Needs Assessment Survey Report

of K-12 Science Teachers on Cape Cod

August, 2011

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Massachusetts

WAQUOIT BAY
NATIONAL
ESTUARINE
RESEARCH
RESERVE

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

With Support from:

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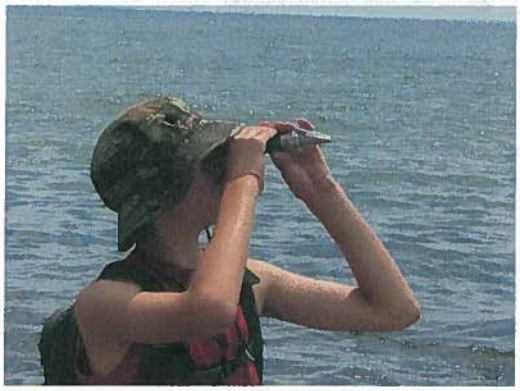
INTRODUCTION

This report is a summary of results of a Needs Assessment Survey of K-12 Science Teachers in public and private schools on Cape Cod in eastern Massachusetts. The survey was conducted by Waquoit Bay National Estuarine Research Reserve (WBNERR) and the survey report and recommendations were written by the JSI Research & Training Institute, Inc. in Boston, MA (JSI) and the Family Centered Institute, Inc. (FCII) in Brewster, MA. This study is part of a coordinated national initiative by the National Estuarine Research Reserve System (NERRS) of the National Oceanic and Atmospheric Administration (NOAA) to evaluate system-wide efforts and help shape future educational activities. The data will be used to define a baseline of estuaries education, identify and establish trends that could influence NERRS policy and strategic planning, and inform future educational priorities on Cape Cod and on National Estuarine Research Reserves across the country.



Findings of the analysis will enable WBNERR's education staff to fill gaps in educational programming for teachers and students in the Cape Cod region. This *Needs Assessment Survey Report of K-12 Science Teachers on Cape Cod*, plus the results of the June 2011 *Market Analysis Survey Report of Environmental Education Programs and Resources on Cape Cod* will provide the foundation for the reserve to form collaborations with other environmental educators to meet some of the training needs identified in the reports.

Eighteen public school districts and 20 private schools in Barnstable, Dukes, and Nantucket counties on Cape Cod and the islands in eastern Massachusetts were invited to participate in the survey. The programs were identified by WBNERR from a list compiled by Cape Cod Community College intern Nancy Dunn who called or emailed each school district or private school to obtain contact information of the name and e-mail address for Superintendents, Assistant Superintendents, and/or Department Heads and to ask permission to conduct the survey. An email was sent to the designated contact in the district to describe the survey's goals, methods, and schedule and to inform them that they would receive a copy of the survey by email to forward to teachers that teach science in each school.

A majority of the questions were required by the NERRS national office as detailed in "KEEP Market Analysis and Needs Assessment: Instructions for the Collection and Reporting of Common Data Useful to Establish a Baseline and Identify Future Trends Shaping Estuary Education". The survey was administered using the web-based *Survey Monkey* tool. Questions were designed to collect data on educational programs provided by each teacher including grade level, discipline of educator, number of years teaching and number of years teaching estuary, watershed and/or ocean related education; methods, materials, content of curricula, and resources to obtain information; needs and priorities for professional development; topics, data sets, and content of new materials; and assistance incorporating climate change into current curricula.

It was not possible to send reminder emails to enhance the response rate since the reserve did not send the surveys directly to the teachers as per the school administration's requirement. Administrators self-reported sending a total of 851 surveys to contacts in both public and private schools. A total of 122 respondents started the survey and 91 (75%) completed the survey. The following report summarizes the results. Results are provided with a number followed by the percentage of responses in parentheses. Throughout the report, percentages were rounded and may not sum to 100%. Many of the questions have "Other" responses. The most informative of these are noted in this report, but others are too few in number to be included here. For complete details on these and other responses, please contact Joan Muller at the Waquoit Bay National Estuarine Research Reserve.

1. **What county do you teach in?**

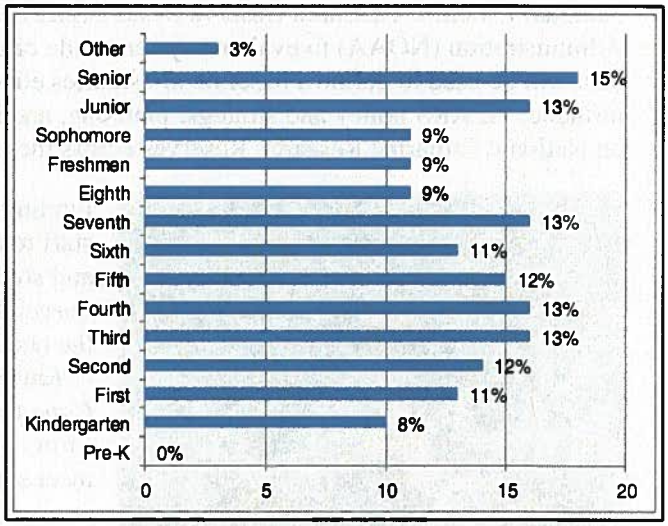
Of the 120 teachers that responded to this question, 118 teach in Barnstable County. One person teaches in Dukes County, which comprises the island of Martha's Vineyard, and another teaches in Nantucket County, which comprises the island of Nantucket.

2. **What level do you teach?**

This question was answered by 122 teachers, with a fairly even distribution of responses for all grades.

- 53 (43%) teach grades K-3
- 44 (36%) teach grades 4-6
- 38 (31%) teach grades 7-9
- 45 (36%) teach grades 10 -12

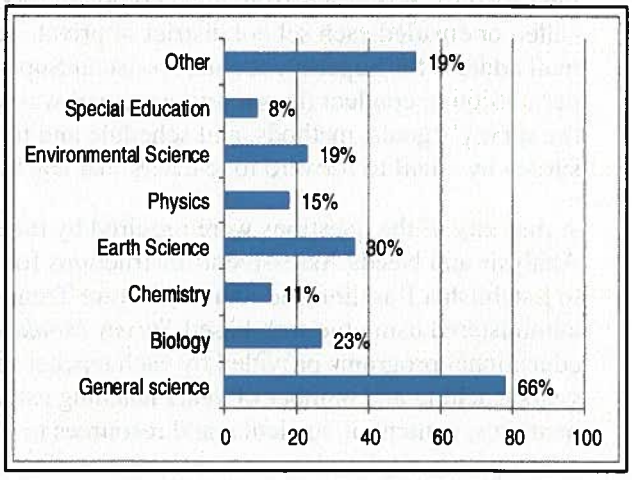
There were three "Other" responses, one each from teachers that teach special education, Title I, and college.



