Kachemak Bay
National Estuarine Research Reserve
Education Needs Assessment Results

June 2011

Kachemak Bay National Estuarine Research Reserve (KBNERR), located in Homer, Alaska, is part of the National Estuarine Research Reserve (NERR) System, which is comprised of 28 coastal reserves in 22 states and Puerto Rico. The NERR system is managed by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service/Office of Coastal and Resource Management. Each reserve is made up of a partnership between NOAA and a state entity. In the case of KBNERR that state entity is the Alaska Department of Fish and Game, Sport Fish Division. KBNERR engages in coastal research and education within Kachemak Bay, the largest reserve within the System.

KBNERR offers highly effective public and school-based coastal science education using a unique Discovery Lab format. KBNERR educators utilize an on-site science lab and an adjacent coastal salt marsh to explore an array of resource and science-based topics.

During the spring of 2011 KBNERR education staff conducted a needs assessment as part of a Reserve-wide effort by the NERR to identify gaps in coastal education. On a local level the needs assessment will enable KBNERR and partnering coastal educators in the Homer area to better meet the needs of teachers and students within the Kenai Peninsula Borough.

A complementary market analysis conducted at the same time summarizes the current educational offerings and outreach efforts by coastal educators in the Homer area.

Survey Process:

KBNERR targeted all16 schools that lie within a 30-mile radius of Homer, as classes from these schools make up the vast majority of classroom visits to KBNERR Discovery Labs. A total of 156 teachers are employed at the 16 schools. All teachers at each school were contacted by an email delivered through the school superintendent, and several teachers on KBNERR list serves were contacted a second time by direct request. 40 teachers responded to the invitation to complete the needs assessment for a total response rate of 26%.

Question 1:

1. What grade(s) do you teach?

Answer Options	Response Percent	Response Count
Pre-K	7.9%	3
1st	15.8%	6
2nd	13.2%	5
3rd	18.4%	7
4th	21.1%	8
5th	21.1%	8
6th	26.3%	10
7th	21.1%	8
8th	18.4%	7
9th	28.9%	11
10th	28.9%	11
11th	26.3%	10
12th	23.7%	9
Informal Educator	7.9%	3
answered question		**38**
skipped question		**2**

Respondents were spread over all grade levels as seen in the table below, with the lowest response coming from informal educators and Pre-K (7.9% each) and the highest response rate coming from grades 9 and 10 (28.9% each). The total number of responses is 97 while a total of 38 teachers answered this question. The discrepancy appears because teachers in rural schools frequently teach multiple grades - often in the same classroom.

Questions 2 and 3:

2. Do you take your students on field trips as a part of your science curriculum/activities?		
Answer Options	**Response Percent**	**Response Count**
Yes	84.2%	32
No	15.8%	6
	answered question	**38**
	skipped question	**2**

3. If yes, what kind of outdoor experiential opportunities / activities are your students provided with? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Outdoor activities on or adjacent to school grounds during school time	85.7%	24
Outdoor field trips offsite	85.7%	24
Outdoor activities assigned to students as homework	10.7%	3
Other (please specify)		2
	answered question	**28**
	skipped question	**12**

In the Homer area nearly all teachers (84.2%) take their students on field trips, and many of these are off school grounds. Because Homer is a small community (population 5,003 as of 2010), school groups from four schools in town are able to walk to local field trip locations at little or no cost to the school system. However, other schools are located several miles out of town by road, or are located off the road system where busing and air transportation are factors.

Two teachers marked “other” and provided the following additional field trip activities and opportunities:

> “Indoor field trips offsite”
>
> “extra credit opportunities”

Question 4:

4. If not, why not?	
Answer Options	**Response Count**
	5
answered question	**5**
skipped question	**35**

"My role is an Interventionist that takes small groups of children out of the classroom for remedial work. I suppose I could take a group I was working with on a field trip, but I am not a classroom teacher."

"Mostly because I already feel overwhelmed with covering the history curriculum. The paperwork and transportation issues seem like an extra burden."

