why is National Estuarine Research Reserve System interested in teachers and education?

The National Estuarine Research Reserve System uses its network of living laboratories to investigate crucial issues facing America's coastal communities. As part of this network, it is the mission of the ACE Basin and NI-WB NERRs to improve the management of coastal environments through research, education and stewardship. To this end, we put a strong focus on professional development for educators in the areas of coastal science using real world science data and new technologies.

Why are the NERRs asking me for input?

By reaching out directly to local educators, we avoid relying on our own perceptions or assumptions about what educators need in the face of changing content standards and curriculums. We hope that you will tell us about your needs and priorities as an educator of the citizens of tomorrow.

How will participating in this survey benefit me?

We will use this information to design student programs, materials, and training to support your teaching. Survey participants will also have the option of entering a drawing for a great package of prizes, including a chance to take your students on the Educational Vessel Discovery, a classroom set of the South Carolina Beachcomber's Guide, supplies to teach Estuaries 101 lessons, among other goodies.

How long will this survey take?

The survey will take approximately 20 minutes to complete.

Is it anonymous/confidential?

Yes, the survey is anonymous and individual results will remain confidential; data will be released in the aggregate only and will be available to you upon request.

The survey will only be available for a limited time, so please provide your input as soon as possible. Your participation is crucial to ensuring that our training offerings and materials meet your needs. Thank you very much for your time and support.

To begin the survey, please follow this link:

<https://www.surveymonkey.com/s/SC-Teachers-Needs-Assessment>

If you have additional questions, please contact Julie Binz, at BinzJ@dnr.sc.gov or (843) 953-9156 or Beth Thomas at Beth@belle.baruch.sc.edu or (843) 904-9016.

Survey Dissemination Distribution Emails

DISTRIBUTION ROUND 1

Sent: Tuesday, March 26, 2013
Subject: SC Teachers Needs Assessment

Dear Educator,

The ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) are seeking input about your professional development and curriculum needs related to coastal science topics.

As two of the 28 living laboratories in the National Estuarine Research Reserve System, it is the mission of the ACE Basin and NI-WB NERRs is to improve the management of coastal environments through science, education, and stewardship.

We are asking for about 20 minutes of your time to complete a survey about your needs as an educator of the citizens of tomorrow. We will use this information to design student programs, materials, and training to support your teaching.

The survey is anonymous and individual results will remain confidential; data will be released in the aggregate only and will be available to you upon request.

The survey will only be available for a limited time, so please provide your input as soon as possible. Your participation is crucial to ensuring that our training offerings and materials meet your needs.

To begin the survey, please follow this link:
<https://www.surveymonkey.com/s/SC-Teachers-Needs-Assessment>

Please see the attached letter for additional information about the survey.
If you have additional questions, please contact Julie Binz, at BinzJ@dnr.sc.gov or (843) 953-9156 or Beth Thomas at Beth@belle.baruch.sc.edu or (843) 904-9016.

Thank you very much for your time and support.

DISTRIBUTION ROUND 2

Sent: Tuesday, April 9, 2013

Subject: SC Teachers Needs Assessment - 2nd Delivery (deadline approaching)

Dear Educator,

The ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) are seeking input about your professional development and curriculum needs related to coastal science topics.

As two of the 28 living laboratories in the National Estuarine Research Reserve System, the mission of the ACE Basin and NI-WB NERRs is to improve the management of coastal environments through science, education, and stewardship.

We are asking for about 20 minutes of your time to complete a survey about your needs as an educator of the citizens of tomorrow. We will use this information to design student programs, materials, and training to support your teaching.

The survey is anonymous and individual results will remain confidential; data will be released in the aggregate only and will be available to you upon request.

Please provide your input as soon as possible: the survey will close on Wednesday, April 17. Your participation is crucial to ensuring that our training offerings and materials meet your needs.

To begin the survey, please follow this link:

<https://www.surveymonkey.com/s/SC-Teachers-Needs-Assessment>

Please see the attached letter for additional information about the survey.

If you have additional questions, please contact Julie Binz, at BinzJ@dnr.sc.gov or (843) 953-9156 or Beth Thomas at Beth@belle.baruch.sc.edu or (843) 904-9016.

Thank you very much for your time and support.

DISTRIBUTION ROUND 3

Sent: Thursday, April 18, 2013

Subject: SC Teachers Needs Assessment - LAST CHANCE FOR INPUT! (Deadline extended through Friday, April 19)

Dear Educator,

The ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) are seeking input about your professional development and curriculum needs related to coastal science topics. In the interest of ensuring that all target educators have the opportunity to contribute, the closing date for the survey has been extended through the end of this week.

As two of the 28 living laboratories in the National Estuarine Research Reserve System, the mission of the ACE Basin and NI-WB NERRs is to improve the management of coastal environments through science, education, and stewardship.

We are asking for about 20 minutes of your time to complete a survey about your needs as an educator of the citizens of tomorrow. We will use this information to design student programs, materials, and training to support your teaching.

The survey is anonymous and individual results will remain confidential; data will be released in the aggregate only and will be available to you upon request.

Please provide your input as soon as possible: the survey will close at COB on Friday, April 19. Your participation is crucial to ensuring that our training offerings and materials meet your needs.

To begin the survey, please follow this link:

<https://www.surveymonkey.com/s/SC-Teachers-Needs-Assessment>

Please see the attached letter for additional information about the survey.

If you have additional questions, please contact Julie Binz, at BinzJ@dnr.sc.gov or (843) 953-9156 or Beth Thomas at Beth@belle.baruch.sc.edu or (843) 904-9016.