3. **What discipline do you teach?**

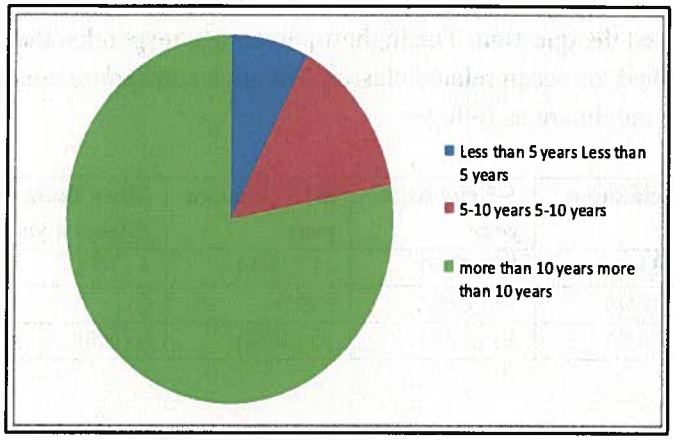
There were 119 responses to this question; 3 did not answer the question. In descending order of frequency the responses were:

- General science 78 (66%)
- Earth science 36 (30%)
- Biology 27 (23%)
- Environmental science 23 (19%)
- Physics 18 (15%)
- Chemistry 13 (23%)
- Special education 9 (8%)



There were 22 (18.5%) responses to "Other". The disciplines listed as "Other" included: Life Science, History, Health, Human Relations, and Botany, and Physical Science.

4. How many years have you been teaching?



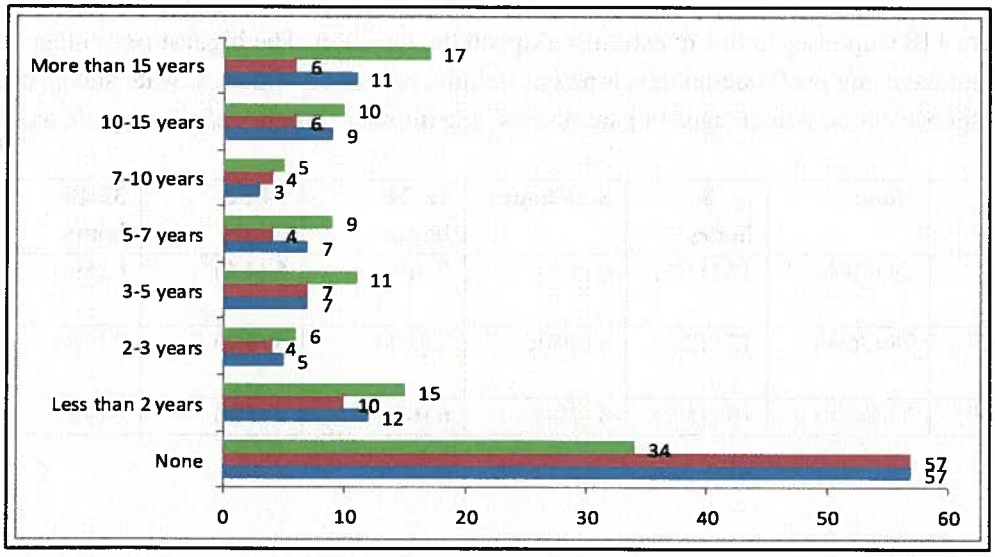
There were 118 responses to this question; 4 skipped the question. Of those who responded:

- 92 (78%) have been teaching more than ten years
- 17 (14%) have been teaching 5-10 years
- 9 (8%) have been teaching less than five years

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

There were 121 responses to this question; 1 person skipped the question. A large percentage responded that they did not teach estuary, watershed, or ocean related topics. The topics, response count, percentages in parentheses, and number of years taught are as follows:

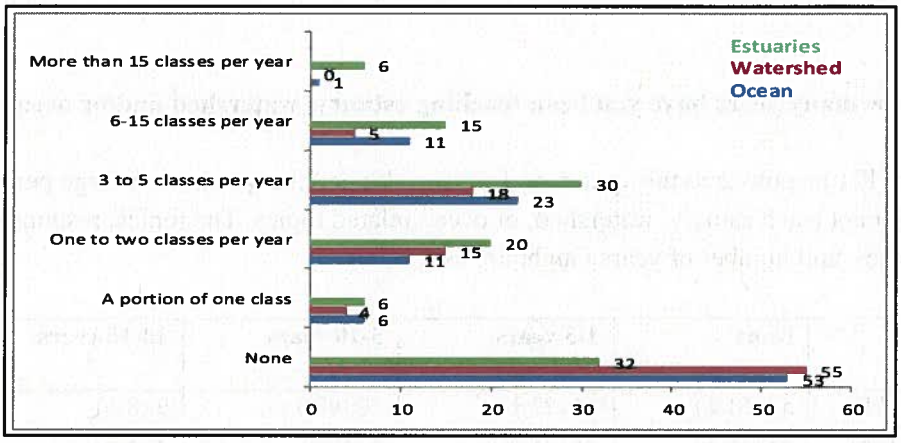
Topics	None	1-5 years	5-10 years	10-15 years	More than 15 years
Estuaries (111)	57 (51%)	24 (22%)	10 (9%)	9 (8%)	11 (10%)
Watershed (98)	57 (59%)	21 (21 %)	8 (8%)	6 (6%)	6 (6%)
Ocean (107)	34 (32%)	32 (30%)	14 (13%)	10 (9%)	17 (16%)



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

There were 119 responses to this question; 3 skipped the question. The highest percentage responded that they did not teach any classes on estuaries, watershed, or ocean related classes. The topics, response count, percentages in parentheses, and number of classes taught are as follows:

Topic	None	Portion of 1 Class	1-3 classes a year	3-5 classes a year	6-15 classes a year	More than 15 classes a year
Estuaries (105)	53 (51%)	6 (6%)	11 (11%)	23 (22%)	11 (11%)	1 (1%)
Watershed (97)	55 (57%)	4 (4%)	15 (16%)	18 (19%)	5 (5%)	0
Ocean (109)	32 (29%)	6 (6%)	20 (18%)	30 (28%)	15 (14%)	6 (6%)



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

There were 118 responses to this question; 4 skipped the question. The highest percentage responded that they did not have any professional development training related to estuaries, watersheds, or oceans. The topics, response count, percentages in parentheses, and number of hours of training are as follows:

Topic	None	< 8 hours	8-16 hours	16-24 hours	24-32 hours	32-40 hours	40 + hours
Estuaries (113)	79 (70%)	12 (11%)	6 (5%)	5 (4%)	5 (4%)	6 (5%)	0
Watershed (103)	78 (76%)	12 (12%)	5 (5%)	2 (2%)	3 (3%)	3 (3%)	0
Ocean (109)	73 (67%)	16 (15%)	8 (7%)	6 (6%)	2 (2%)	4 (4%)	0