"i am a interventionist, not a classroom teacher"

"extra credit opportunities"

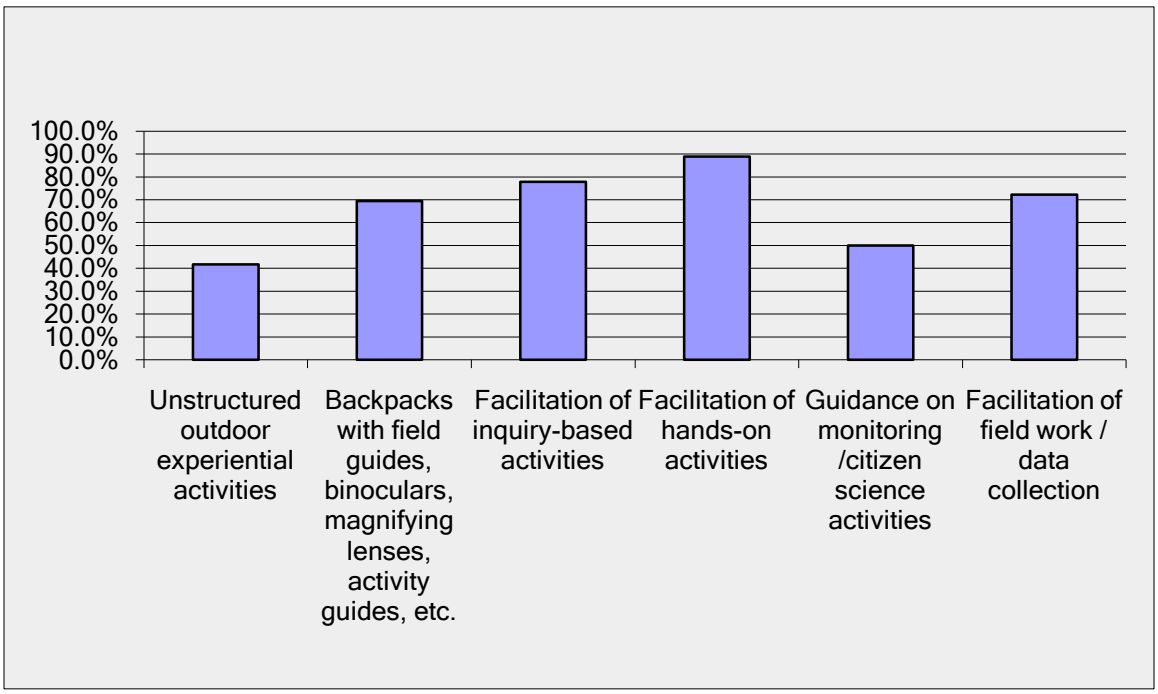
"My content area is English."

"no funds"

Questions 5 and 6:

5. Are you interested in incorporating more outdoor education in your classroom?		
Answer Options	**Response Percent**	**Response Count**
Yes	97.4%	37
No	2.6%	1
answered question		**38**
skipped question		**2**

6. If yes, which of the following would be helpful to you? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Unstructured outdoor experiential activities	41.7%	15
Backpacks with field guides, binoculars, magnifying lenses, activity guides, etc.	69.4%	25
Facilitation of inquiry-based activities	77.8%	28
Facilitation of hands-on activities	88.9%	32
Guidance on monitoring /citizen science activities	50.0%	18
Facilitation of field work / data collection	72.2%	26
Other (please specify)		3
	answered question	**36**
	skipped question	**4**



The vast majority (97.4%) of teachers are interested in including more outdoor education into their classroom schedule. Of those who do want to include more outdoor education, most would like facilitated hands-on or inquiry-based activities (88.9% and 77.8% respectively). Additional suggestions under "other" were:

"Health related science, maybe at hospital"