Thank you very much for your time and support.

DISTRIBUTION ROUND 4

Sent: Friday, April 19, 2013

Subject: SC Teachers Needs Assessment - FINAL REMINDER! (Survey closes today)

Dear Educator,

This is your final opportunity to provide input!

The ACE Basin and North Inlet-Winyah Bay (NI-WB) National Estuarine Research Reserves (NERRs) are seeking your input about your professional development and curriculum needs related to coastal science topics. This information will be used to develop student programs, materials, and training to support your teaching.

As two of the 28 living laboratories in the National Estuarine Research Reserve System, the mission of the ACE Basin and NI-WB NERRs is to improve the management of coastal environments through science, education, and stewardship.

We are asking for about 20 minutes of your time to complete a survey about your needs as an educator of the citizens of tomorrow.

The survey is anonymous and individual results will remain confidential; data will be released in the aggregate only and will be available to you upon request.

Please provide your input as soon as possible: the survey will close at COB today (Friday, April 19)! Your participation is crucial to ensuring that our training offerings and materials meet your needs.

To begin the survey, please follow this link:

<https://www.surveymonkey.com/s/SC-Teachers-Needs-Assessment>

Please see the attached letter for additional information about the survey.

If you have additional questions, please contact Julie Binz, at

BinzJ@dnr.sc.gov or (843) 953-9156 or Beth Thomas at Beth@belle.baruch.sc.edu or (843) 904-9016.

Thank you very much for your time and support.

Appendix B: Needs Assessment Survey Instrument

1. Introduction

Thank you for your willingness to help the ACE Basin and North Inlet-Winyah National Estuarine Research Reserves gather important information about estuary, watershed, and ocean education.

If you have any questions, please contact us: Julie Binz: (843) 953-9156 binzj@dnr.sc.gov or Beth Thomas:(843) 904-9016 beth@belle.baruch.sc.edu.

Thank you,
Julie & Beth

2. Basics

1. In which school district do you teach?

- Horry
- Georgetown
- Charleston
- Dorchester 2
- Dorchester 4
- Berkeley
- Colleton
- Beaufort
- Jasper
- None of the Above

3.

1. What grades do you teach? (Check all that apply)

- 6th 9th 12th
- 7th 10th
- 8th 11th
- Other (please specify)

2. How many years have you been teaching?

- Less than 2 years
- 2-3 years
- 3-5 years
- 5-7 years
- 7-10 years
- 10-15 years
- More than 15 years

3. There are two National Estuarine Research Reserves (NERRs) in South Carolina, the ACE Basin NERR and North Inlet-Winyah Bay NERR, which are two of the 28 NERRs around the country protected for the purposes of education, research, water-quality monitoring and coastal stewardship. Were you aware that your state has two NERRs?

- Yes
- No

4.

1. Have you ever used any educational services or products offered by the ACE Basin and Winyah Bay-North Inlet NERRs?

- Yes
- No

5.

1. Which services or products have you used?

- Field trips
- Curriculum
- Websites
- Professional Development Trainings/Workshops
- Other

Other (please specify)

6.

1. Why haven't you used any services or products?

7. Watershed, Estuary, Ocean Education

Definitions for question clarity below.

Watershed: An area of land where all water drains to a common place.

Estuary: A semi-enclosed coastal body of water where fresh and salt water meet and mix.

Ocean: Relating to a system of open-ocean habitats, characterized by exposure to wave action, tidal fluctuations and ocean currents.

1. How many years have you been teaching estuary, watershed and ocean related topics?

	Never taught this topic	Less than 2 years	2-3 years	3-5 years	5-7 years	7-10 years	10-15 years	More than 15 years
Estuaries	<input type="checkbox"/>							
Watershed	<input type="checkbox"/>							
Ocean	<input type="checkbox"/>							

2. How many class or activity periods of estuary, watershed, and/or ocean instruction do your students receive in a typical school year.

	None	A portion of one class	1-2 full classes	3-5 full classes	6-15 full classes	More than 15 full classes per year
Estuaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watershed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Do you have a need for new educational materials related to estuary, watershed, and/or marine/ocean science in languages other than English?

- Yes
 No

If yes, what languages

4. Have you had any training in watershed, estuary or ocean/marine science within the last three years?

- Yes
 No

8.

1. In the last three years, how many hours of professional development training in science have you obtained related to estuaries, watersheds and the ocean?

	Less than a day (<8 hrs)	1-2 days (8-16 hrs)	2-3 days (16-24 hrs)	3-4 days (24-32 hrs)	4-5 days (32-40 hrs)	more than 40 hours
Watershed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estuaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Which professional development trainings have you taken to supplement your watershed, estuary, ocean education?

- NOAA/NERRS Teachers on the Estuary (TOTE)
- Project WET
- Project Wild Aquatic
- Green Eggs and Sand Workshop
- ACE Basin Adventure
- Poems, Pencils, Photographs, and Pluff Mud
- The Jason Project Professional Development
- a COSEE or Sea Grant Workshop
- None of the Above
- Other (please specify)

3. Think about your plans for your class for the entire year. How much emphasis did you or will you give each of the following?

	Little or no emphasis	Moderate emphasis	Heavy emphasis	N/A to me
Outdoor experiential activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lab or field work/data collection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stewardship projects or activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data analysis, statistics and probability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific inquiry skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. From which web resources do you currently obtain watershed, estuary, and ocean/marine information for use in your classroom? Check all that apply.