8. **Which professional development trainings have you taken to supplement your estuary/watershed/ocean education?**

There were 111 responses to this question; 11 skipped the question. Of those who responded 71 (64%) reported that they had not taken any of the professional development trainings listed on the survey form to supplement their estuary, watershed, or ocean education. The responses in descending order of frequency were:

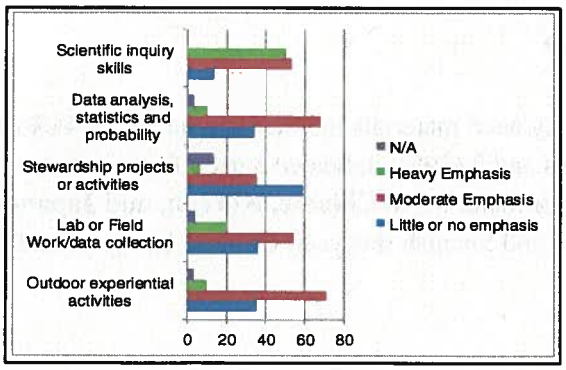
- No professional development training 71 (64%)
- Project WET 12 (11%)
- NOAA/NERRS Teachers on the Estuary Training 8 (7%)
- Project Wild Aquatic 8 (7%)
- The Jason Project Professional Development 8 (7%)
- Green Eggs and Sand 1 (1%)

In addition to the above, 18 respondents listed other professional development training that included: Life in a Salt Marsh by the Thornton Burgess Society; Science in the classroom at Bridgewater State College; programs sponsored by the New England Aquarium, Audubon Society, Center for Coastal Studies, Woods Hole Oceanographic Institute, Mass Maritime Academy and the National Park Service; Ocean Quest Marine Education on a research vessel out of Woods Hole; Mass Department of Education Summer Institute; and the Waquoit Bay National Estuarine Research Reserve program at the New Bedford Whaling Museum.

9. **Think about your plans for your class. In order of descending order of importance, how much emphasis did you or will you give each of the following?**

There were 119 responses to this question; 3 skipped the question. The highest number/percentage of responses and the response count in parentheses are as follows:

Category	Emphasis
Outdoor experiential activities (119)	Moderate emphasis - 71 (60%)
Data analysis, statistics, and probability (115)	Moderate emphasis - 68 (59%)
Lab or field work/data collection (114)	Moderate emphasis - 54 (47%)
Scientific inquiry skills (116)	Moderate emphasis – 53 (46%)
Stewardship projects or activities (113)	Little or no emphasis - 59 (52%)



10. Do you want to include more outdoor education activities into your classroom?

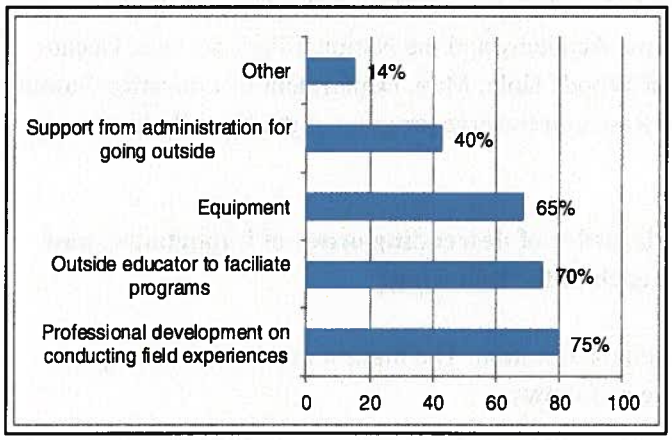
There were 119 responses to this question; 3 did not answer the question.

- 108 (91%) **want more** outdoor education activities in their classrooms
- 11 (9%) **do not want more** outdoor education activities in their classrooms

11. If yes, what help do you need to incorporate more outdoor education with your classes?

There were 108 who answered yes to the previous question and 107 of them provided the following information about their need for assistance to incorporate outdoor education in their classes:

- 80 (75%) would like professional development on conducting field experiences
- 75 (72%) would like an outside educator to facilitate programs
- 69 (65%) want equipment
- 43 (40%) would like support from administration for going outside



There were 21 narrative responses to this question. Eight responses indicated the need for more time and 7 indicated the need for more funds, especially for transportation to and from outdoor education activities. Some wanted more information on how to strengthen the teaching experience through curriculum design, more focus on the grade level being taught, and how to make the outdoor education classes more clearly match MCAS requirements.

12. Do you need educational materials in different languages for your students?

There were 121 responses to this question; 1 person skipped the question.

- 103 (85%) responded that they **do not need** education materials in different languages
- 18 (15%) responded that they **do need** materials in different languages.

13. If yes, what languages?

Of the 18 that responded that they need materials in other languages, 8 (44%) indicated the need for educational materials in **Spanish** and 7 (39%) indicated a need for materials in **Portuguese**. There were 3 additional responses, one each for materials in **Chinese, Korean, and Japanese**. One teacher reported that she needed both Portuguese and Spanish this year, Chinese last year, and Portuguese the year before.

14. There is a National Estuarine Research Reserve located in Falmouth and Mashpee called the Waquoit Bay National Estuarine Research Reserve, which is one of 28 Reserves around the country protected for the purposes of education, research, water-quality monitoring and coastal stewardship. Were you aware that your state has a National Estuarine Research Reserve?

There were 121 responses to this question; one teacher skipped the question.

- 88 (73%) **were aware** of the Waquoit Bay National Estuarine Research Reserve (WBNERR)
- 33 (27%) **were not aware** of the WBNERR

15. If yes, have you ever used any of their educational services or products?

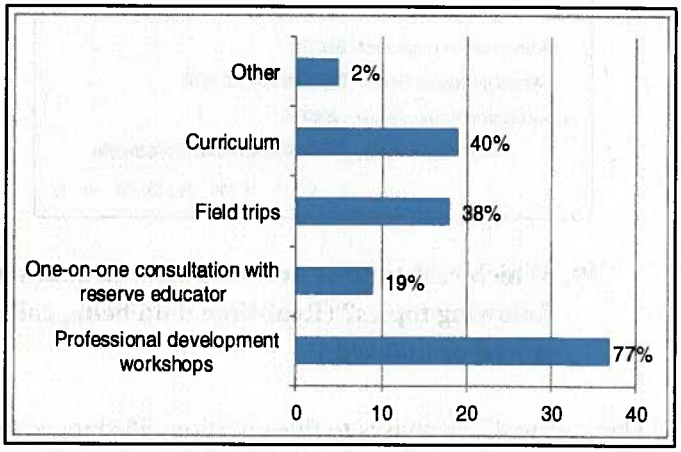
Of the 88 teachers that were aware of WBNERR,

- 49 (56%) **had used** the services and products of WBNERR
- 39 (44%) **had not used** the services and products of WBNERR

16. If yes, which products or services?

There were 48 respondents that answered this question; 74 skipped the question.