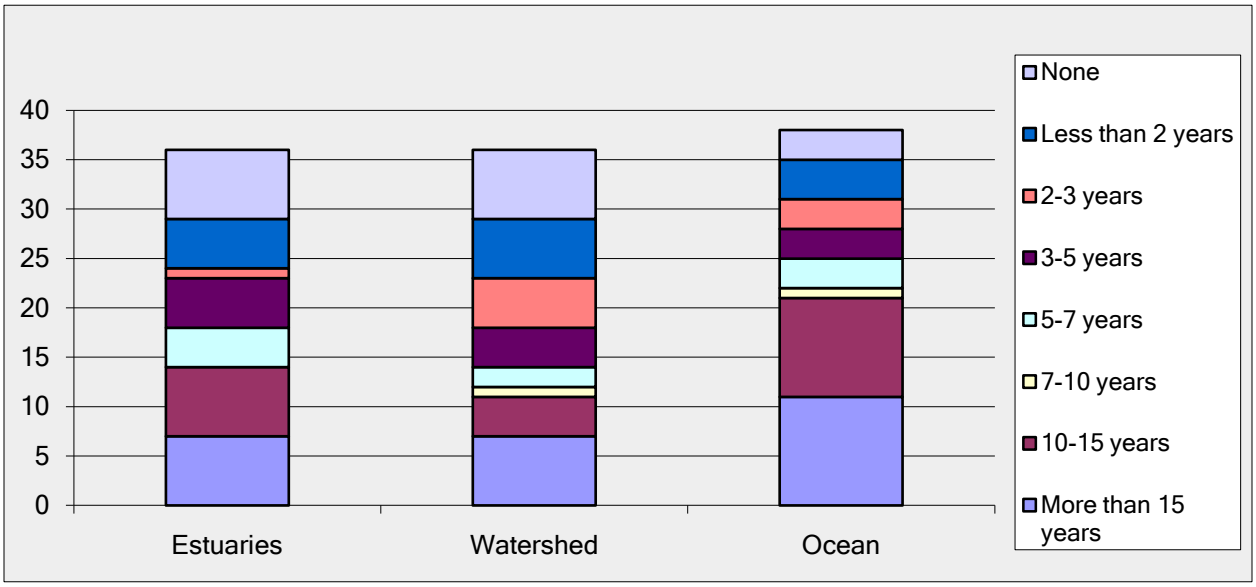
"GPS / cameras/ other equipment to be borrowed for school use"

"I love having a local expert or scientist to work with on projects such as citizen science. It really validates the students' efforts."

Question 7:

7. How many years have you been teaching about estuaries*, watersheds and ocean-related*** topics? *Estuary: a semi-enclosed coastal body of water where fresh and salt water meet and mix. **Watershed: An area of land where all the water drains to a common place. ***Ocean: Related to a system of open-ocean habitats, characterized by exposure to wave action, tidal fluctuations and ocean currents.**

Answer Options	None	Less than 2 years	2-3 years	3-5 years	5-7 years	7-10 years	10-15 years	More than 15 years	Response Count
Estuaries	7	5	1	5	4	0	7	7	36
Watershed	7	6	5	4	2	1	4	7	36
Ocean	3	4	3	3	3	1	10	11	38
							answered question		**38**
							skipped question		**2**