- NOAA Education- <http://www.education.noaa.gov>
- National Estuarine Research Reserve System- <http://nerrs.noaa.gov>
- NOAA Estuary Education- www.estuaries.noaa.gov.
- ACE Basin NERR- <http://dnr.sc.gov/marine/NERR/index.html>
- North Inlet-Winyah Bay NERR-<http://www.northinlet.sc.edu/>
- SC Department of Natural Resources- www.dnr.sc.gov
- NSTA Estuaries Sci Guide- <http://sciguides.nsta.org>
- Environmental Protection Agency- www.epa.gov
- Wikipedia- www.wikipedia.org
- National non-profit (specify below)
- Local non-profit (specify below)
- I do not use web resources
- Other (please specify)

5. About which of the following topics have you used real world science data (either real-time or archived) in your teaching? Please check all that apply.

***Note: We're defining real-time data streams as data that you can access as they are being collected by scientific instruments to study current conditions or events. Archived data are older data that are stored and indexed so that they can be easily located and retrieved.**

- I don't use real-time/archived data in the classroom
- algal blooms
- tagged animal tracking
- atmospheric carbon dioxide
- bathymetry/topography
- currents
- dissolved oxygen (DO)
- fish species & abundance
- nutrients
- ocean color
- pH
- salinity
- sea level rise
- temperature: air
- temperature: water
- water depth
- water contaminants
- water turbidity (clarity/cloudiness)
- waves
- zooplankton species
- I use real-time/archived data, but not related to any of these topics
- Other (please specify)

6. Which of the following real-time/archived data sets would you need synthesized into age-appropriate learning materials and visualizations for your teaching?? (Check all that apply)

***Note: We're defining real-time data streams as data that you can access as the data are being collected by scientific instruments, or shortly thereafter, to study current conditions or events. Archived data are defined as older data that are still important and necessary for future reference, but are stored and indexed so that they can be easily located and retrieved.**

- | | |
|---|---|
| <input type="checkbox"/> algal blooms | <input type="checkbox"/> salinity |
| <input type="checkbox"/> tagged animal tracking | <input type="checkbox"/> sea level rise |
| <input type="checkbox"/> atmospheric carbon dioxide | <input type="checkbox"/> temperature: air |
| <input type="checkbox"/> bathymetry/topography | <input type="checkbox"/> temperature: water |
| <input type="checkbox"/> currents | <input type="checkbox"/> water depth |
| <input type="checkbox"/> dissolved oxygen (DO) | <input type="checkbox"/> water contaminants |
| <input type="checkbox"/> fish species & abundance | <input type="checkbox"/> water turbidity (clarity/cloudiness) |
| <input type="checkbox"/> nutrients | <input type="checkbox"/> waves |
| <input type="checkbox"/> ocean color | <input type="checkbox"/> zooplankton species |
| <input type="checkbox"/> pH | <input type="checkbox"/> none of the above |
| <input type="checkbox"/> Other (please specify) | |

9. Outdoor Education

1. Have you incorporated opportunities for outdoor exploration into your curriculum for the year?

- Yes
- No

10.

1. What type of activities?

2. To what extent would the following assist you in incorporating more outdoor education into your curriculum?

	1-Not Useful	2	3-Somewhat Useful	4	5-Extremely Useful
Tools and equipment (e.g. backpacks, field guides, magnifying glasses)	<input type="radio"/>				
Lesson plans that incorporate field-based hands on, or inquiry-based activities	<input type="radio"/>				
Case studies on scientific field data collection and associated activities for incorporation into curricula	<input type="radio"/>				
Institutional support from school administration	<input type="radio"/>				
Opportunities to partner with organizations that specialize in outdoor education	<input type="radio"/>				
Training on how to conduct outdoor education activities	<input type="radio"/>				
Better access to natural habitats or other suitable sites for outdoor learning	<input type="radio"/>				

3. Do you take your students on field trips as part of your science curriculum/activities?

- Yes
- No

11.

1. How many times per year?

	1-2	3-4	5-6	7-8	9-10	more than 10
Indoor Field Trips (e.g. museums)	<input type="radio"/>					
Outdoor Field Trips (e.g. nature centers, wildlife refuges)	<input type="radio"/>					

2. How far would you be able to travel to bring your students on a half-day (3-4 hours), outdoor, hands-on environmental education experience?

- <25 miles
- 26-50 miles
- 51-75 miles
- 76-100 miles
- 101-150 miles
- >150 miles

3. How many students do you typically bring on field trips?

- <25
- 26-40
- 41-70
- >70

4. What is the single biggest determinant of when you schedule field trips?

- Time of year
- Curriculum, i.e. when we are addressing relevant topics
- Availability of the field trip/activity provider
- Availability of internal resources (e.g. funds, transportation)
- No single factor, scheduling is arbitrary

12.

1. Please describe your preferred month(s) for scheduling field trips:

	1-Not Acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
August	<input type="radio"/>				
September	<input type="radio"/>				
October	<input type="radio"/>				
November	<input type="radio"/>				
December	<input type="radio"/>				
January	<input type="radio"/>				
February	<input type="radio"/>				
March	<input type="radio"/>				
April	<input type="radio"/>				
May	<input type="radio"/>				
June	<input type="radio"/>				

2. To what extent do the following represent barriers to taking OUTDOOR field trips?

	1-Not a barrier	2	3-Somewhat of a barrier	4	5-Very significant barrier
Transportation costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Program fees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alignment with curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suitable partners specializing in outdoor education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher comfort level in an outdoor setting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Administration concerns about students outdoors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

3. Please rate your interest in participating in a multi-session program involving a mix of classroom and outdoor education activities that spans the school year (for example, 3-5 separate programs over the course of a year on a schedule to be determined on a custom basis.)