- 37 (77%) indicated the use of professional development workshops
- 10 (40%) indicated use of curriculum
- 18 (38%) went on field trips
- 9 (19%) engaged in one-on-one consultation with a reserve educator



Specific services mentioned include children attending summer programs, course work on energy conservation and renewable energy, and professional development taught at the Horace Mann Charter School.

17. If no, why not?

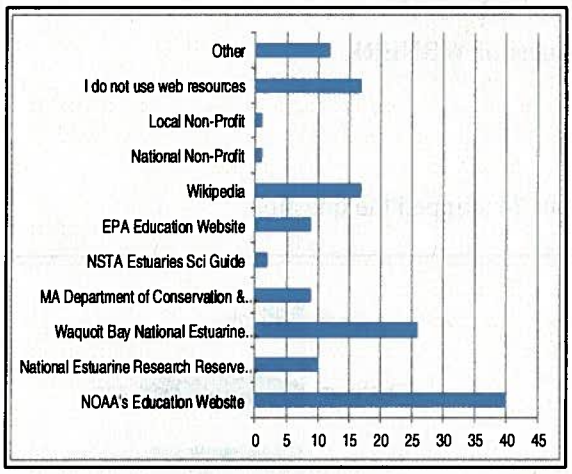
There were 38 responses to this question; 84 skipped the question. Of those that answered the question:

- 18 (47%) reported that Waquoit Bay's products and services "do not fit into my curriculum"
- 17 (45%) responded "was unaware of services and products"
- 7 additional responses indicated the need for "someone to send or email information about what is available; WBNERR is too far away; haven't had time for training; cost of bussing; lack of lessons/activities on estuaries and wetlands."

18. From which web resources do you currently obtain estuary, watershed, and ocean information for use in your classroom?

There were 83 responses to this question; 39 skipped the question. In descending order of use the web resources used by respondents were:

- 40 (48%) NOAA's Education website
- 26 (31%) Waquoit Bay National Estuarine Research Reserve website
- 17 (21%) Wikipedia
- 10 (12%) National Estuarine Research Reserve System's Education website
- 9 (11%) responses each for the Massachusetts Department of Conservation and Recreation and the EPA Education websites
- 17 (21%) reported not using web resources



Other sites listed as being useful included: Discovery Education streaming, National Marine Educators Association, Woods Hole Oceanographic Institute, Westport River Watershed Alliance, Museum of Science, Audubon and YouTube.

19. Which real-time or archived science data sets have you used in your teaching related to the following topics? (Real-time data being collected by scientific instruments; Archived data stored or indexed.)

There were 87 responses to this question; 35 skipped the question. The responses indicating use of real-time or archived data sets in descending order of use were:

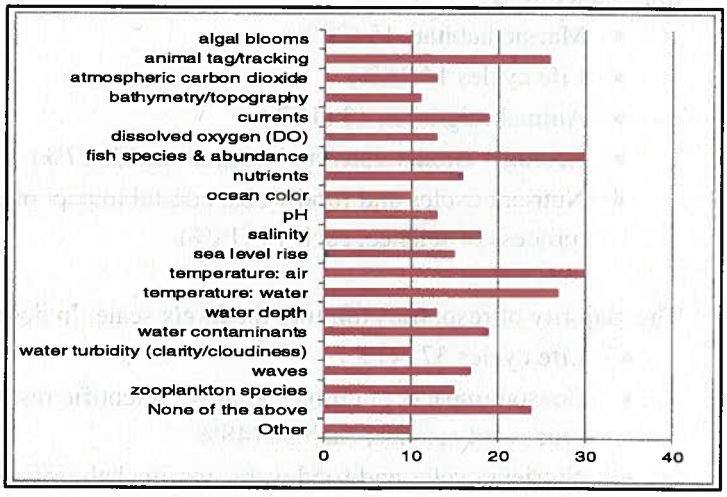
- None of the above 48 (55%)
- Air temperature 24 (28%)
- Water temperature 19 (22%)
- Currents 16 (18%)
- Sea level rise 12 (14%)
- Fish species and abundance 10 (11.5%)
- pH 10 (11.5%)
- Salinity 9 (10%)

Other real-time data sets reported were: the NOAA buoy system, the NOAA infrared radar site, and water sampling in Barnstable for dissolved oxygen, turbidity, salinity, pH, and temperature.

20. Which of the following real-time archived science data sets would you need synthesized into age-appropriate learning materials and visualization for your teaching?

There were 83 responses to this question; 39 skipped the question. In descending order of need the responses were:

- Air temperature, fish species and abundance, each 30 (36%)
- Water temperature 27 (32%)
- Animal tracking 26 (31%)
- Currents, water contaminants, each 19 (23%)
- Salinity 18 (22%)
- Waves 17 (21%)
- Nutrients 16 (19%)
- Sea level rise, zooplankton species, each 15 (18%)
- None of the above 24 (29%)



21. We are seeking input on where to put our efforts to develop new educational materials. How needed are new educational materials for the following topics?

There were 87 respondents to this question; 35 skipped the question. Of those that responded, each rated the topics from "Do Not Need" to "Highly Needed." Key topics in descending order of importance on the ***highly needed*** scale and the response count were:

- Scientific research 22 (34%)
- Life cycles and analyzing graphs, each 19 (30%)
- Biodiversity, map reading, coastal impacts and climate change, erosion, each 18 (25%)
- Nutrient cycles and food webs, data analysis (graphing), weather, each 17 (26%)

Key topics in descending order of importance on the ***needed scale*** were:

- Life cycles 41 (55%)
- Animal migration, erosion, each 39 (55%)
- Nutrient cycles 36 (51%)
- Marine habitats, map reading, each 35 (49%)
- Coastal impacts of climate change, actions people can take, each 34 (52%)

Key topics on the ***do not need*** scale were:

- Marine related careers 30 (49%)
- Eutrophication 25 (42%)
- Weather 22 (31%)
- Values of estuaries 21 (34%)
- Biodiversity and adaptation, animal migration, each 20 (31%)
- Analyzing graphs, actions people can take, and human use of estuaries, each 19 (30%)

22. How likely are you to attend a professional teacher training for the following topics?

There were 90 responses to this question; 32 skipped the question. Responses were on a scale from "Would Not Attend" to "Very Likely." Top responses on the ***very likely*** scale in descending order of importance were:

- Marine habitats 15 (20%)
- Life cycles 14(18%)
- Animal migration 13 (17%)
- Ecology: Biodiversity and adaptation 12 (17%)
- Nutrient cycles and food webs, coastal impact of climate change, weather, scientific research, the process of science, each 10 (14%)

The majority of responses fell into the ***likely*** scale. In descending order of importance they are:

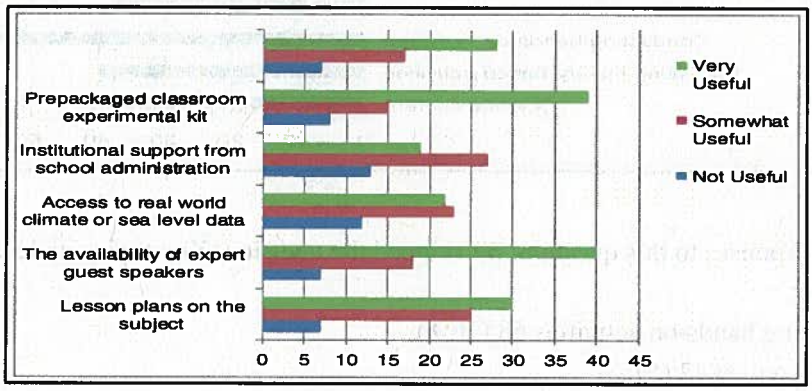
- Life cycles 37 (47%)
- Coastal impacts of climate change, scientific research, the coastal impacts of climate change, the process of science, each 34 (48%
- Nutrient cycles and food webs, marine habitats, each 33 (45%)
- Values of estuaries 31 (44%)
- Erosion 30 (44%)
- Animal migration, weather, each 29 (38%)
- Actions people can take 28 (44%)
- Data analysis: Graphing 26 (39%)
- Human actions and stewardship actions 25 (38%)
- Map reading, human use of estuaries, each 24(39%)
- Analyzing graphs 23 (34%)
- Sea level rise 22 (33%)
- Eutrophication 16 (26%)
- Marine related careers 14 (22%)

On the ***not likely*** scale responses in descending order of importance included:

- Nutrient cycles and food webs, map reading, marine related careers, eutrophication, each 22 (36%)
- Analyzing graphs 21 (31%)
- Animal migration, sea level rise, weather, human impacts and stewardship actions, values of estuaries, each 20 (26-30%)
- Life cycles, actions people take, each 18 (23%)
- Data analysis: Graphing, human use of estuaries, each 17 (25-28%)
- Erosion 16 (23%)
- Ecology: Biodiversity and adaptation 14 (20%)
- Marine habitats, costal impacts of climate change, each 12 (16-17%)

On the ***would not attend*** scale the highest response was for marine related careers 25 (39%). Comments on this question suggested that there is too little professional teacher training of science content for very young children (K through grade 1) and that scientific lectures on current research on Cape Cod ecosystems would be welcomed.

23. To what extent would the following assist you to incorporate the effects of climate change on coastal areas into your curriculum?



There were 83 responses to this question: 39 skipped the question. Key topics in descending order of importance on the ***very useful*** scale were:

- Availability of expert guest speakers 40 (50%)
- Prepackaged classroom experiment kit 39 (48%)
- Lesson plans on the subject 30 (38%)
- Professional development workshop to enhance content knowledge of subject 28 (38%)
- Access to real world climate or sea level rise 22 (29%)
- Institutional support from school administration 19 (%)

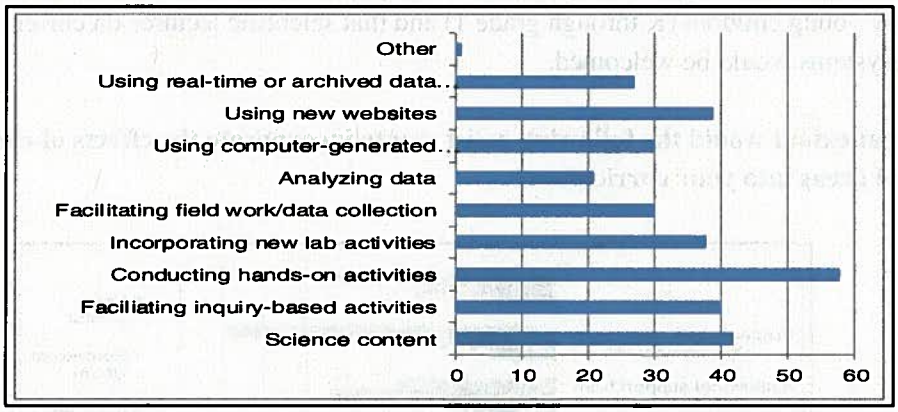
On the ***somewhat useful*** scale were:

- Institutional support from administration 27 (37%)
- Lesson plans on the subject 25 (32%)
- Access to real world climate or sea level data 23 (31%)
- Availability of expert guest speakers 18 (23%)
- Professional development workshop to enhance content knowledge of subject 17 (23%)
- Prepackaged classroom experiment kit 15 (19%)

There were only between 7 and 13 responses to each subject on the ***not useful*** scale. They were:

- Institutional support from administration 13 (18)
- Access to real world climate or sea level data 12 (16%)

24. What type of professional development training do you need?



There were 83 responses to this question; 39 skipped the question. Key topics in descending order of importance were:

- Conducting hands-on activities 58 (70%)
- Science content 42 (51%)
- Facilitating inquiry-based activities 40 (48%)
- Using new websites 39 (47%)
- Incorporating new lab activities 38 (46%)
- Facilitating field work/data, and using computer generated visualizations of data each 30 (36%)
- Using real-time or archived data from monitoring sites 27 (33%)
- Analyzing data 21 (25%)

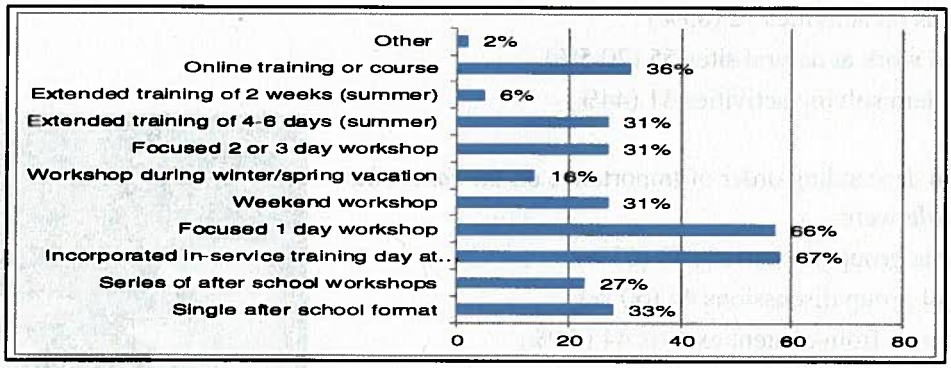
25. What are your preferred times for attending professional development programs?