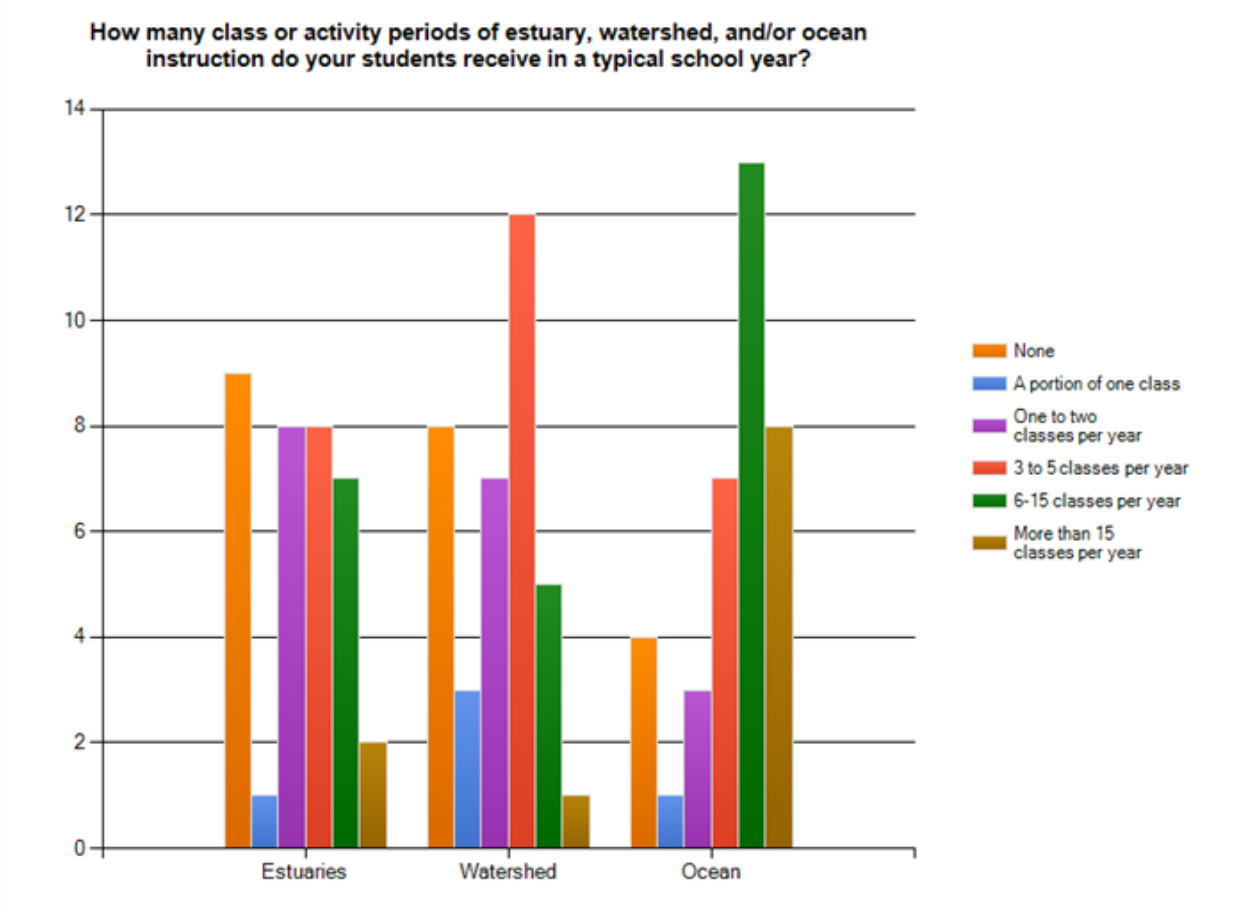


Of the 38 teachers who responded to the question below, a surprising number have been teaching about estuaries, watersheds, and the ocean for 10 years or more. Ocean education was particularly strong, with 21 teachers (55% or respondents) indicating that they have taught students about oceans for 10 years or more.

Question 8:

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

Answer Options	None	A portion of one class	One to two classes per year	3 to 5 classes per year	6-15 classes per year	More than 15 classes per year	Response Count
Estuaries	9	1	8	8	7	2	35
Watershed	8	3	7	12	5	1	36
Ocean	4	1	3	7	13	8	36
						answered question	**37**
						skipped question	**3**