1-Not interested	2	3-Somewhat interested	4	5-Very Interested
<input type="radio"/>				

4. Do you incorporate lessons or discussion related to climate change into your curriculum for the year?

- Yes, it's a regular topic of discussion
- Yes, minimally, but I would like to address it more
- Yes, but only to meet the required standards
- No, but I'd like to incorporate it in the future
- No, and I don't plan to incorporate it unless I am required to do so

5. To what extent would the following assist you in incorporating more discussion of the effects of climate change on coastal areas into your curriculum?

	1-Not Useful	2	3-Somewhat Useful	4	5-Extremely Useful
Lesson Plans on the subject	<input type="radio"/>				
The availability of expert guest speakers	<input type="radio"/>				
Access to real-world climate or sea level data	<input type="radio"/>				
Institutional support from school administration	<input type="radio"/>				
Pre-packaged experiment classroom kit	<input type="radio"/>				
Enhanced content knowledge of the topic	<input type="radio"/>				
Other	<input type="radio"/>				

Please specify

13. Materials Needed

1. Please describe your interest in seeing the following topics developed into educational materials.

	1-Not Interested	2	3-Somewhat Interested	4	5-Extremely Interested
Nutrient Cycles and Food Webs	<input type="radio"/>				
Biodiversity and Adaptation	<input type="radio"/>				
Life Cycles of Marine/Aquatic Organisms	<input type="radio"/>				
Marine/Aquatic Habitats	<input type="radio"/>				
Animal Migration	<input type="radio"/>				
Estuaries as Nurseries for Marine Life	<input type="radio"/>				
Invasive Species	<input type="radio"/>				
Geologic Change	<input type="radio"/>				
Tides, Waves & Currents	<input type="radio"/>				
Rivers and Watersheds	<input type="radio"/>				
Erosion and Sedimentation	<input type="radio"/>				
Weather	<input type="radio"/>				
Climate Change/Sea Level Rise	<input type="radio"/>				
Earth Systems	<input type="radio"/>				
Water Cycle	<input type="radio"/>				
Physical Properties of Water	<input type="radio"/>				
Heat Transfer	<input type="radio"/>				
Salinity	<input type="radio"/>				
Water Density	<input type="radio"/>				
Wetlands/Marshes	<input type="radio"/>				
Water Chemistry	<input type="radio"/>				
Experimentation & the Scientific Method	<input type="radio"/>				
Lab or Field Work Techniques	<input type="radio"/>				
Real estuary measurements and data (temperature, dissolved oxygen, salinity, etc)	<input type="radio"/>				
Technology & Instrumentation	<input type="radio"/>				
Interdisciplinary Research	<input type="radio"/>				
Commercial Fishing & Fisheries	<input type="radio"/>				
Cultural Heritage	<input type="radio"/>				

Water Pollution	<input type="radio"/>				
Conservation	<input type="radio"/>				
Recreation (Fishing, Birding, Boating, etc.)	<input type="radio"/>				
Human Impact on the Environment	<input type="radio"/>				
Coastal Hazards	<input type="radio"/>				
Water Quality & Health	<input type="radio"/>				
Marine Related Careers	<input type="radio"/>				
Actions you can take	<input type="radio"/>				

Other (please specify)

2. Please describe your interest in the following distance learning products.

	1-Not interested	2	3-Somewhat interested	4	5-Very interested
A live, interactive, real-time virtual field trip (offered at a fixed, specified time once per year).	<input type="radio"/>				
A taped virtual field trip (available year round via the web).	<input type="radio"/>				
Short (5 minutes or less) video segments on coastal environmental topics (available year round on the web).	<input type="radio"/>				
Longer (45-60 minutes) video segments on coastal environmental topics (available year round on the web).	<input type="radio"/>				

3. Please describe your interest in professional development to build the following skills.

	1-Not interested	2	3-Somewhat interested	4	5-Extremely interested
Facilitating inquiry-based activities	<input type="radio"/>				
Conducting hands-on activities	<input type="radio"/>				
Facilitating field work/data collection	<input type="radio"/>				
Analyzing data	<input type="radio"/>				
Using computer-generated visualizations of data	<input type="radio"/>				
Identifying and accessing scientific content on the Web	<input type="radio"/>				
Using real-time or archived data	<input type="radio"/>				

Other (please specify)

4. Please describe your interest in professional development on the following topics.

	1-Not Interested	2	3-Somewhat Interested	4	5-Extremely Interested
Watersheds	<input type="radio"/>				
Aquatic & Coastal Biodiversity	<input type="radio"/>				
Aquatic & Coastal Habitats	<input type="radio"/>				
Life cycles of Aquatic & Coastal Organisms	<input type="radio"/>				
Invasive Species	<input type="radio"/>				
Submerged Aquatic Vegetation	<input type="radio"/>				
Tides, Waves & Currents	<input type="radio"/>				
Coastal Erosion	<input type="radio"/>				
Water Quality and Aquatic Chemistry	<input type="radio"/>				
Changing Climate	<input type="radio"/>				
Weather	<input type="radio"/>				
Fisheries Issues	<input type="radio"/>				
Environmental Conservation	<input type="radio"/>				
Human Impacts on Aquatic & Coastal Ecosystems	<input type="radio"/>				
Marine Science Careers	<input type="radio"/>				

Other (please specify)