There were 83 responses to this question; 39 skipped the question. The most popular times for attending professional development training in descending order of preference by season were:
Fall: during the school day 37 (71%); week days after school 25 (58%); Saturdays 20 (54%)
Winter: during the school day 39 (75%); Saturdays 29 (78%); week days after school 28 (65%)
Spring: during the school day 30 (58%); week days after school 24 (56%); Saturdays 20 (54%)

26. Which summer months would you prefer to attend professional development workshops?

There were 88 responses to this question; 34 skipped the question. Respondents were almost equally divided between 1) accepting either July or August as a professional development workshop time 31 (35%), and 2) not willing to attend workshops during the summer 24 (27%). Of those who would attend, respondents preferred July 22 (25%) to August 12 (14%).

27. What are your preferred professional development delivery formats?

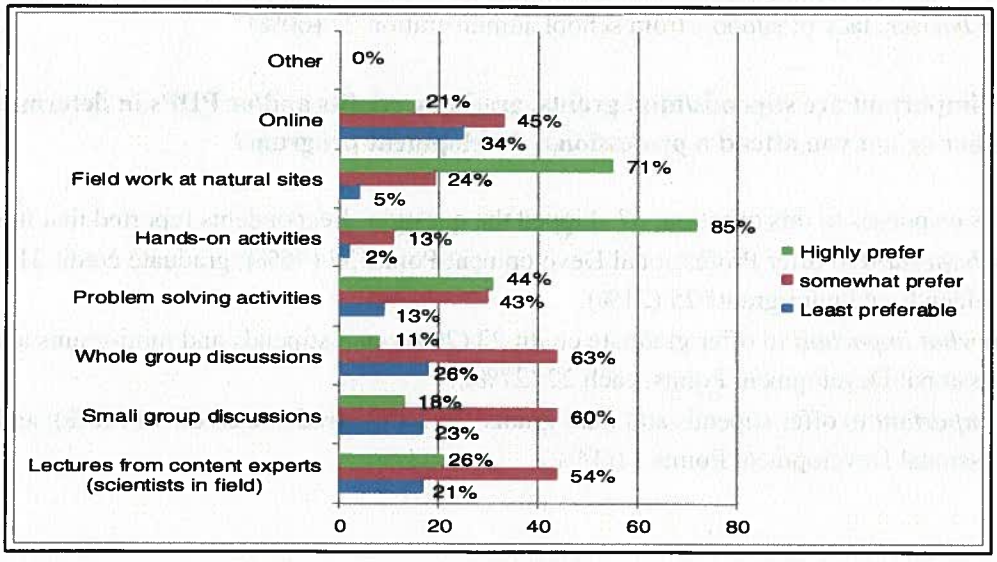


There were 86 responses to this question; 36 skipped the question. In descending order of preference the responses were:

- Professional development workshops incorporated into in-service training day at school 58 (67%)
- Focused one day workshop 57 (66%)
- On-line training or course 31 (36%)
- Single after school format 28 (32%)
- Weekend workshop, focused 2 or 3 day workshop, or extended training of 4-5 days (during the summer), each 27 (32%)
- Workshop during winter or spring vacation week 14 (16%)
- Extended training of two weeks (during the summer) 5 (6%)

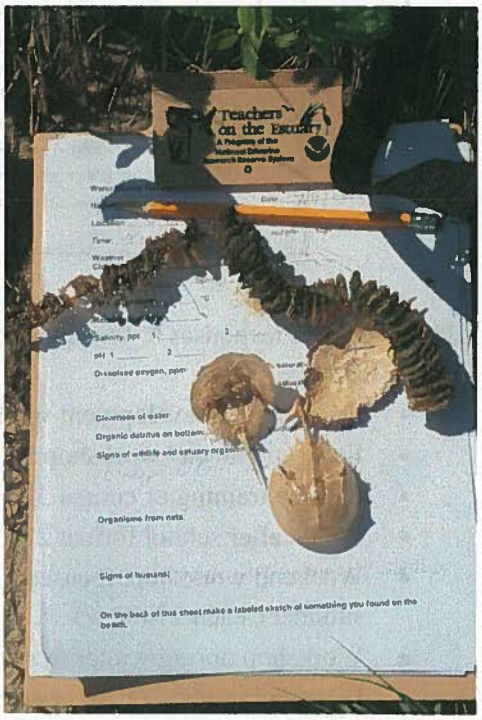
There were 5 additional comments that included request for on-line training, field research and lessons in the field, graduate credit, and professional development points for training.

28. What are your preferred professional development delivery methods?



There were 88 responses to this question; 34 skipped the question. Key topics in descending order of importance on the ***highly preferred*** scale were:

- Hands on activities 72 (85%)
- Field work at natural sites 55 (70.5%)
- Problem solving activities 31 (44%)



Key topics in descending order of importance on the ***somewhat preferred scale*** were:

- Whole group discussions 44 (63%)
- Small group discussions 44 (60 %)
- Lectures from content experts 44 (54%)
- On-line 33 (45%)
- Problem solving activities 30 (43%)

Key topics on the ***least preferable*** scale were:

- On-line 25(34%)
- Whole group discussions 18 (26%)
- Small group discussions 17 (23%)
- Lectures form content experts (scientists in the field) 17 (21%)

29. How much of a barrier are each of the following factors toward preventing you from attending professional development programs?

There were 87 responses to this question; 35 skipped the question. Responses included:

- ***Significant barriers***: high registration fees 25 (53%) and no time /too busy 20 (39%)
- ***Somewhat of a barrier***: training is not relevant to my needs 17 (23.5%); no time /too busy 15 (29%); high registration fees 12 (26%); and travel/transportation constraints 11 (28%)
- ***Not a barrier***: lack of support from school administration 27 (60%)

30. How important are stipends/mini grants, graduate credits and/or PDPs in determining whether or not you attend a professional development program?

There were 88 responses to this question; 37 skipped the question. Respondents reported that it is:

- ***Very important*** to offer Professional Development Points 37 (46%); graduate credit 31 (39%); and stipends and mini-grants 25 (31%).
- ***Somewhat important*** to offer graduate credit 23 (29%); and stipends and mini-grants and Professional Development Points, each 22 (27%).
- ***Not important*** to offer stipends and mini grants 16 (20%); graduate credit 14 (18%); and Professional Development Points 11(14%).

31. How far would you be willing to travel to attend a day-long professional development program?

There were 88 responses to this question; 34 skipped the question. Responses were:

- 55 (62%) reported that they would travel 16 – 50 miles to attend a day-long professional development program
- 25 (28%) would travel no more than 15 miles
- 8 (9%) would travel greater than 51 miles

32. How much are you able to spend per day for a professional development workshop?

There were 88 responses to this question; 36 skipped the question.

- 37 (43%) would be able to spend $20-$50
- 24 (28%) would be able to spend under $20
- 11 (13%) would be able to spend $51-$75

33. In what format would you prefer take home materials?

There were 88 responses to this question; 34 skipped the question.

- 59 (67%) would prefer a kit with materials and equipment
- 14 (16%) would prefer materials in hard copy
- 9 (10%) would prefer a list of materials you could download from the internet
- 6 (7%) would prefer materials in a DVD format

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

There were 88 responses to this question; 37 skipped the question.