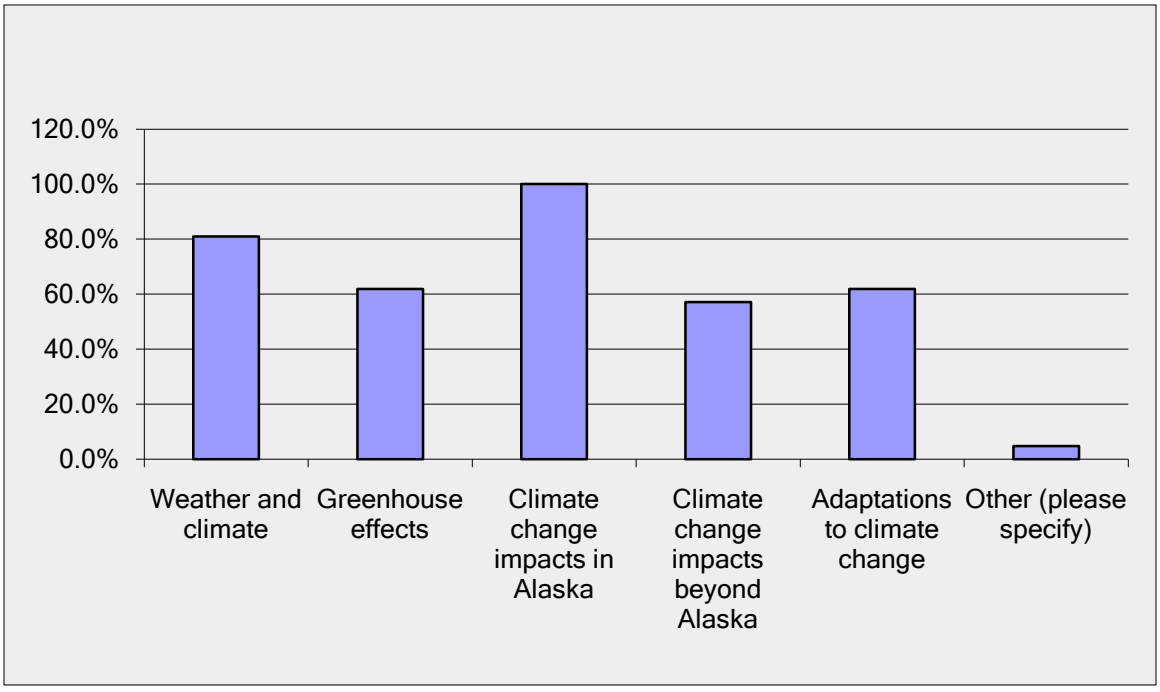


Similarly, a majority of teachers are incorporating instruction about estuaries, watersheds, and the ocean into their class curriculums, with ocean instruction offered during 15 classes or more by 36% of respondents.

Questions 9, 10 and 11:

9. Do you teach about the science of climate change?		
Answer Options	**Response Percent**	**Response Count**
Yes	59.5%	22
No	40.5%	15
	answered question	**37**
	skipped question	**3**

10. If yes, what concepts of climate change do you include in your lessons? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Weather and climate	81.0%	17
Greenhouse effects	61.9%	13
Climate change impacts in Alaska	100.0%	21
Climate change impacts beyond Alaska	57.1%	12
Adaptations to climate change	61.9%	13
Other (please specify)	4.8%	1
	answered question	**21**
	skipped question	**19**



11. If not, why not?	
Answer Options	**Response Count**
	12
answered question	**12**
skipped question	**28**

The science of climate change is taught by 68% of the teachers who responded to this question. All teachers (100%) who provided climate change education teach about climate change impacts to Alaska, while 81% teach about climate change as it pertains to weather and climate.

The respondents who do not teach about the science of climate change gave the following reasons:

> “Not part of my job at this time.”
>
> “I center on changes not specifically that the changes are caused by climate change.”
>
> “I am not a science teacher. I teach about the social implications of climate change somewhat in history classes.”
>
> ‘It is mentioned and discussed if students are interested but not part of this curriculum.”
> “I am no longer a classroom teacher.”
>
> “ I used to teach science on the elementary level, and at that time, climate change was part of the content I taught. Currently, I teach English, so I do not teach climate change; however, I would be interested in learning how to incorporate it more.”
>
> “Lack of knowledge on my part”
>
> “unaware of grade-level appropriate resources”
>
> “We touch on it, but it is a topic that needs and deserves sufficient time to do it right.”
>
> “I am not a science teacher. They get their science instruction on-line”
>
> “I can’t tell fact from fiction on the subject. It is not part of our curriculum, or standards. It feels controversial and as a teacher I avoid that.”