14. Professional Development

1. Please describe your preferred formats for receiving professional development.

	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
single after school workshops	<input type="radio"/>				
series of after school workshops	<input type="radio"/>				
focused 1 day workshop	<input type="radio"/>				
focused 2-3 day workshop (drive to)	<input type="radio"/>				
focused 2-3 day workshop (stay over)	<input type="radio"/>				
extended 4-5 day workshop (stay over)	<input type="radio"/>				
extended 4-5 day workshop (drive to)	<input type="radio"/>				
online training	<input type="radio"/>				

Other (please specify)

2. Please describe your preferred delivery methods for receiving professional development.

	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
lecture	<input type="radio"/>				
small group discussion	<input type="radio"/>				
large group discussion	<input type="radio"/>				
hands-on activities	<input type="radio"/>				
field work at natural sites (observing, gathering specimens, collecting data)	<input type="radio"/>				
online	<input type="radio"/>				

Other (please specify)

3. Please describe your preferred formats for receiving professional development materials.

	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
Printed hard copy	<input type="radio"/>				
DVD/CD format	<input type="radio"/>				
Activity Kit format (loaned)	<input type="radio"/>				
Download materials from website	<input type="radio"/>				
Other (please specify)	<input type="text"/>				

4. Please describe your preferences for scheduling professional development workshops.

	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
Fall (September-November)	<input type="radio"/>				
Winter (December-February)	<input type="radio"/>				
Spring (March-May)	<input type="radio"/>				
Summer (June-August)	<input type="radio"/>				
After school	<input type="radio"/>				
Weekends	<input type="radio"/>				
During the school day	<input type="radio"/>				

5. Please describe your preferences for scheduling professional development workshops during summer months (during the week).

	1-Not acceptable	2	3-Acceptable	4	5-Very Strongly Preferred
June	<input type="radio"/>				
July	<input type="radio"/>				
August	<input type="radio"/>				

6. To what extent do the following factors influence your participation in professional development training?

	1-Not a Factor	2	3-Somewhat of a Factor	4	5-Very Significant Factor
Registration fees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food/lodging considerations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel/transportation considerations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scheduling/available time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stipend/compensation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training topic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of Continuing Education Units (CEUs) or Professional Learning Units (PLUs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

7. Does your school/organization fund professional development?

- Yes
- No

15.

1. How much are you able to spend for a single, day-long training event?

- less than \$30 per day/workshop
- \$30-\$50 per day/workshop
- \$51-\$70 per day/workshop
- \$71-\$90 per day/workshop
- more than \$90 per day/workshop
- Cost of meals and snacks only

2. How much are you willing to spend OUT OF POCKET for a single, day-long training event?

- less than \$30 per day/workshop
- \$30-\$50 per day/workshop
- \$51-\$70 per day/workshop
- \$71-\$90 per day/workshop
- more than \$90 per day/workshop
- Cost of meals and snacks only

3. How far are you willing to travel to attend a single, day long professional development training event on a topic that is of direct interest or application to you assuming you WILL NOT be reimbursed for travel expenses.

- 1-15 miles
- 16-50 miles
- 51-100 miles
- Greater than 100 miles

4. To what degree do you rely upon the following sources of information about professional development opportunities?

	1-Do Not Rely Upon	2	3-Rely Somewhat	4	5-Rely Heavily
Direct email	<input type="radio"/>				
School principal	<input type="radio"/>				
Curriculum coordinator	<input type="radio"/>				
COSEE-SE listserve	<input type="radio"/>				
Word of Mouth	<input type="radio"/>				
Organization newsletters (specify below)	<input type="radio"/>				
Other listserves (specify below)	<input type="radio"/>				
Websites (specify below)	<input type="radio"/>				

Additional specification...

16.

1. Would you like to be added to the ACE Basin and North Inlet-Winyah Bay National Estuarine Research Reserves professional development opportunities email lists?

- Yes
- No

17.