- 69 (81%) reported that they **do** take their students on field trips
- 16 (19%) reported that they **do not** take their students on field trips

35. What factors affect your ability to take students on field trips?

There were 85 responses to this question; 37 skipped the question. The most reported barriers were:

- Transportation costs 76 (89%)
- Program fees 60 (71%)
- Lack of alignment with the curriculum 35 (41%)
- Lack of time 30 (35%)
- Lack of chaperones 19 (22%)
- Administration concerns about students outdoors 8 (9%)

Additional comments that provide insight into factors that affect the ability to take students on field trips include: "children are too young for travel out of the school"; any field trip has "to accommodate 100 children-a number that is difficult to accommodate"; "other teachers complain if my field trip takes

students away from their classes"; and "my kindergarten class requires car seats for each child-a logistic that is difficult to accommodate."

36. How much does your school allow you to pay for program fees for student field trips or classroom programs?

There were 75 responses to this question; 47 skipped the question. The responses were:

- 23 (31%) allow $3-$5 per student
- 15 (20%) allow $5-$10 per student
- 12 (16%) reported they can only do free programs
- 9 (12%) reported that they can only spend up to $3 per student
- 9 (12%) reported that they can spend more than $20 per student.
- 7 (9%) reported they can spend $10-$20 per student

37. To what degree do you rely upon the following sources of information about professional development opportunities or teaching resources?

There were 85 respondents to this question; 37 skipped the question. The response rate for ***rely heavily*** was low for any one source of information. The highest number of responses was:

- Direct mail 21(25%)
- Curriculum coordinator 14 (18%)
- Word of mouth 12 (15 %)

Under the ***rely somewhat*** category responses included:

- Word of mouth 35 (44%)
- School principal 35 (43%)
- Curriculum coordinator 24 (30%)
- Direct mail24 (30%)

In the ***do not rely upon*** category:

- Do not rely on list serves or websites 23 (54%)
- Direct mail 19 (24%)
- Curriculum coordinator 18 (23%)
- School principal 17 (21%)

Additional comments identified sources such as the Sally Ride Science, NSTA e-professional development, Marine Academy of Science and Technology, Woods Hole Science and Technology Education Partnership, pbs.org/teacher, and email.

38. Please rank from *do not need* to *highly needed* to support your teaching, by category.

There were 84 responses to this question; 38 skipped the question. ***Highly needed*** categories reported were:

- Professional teacher development 25 (32%)
- New frameworks - aligned curriculum with local examples 23 (31.5%)
- Outside educator facilitated classroom programs 22 (29%)

Somewhat needed categories reported were

- Professional development 33 (42%)
- Destination for teacher-led field trips32 (42%)
- Reserve Educator-facilitated experience for students at Waquoit Bay 29 (37%)
- One-on-one consulting with teachers 26 (37%)
- Supporting pre and post classroom materials for Reserve site visits 27 (35%)
- Lendable classroom kits on relevant topics 22 (31%)

Additional comments reported the need for classroom kits on topics such as erosion and deposition, soils, climate change, animal adaptations, habitat and ecology, Scientific Method, rocks and minerals, animal adaptations, metamorphosis of the frog, simple machines, wind/air, butterfly life cycles, and food chains/webs. One teacher reported that, "While I think the Reserve has wonderful resources, I doubt we would add a trip there for students given our other commitments. Therefore for me, professional development programs are the most valuable resource."

39. Name a professional development experience you have had in the past. What made it valuable to you?

There were 47 responses to this question; 75 skipped the question. Key responses are as follows:

WORKSHOP NAME	WHY VALUABLE
Courage to Teach workshop	Learned teaching strategies from colleagues
Teachers of the estuary	Got to interact with like-mined teachers, resources
(general)	Workshops where I go home with materials and lesson plans that can be sued the next day without a lot of prep needed
(general)	Professional development where material is presented in a hands-on way, similar to the way students experience the materials and provided with connections to the required standards/curriculum as well as supporting material to take back to the classroom.
Ocean Literacy Summit 2010	Current research
ROV Workshops	Learned how to complete the project and got materials to use with students.
WBNERR	A good mixture of expert, hands-on activities and discussion, as well as a treasure trove of materials on CD.

Rocks, Sand and Soil - at WBNERR	Aligned to my curriculum frameworks.
Labs and activities	I can apply directly to my classroom.
NEED energy workshop	Good hands-on experiences and a valuable classroom kit that fits into my curriculum frameworks.
Data analysis course	We were immersed in the curriculum, practiced making plans, and then practiced with actual students. Very hands-on.
WBNERR Teachers on the Estuary (TOTE)	Good review of real-time data analysis.
Week long science education course on Cape Cod	Lots of site visits to local resources.
Learning to use Vernier Lab Pro probes	Makes collecting field data so much easier.
Exploring animal habitats	
Sally Ride Science connecting with Climate change Workshop	Met scientists that work in the field.
Math workshop	Practical with materials I could use or adapt for use in the classroom.
Barnstable County Cooperative Extension	Hands on experience
Marine science	Hands on experience
Wellfleet Audubon – trail hikes and lessons	Highly enthusiastic teacher
What's new in children's literature	Allowed me to review children's books as well as design lesson plans with them.
Technology class	I developed a blog for my class.
AIMS in science program	Made science understandable to everyone – lots of experiments tailored to grade level.
Hybrid class – half on-line/half face-to-face.	Appealed to 2 teaching strategies.
WBNERR TOTE	Provided relevant estuary information to continue our pond study.
Differentiated instruction	Came away with activities and lessons I could use with my students.
Woods Hole Oceanographic Institution (WHOI) undersea volcano	It tied directly into my 7th grade curriculum.
Long Pond Nature Center Tidal Pool	A complete program with an instructor.
(general)	Taking materials back to the classroom that I can use immediately.
(general)	Many valuable experiences. The best ones are those that I can walk away with lesson plans or teachable moments for my class.
Cape Cod Seasons and Cycles	Comprehensive and very informative.
Ernestina	Learned how to sail a boat together with celestial navigation.
(general)	Any professional development is valuable if it is relevant and supplies materials to use in the classroom along with information on how to use the materials.
(general)	Guest speaker on classroom management

40. How can Waquoit Bay National Estuarine Research Reserve support your program?

CATEGORY	COMMENT
Already love WBNERR	Love the courses offered at WBNERR!
	I appreciate the interest in connecting with teachers.
	I have been very happy with programs taken through WBNERR and am always looking for more.
	You (WBNERR) were great this year!
	WBNERR supports us fully – our partnership is invaluable to our students.
	I think WBNERR is doing a great job!
Would also like….	Program offered that I can incorporate into my Life Science classes as either presentations by your staff or field trips.
	More hands-on activities to make science fun in the early grades. (Multiple requests.)
	Field trips are beneficial. (Multiple requests.)
	It would be great to have workshops for teachers of first and second grade students (6-8 years old).
	Would like professional development courses specific to certain grade levels or age groups.
	Continue pond series with students.
	Would like WBNERR to provide well-planned field trips where I can bring my classes and learn together with your guides about estuaries and oceans.
	Assistance teaching land forms. I teach 3rd grade and often find this unit difficult for them to grasp. Most of the work is too technical for my students.
	Lendable kits.
	Tie hands-on activities to our standards, train us, and help with materials.
	I'd like a scientist mentor/visitor during the school year.
	Offer programs that would incorporate the Massachusetts standards for 4th grade science topics.
	In-classroom guest speakers from a scientist in the area. (Multiple requests)
	Physical oceanography seminars.
	To act as a conduit between educators and policy makers to help education become more "hands-on" and experiential vs. the testing frenzy.
	More earth science/geology-related materials.
	More alignment with physics.