Question 12:

12. What kinds of educational information do you need to incorporate more discussion about the effects of climate change on coastal areas in your classroom?		
Answer Options	**Response Percent**	**Response Count**
weather vs. climate change	60.7%	17
use of data in the classroom	57.1%	16
climate change and sea level rise	64.3%	18
climate change and ocean acidification	60.7%	17
human impacts and stewardship actions	57.1%	16
local scientific research	67.9%	19
adaptations to climate change	46.4%	13
Other (please specify)		3
	answered question	**28**
	skipped question	**12**

Based on these findings, teachers want a broad range of climate change education, as indicated by the range of interest indicated in question 12. Interjecting scientific research into programs and teacher workshops will meet the greatest need.

Teachers who marked "other" made the following comments:

> "I would want more information on all of this if I was teaching it specifically"
>
> "Literature or writing connections"
>
> "Bibliography of good trade books and easy readers addressing these topics; visuals to use in the primary classroom (such as posters); in service time to develop the grade-level materials needed"

Questions 13, 14 and 15:

13. Are estuary science topics a required part of your district's or school's requirements?		
Answer Options	**Response Percent**	**Response Count**
Yes	48.5%	16
No	51.5%	17
	answered question	**33**
	skipped question	**7**

14. Are marine science topics a required part of your district's or school's requirements?		
Answer Options	**Response Percent**	**Response Count**
Yes	82.9%	29
No	17.1%	6
	answered question	**35**
	skipped question	**5**

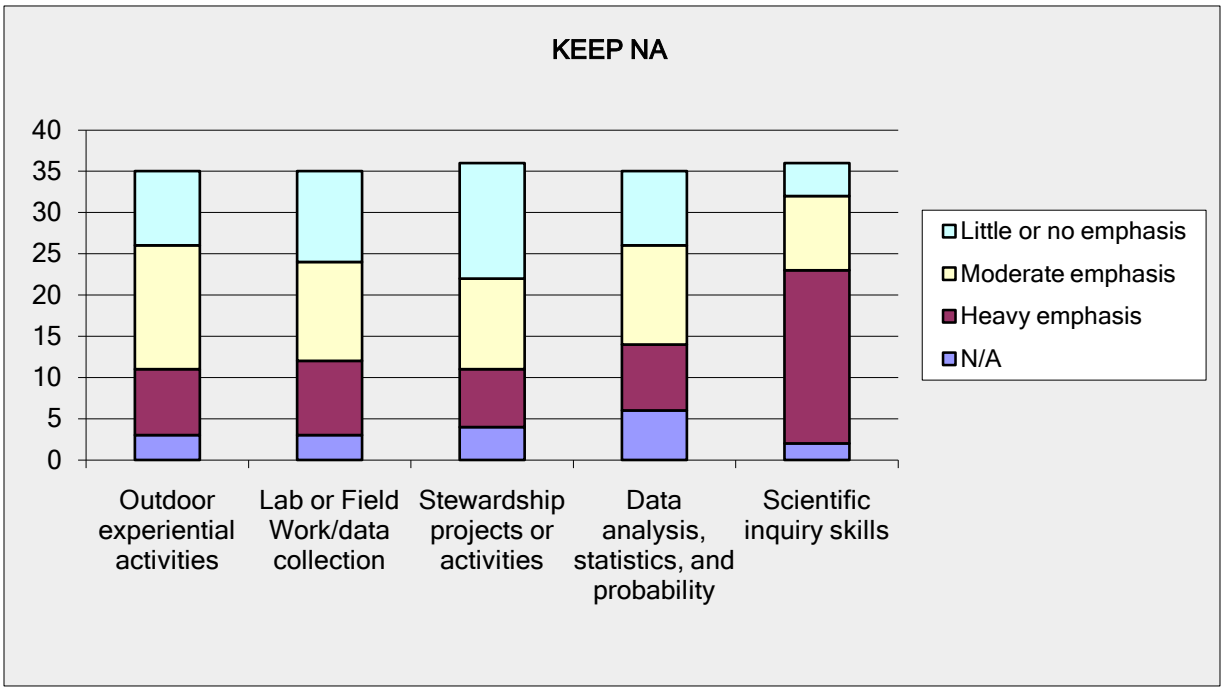
15. Are climate change science topics a required part of your district's or school's requirements?		
Answer Options	**Response Percent**	**Response Count**
Yes	51.5%	17
No	48.5%	16
	answered question	**33**
	skipped question	**7**