1. Please provide your email address or send an email request to binzj@dnr.sc.gov:

2. If you would you like enter into the prize drawing, please provide your email address below.

Appendix C: Demographic Information

Appendix C: Demographics by County

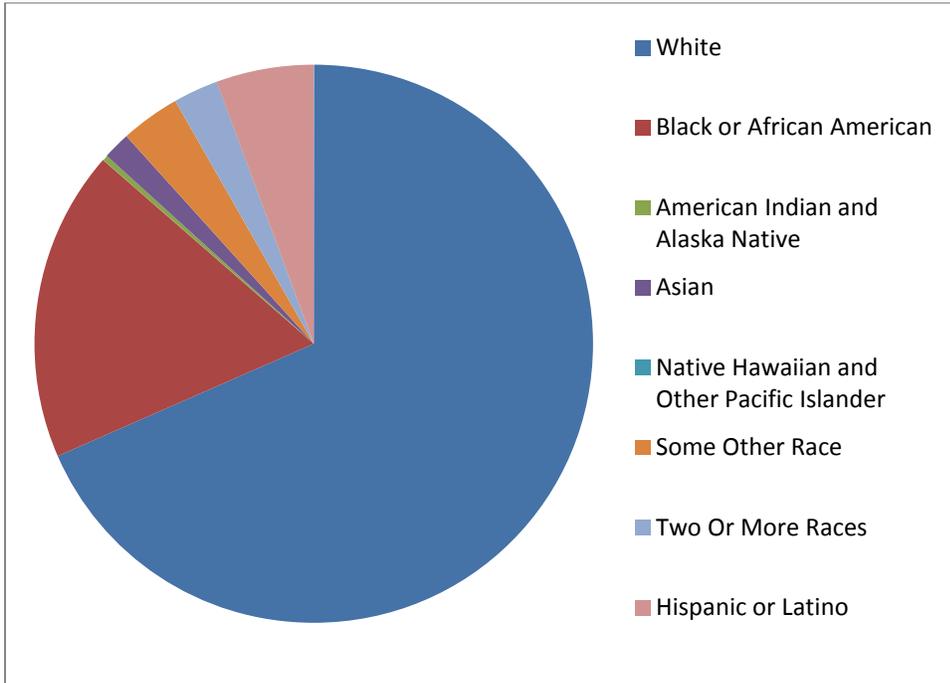


Figure 1: School enrollment in Horry County by race*

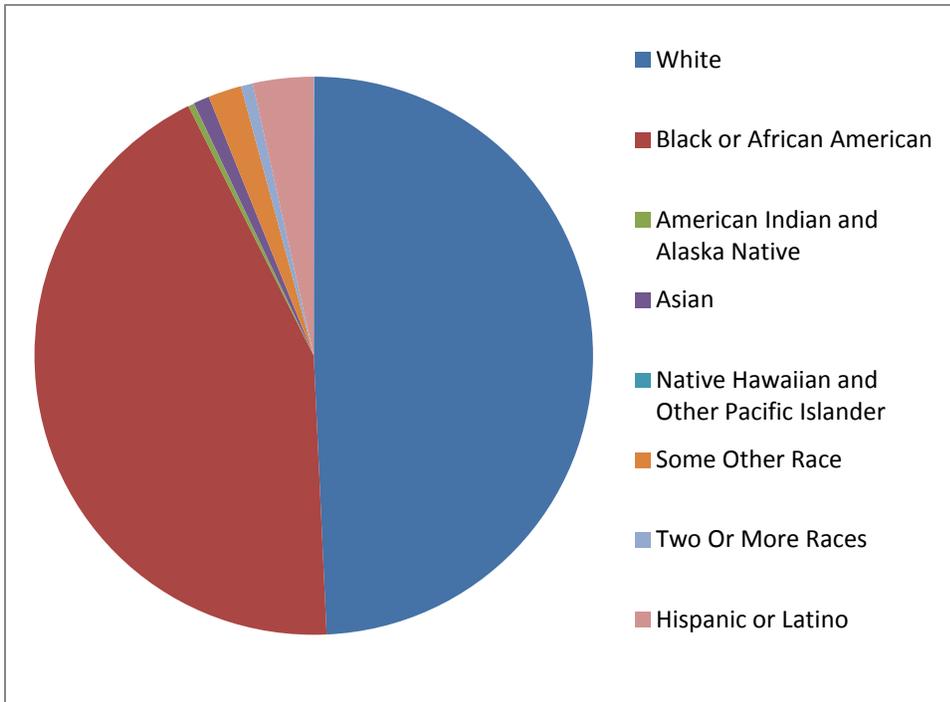