41. Would you like to be added to an e-mail list for WBNERR upcoming programs and opportunities for teachers?

There were 83 responses to this question; 39 skipped the question. Most 48 (58%) would like to be added to the WBNERR email list and 35 (42%) did not want to be on the email list.

42. Would you like to be entered into a raffle for a mini-digital camcorder?

There were 86 responses to this question; 36 skipped the question. Fifty-four (63%) would like to have their name entered for a camcorder and 52 provided contact information, but 32 (37%) did not want to be included in the raffle.

CONCLUSIONS AND RECOMMENDATIONS

TOPIC	COMMENT
Use of WBNERR resources and requests for assistance.	Many teachers know about and respect the WBNERR and their educational resources and most have been very satisfied with its programs.
	Almost as many teachers have not used the Reserves services.
	Teachers would like WBNERR to offer workshops for teaching very young children (grades K-4) and more age appropriate methods for teaching science, especially methods and content aligned with state level frameworks by grade.
	Field trips to WBNERR and visits form scientists to schools.
	Age appropriate kits that can be loaned to schools for science classes and classroom assignments and curriculum already prepared and ready to use.
	Assistance interfacing with educators and policy-makers to advocate for more hands-on educational experiences for students.
Outdoor Education	Most teachers want more opportunities for outdoor educational programs and need assistance in arranging for and paying for transportation.
Field Trips	Most teachers reported that they took their students on field trips, but that transportation costs and fees presented a barrier to frequent trips.
Languages	Some teachers wanted materials in Spanish and Portuguese.
Professional Development	Teachers prefer using hands-on and field-based educational opportunities to teach science and environmental education.
	Teachers want professional development to augment skills to use in the classroom.

	Teachers seem to be creative in using websites to obtain additional resources for teaching science and environmental education.
	Many teachers do not use real-time or archived data sets. Some reported that these data sets do not meet their curriculum or grade level needs. Others want additional opportunities to learn how to use these data sets.
	Teachers reported needing age-appropriate educational materials related to teaching scientific research, analyzing graphs, data analysis, biodiversity and climate change.
	Teachers reported that the following would be most useful for assisting them to incorporate the effects of climate change on coastal areas in their curriculum: expert guest speakers, prepackaged classroom experience kits, professional development to help teachers understand the content of the subject, methods to teach it, and lesson plans.
	Teachers highly preferred methods for professional development that included hands-on activities, field work at natural sites, and problem solving activities.
	Barriers to attending professional development workshops were: high registration fees and no time. Teachers report the wish to earn professional development points, closely followed by graduate credits. They would be willing to travel 8-50 miles to attend a workshop, and would be willing to pay $20-$50 for a day long workshop. Most would prefer take-home materials in the form of a kit of materials and equipment they could immediately use in the classroom.

ATTACHMENTS

School District Profiles

Survey Instrument

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Massachusetts School and District Profiles – 2010-2011 Enrollment by Race/Gender

DISTRICT	African American	Asian	Hispanic	White	Native American	Native Hawaiian, Pacific Islander	Multi-Race, Non-Hispanic	Males	Females
Barnstable	5.1	1.9	5.7	81.7	0.9	0.4	4.2	50.4	49.6
Barnstable Community Horace Mann Charter Public (District)	6.9	1.5	6.6	81.1	1.2	0.3	2.4	47.9	52.1
Barnstable Horace Mann Charter (District)	4.3	2.7	6.9	80.9	1	0.6	3.7	49.6	50.4
Bourne	1.1	1.3	2.8	88.8	0.2	0.1	5.6	50.6	49.4
Brewster	4.5	1.6	3.3	89.8	0	0	0.8	51.1	48.9
Cape Cod Lighthouse Charter (District)	0.4	0	2.6	93.9	0	0	3.1	47.8	52.2
Cape Cod Regional Vocational Technical	4.2	0.4	7.9	82.8	1.3	0.3	3	64.4	35.6
Chatham	1.6	1.4	3.9	88.9	0	0.3	3.9	54.3	45.7
Dennis-Yarmouth	5.5	2.1	7.1	78.5	1.7	0.1	5.1	52.1	47.9
Eastham	1.4	3.3	3.3	90	0	0	1.9	45.9	54.1
Falmouth	3.9	2.6	3.2	85.5	1.1	0.1	3.6	51.8	48.2
Harwich	4.2	1.2	3.5	86	0.8	0.4	3.9	51.5	48.5
Martha's Vineyard Charter (District)	6.1	2.8	6.6	80.1	0	0	4.4	48.1	51.9
Marthas Vineyard	3.1	0.7	8.9	78.1	2.2	0	6.9	52.6	47.4
Mashpee	2.4	2.2	4	80.1	5.3	0.1	5.8	50.5	49.5
Nantucket	13.4	1.6	13.1	68.6	0.2	0.1	3	51.7	48.3
Nauset	2.6	2	2.9	91.5	0.3	0.2	0.6	51	49
Oak Bluffs	4.4	2	11.8	70.6	2.5	0.5	8.3	51.7	48.3
Orleans	3.6	3.6	2.5	86.8	0	2	1.5	52.3	47.7
Provincetown	12	0.8	13.6	68	0	0	5.6	42.4	57.6
Sandwich	0.7	1.9	0.6	96.7	0.2	0	0	50.8	49.2
Sturgis Charter Public (District)	1.2	2.2	3.1	87.9	0	0	5.6	44.6	55.4
Tisbury	3.7	1.6	15.3	72	2.5	0	5	53.9	46.1
Truro	3.4	2.7	5.5	83.6	0	0	4.8	50.7	49.3
Upper Cape Cod Regional Vocational Technical	3.2	0.9	2.6	88	0.8	0	4.7	57.8	42.2
Wellfleet	2.1	0	2.8	90.8	0	0	4.3	44.7	55.3
State Total	8.2	5.5	15.4	68	0.2	0.1	2.4	51.3	48.7