Figure 2: School Enrollment in Georgetown County by race*

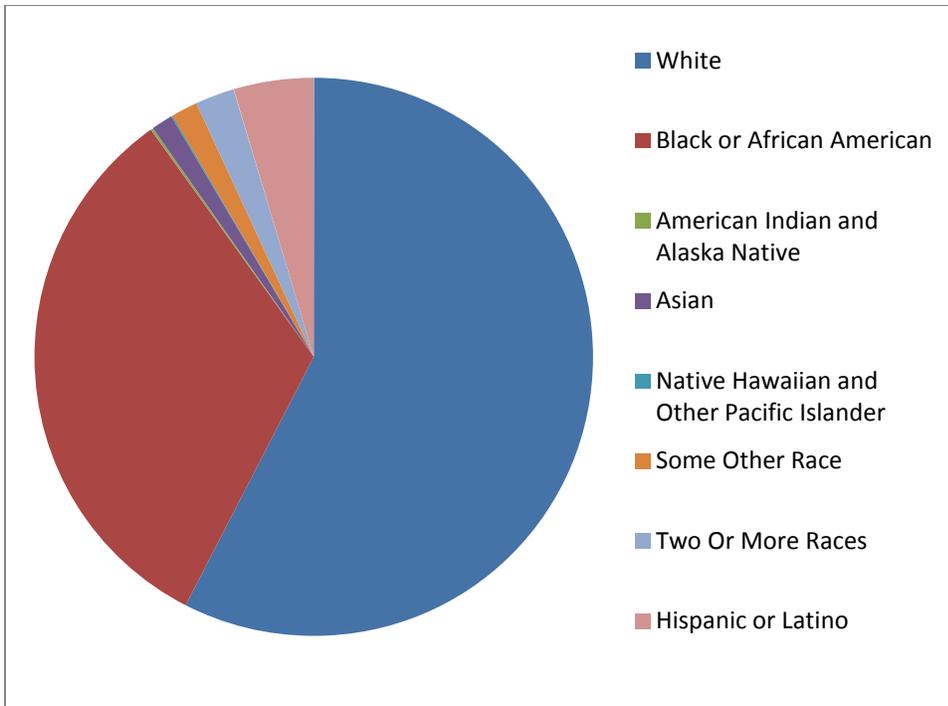


Figure 3: School enrollment in Charleston County by race*

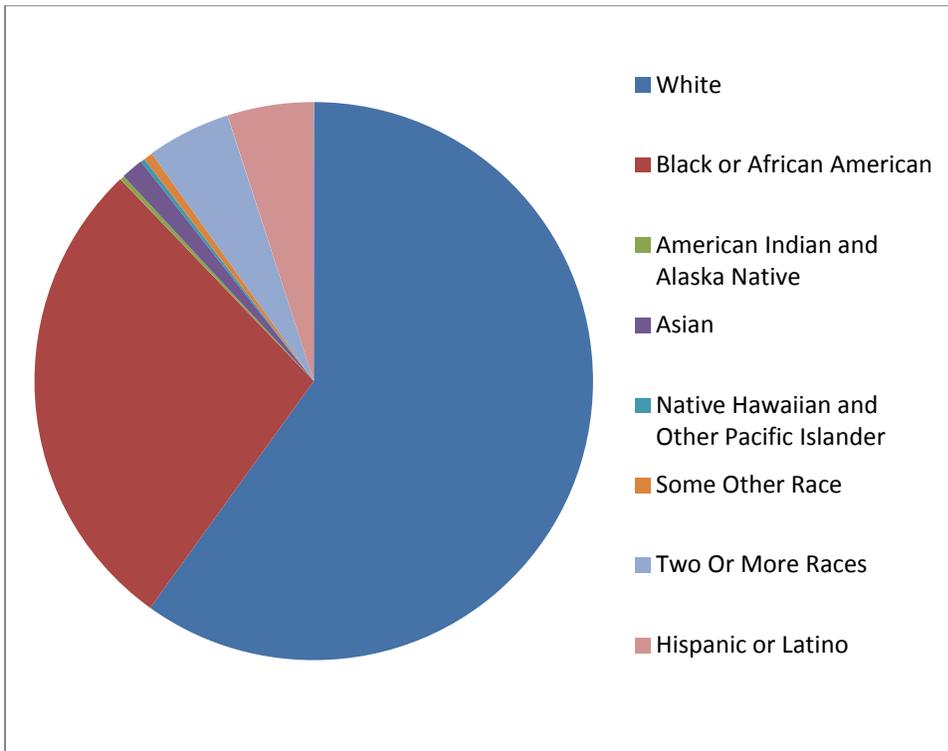


Figure 4: School enrollment in Dorchester county by race*

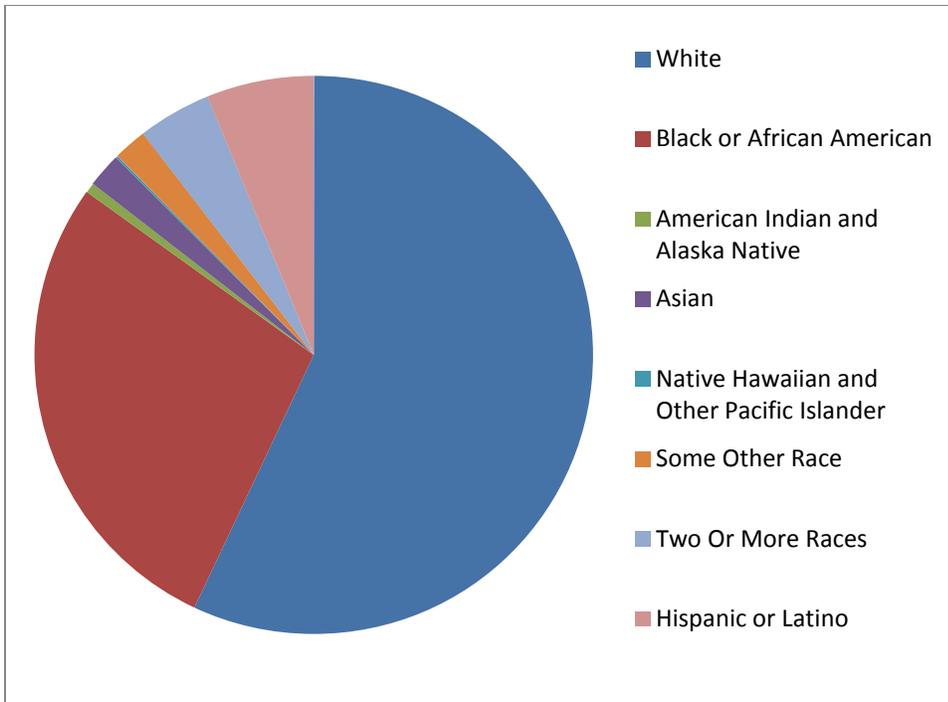


Figure 5: School enrollment in Berkeley County by race*

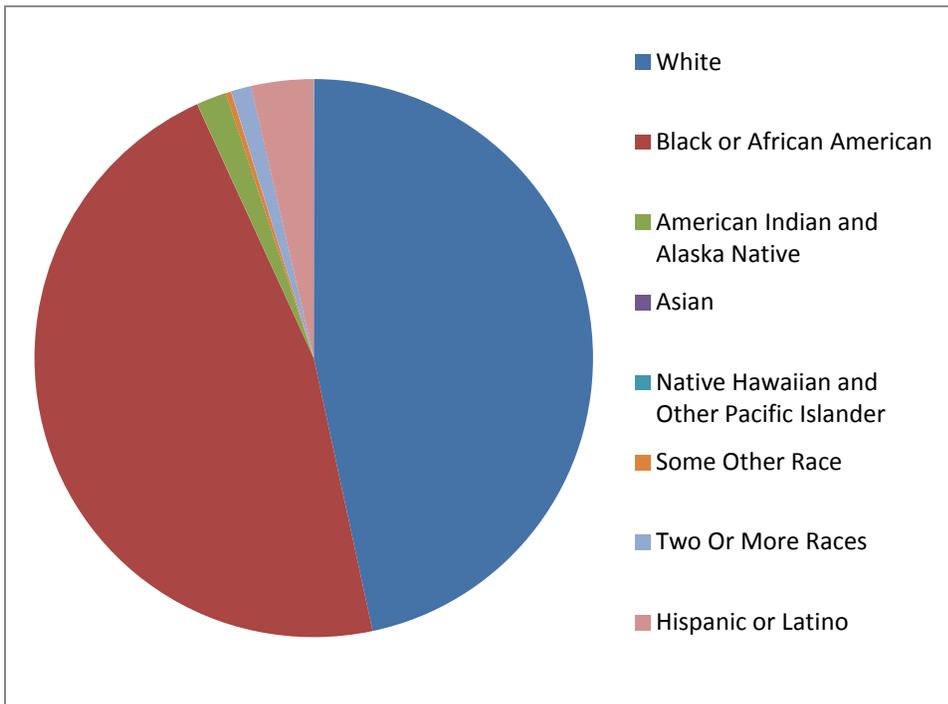


Figure 6: School enrollment in Colleton County by race*

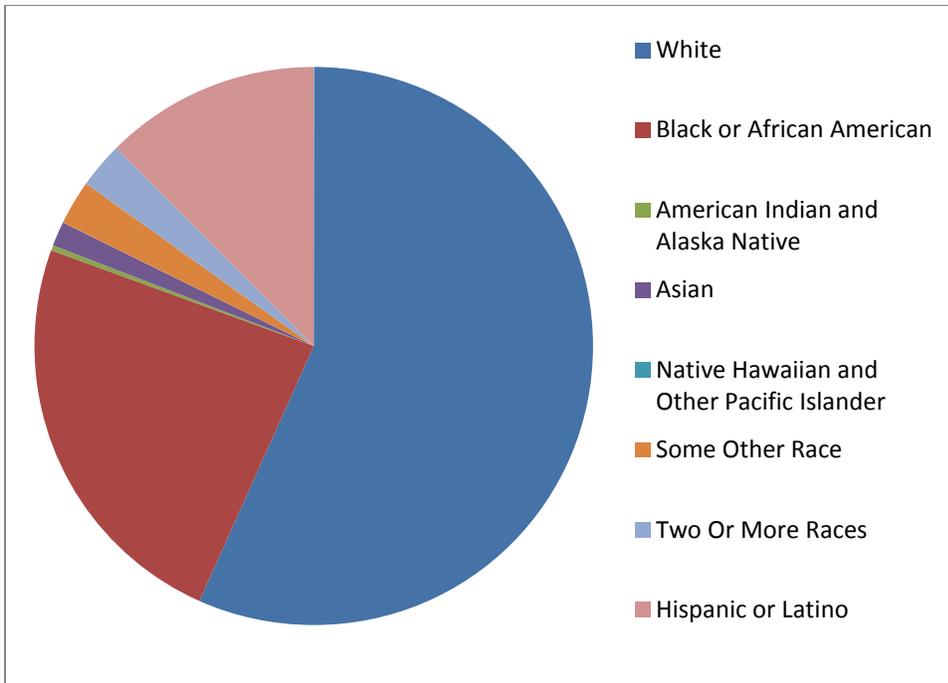


Figure 7: School enrollment in Beaufort County by race*

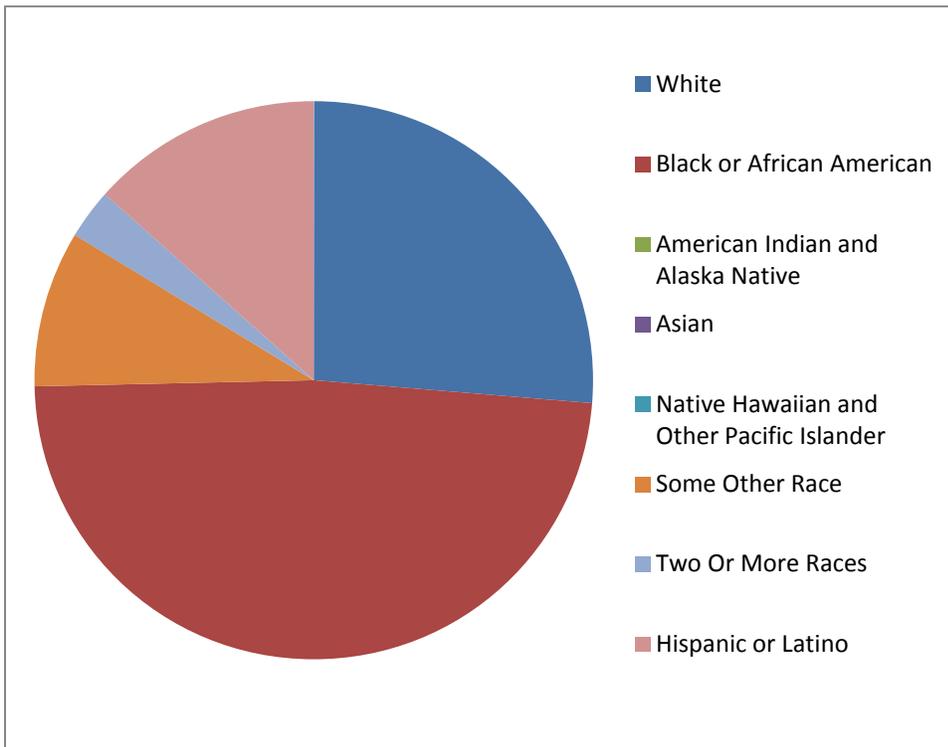


Figure 8: School enrollment in Jasper County by race*

*According to the U.S. Census Bureau 2007-2011 American Community Survey 5 year estimates