Marine science is a required topic for 82.9% of the teachers surveyed, while climate change science and estuary science are required topics for about half of all teachers surveyed (51.5% and 48.5% respectively).

Question 16:

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

Answer Options	Little or no emphasis	Moderate emphasis	Heavy emphasis	N/A	Response Count
Outdoor experiential activities	9	15	8	3	35
Lab or Field Work/data collection	11	12	9	3	35
Stewardship projects or activities	14	11	7	4	36
Data analysis, statistics, and probability	9	12	8	6	35
Scientific inquiry skills	4	9	21	2	36
				answered question	**36**
				skipped question	**4**



When planning for the upcoming school year, teachers responding to the Needs Assessment focus most heavily on scientific inquiry skills, exceeding outdoor experiential activities, which had a moderate emphasis. Coastal educators in Homer can strive to offer more programs that capitalize on both scientific inquiry and outdoor experiential activities to meet the needs and interests of area teachers and students.

Question 17:

17. Which topics would you like educational materials for to use in your classroom? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Nutrient Cycles and Food Webs	66.7%	20
Biodiversity and Adaptations	63.3%	19
Life Cycles of Marine/Aquatic Organisms	60.0%	18
Marine/Aquatic Habitats	73.3%	22
Animal Migration	56.7%	17
Estuaries as Nurseries for Marine Life	60.0%	18
Invasive Species	50.0%	15
Geologic Change	43.3%	13
Tides, Waves & Currents	60.0%	18
Rivers and Watersheds	56.7%	17
Erosion and Sedimentation	43.3%	13
Weather	56.7%	17
Climate Change/Sea Level Rise / Ocean Acidification	53.3%	16
Earth Systems	50.0%	15
Water Cycle	53.3%	16
Physical Properties of Water	46.7%	14
Heat Transfer	20.0%	6
Salinity	40.0%	12
Water Density	40.0%	12
Wetlands/Marshes	63.3%	19
Water Chemistry	36.7%	11
Experimentation & the Scientific Method	56.7%	17
Lab or Field Work Techniques	50.0%	15
Real estuary measurements and data (temperature, dissolved oxygen, salinity, etc)	40.0%	12
Technology & Instrumentation	43.3%	13
Interdisciplinary Research	36.7%	11
Commercial Fishing & Fisheries	43.3%	13
Water Pollution	50.0%	15
Conservation	60.0%	18
Recreation (Fishing, Birding, Boating, etc.)	40.0%	12
Human Impact on the Environment	60.0%	18
Coastal Hazards	36.7%	11
Water Quality & Health	40.0%	12
Marine Related Careers	50.0%	15
Actions citizens/students can take	53.3%	16
answered question		**30**
skipped question		**10**

Teachers have an ongoing need for relevant science-based educational materials with the greatest interest in marine and aquatic habitats (at 73.3%), and the least interest in interdisciplinary research (at 36.7%) perhaps because the later is undefined and rather vague.

Question 18:

18. In What format would these materials be most useful?	
Answer Options	**Response Count**
	20
answered question	**20**
skipped question	**20**

Based on answers to question 18, educators who replied to the needs assessment would find the following formats to be most useful:

> Informational materials such as low level books, maps, graphs that elementary students could understand. Also anything hands on, test kits, etc...
>
> Posters, worksheets, books, movies
>
> background information with inquiry based activities, hands-on, possibly student books and resources tub if applicable.
>
> Electronic files, yet I would be very open to professional development. From there, I could generate my own methods.
>
> pdf, spreadsheet, books, software, maps, lesson plans,
>
> Lessons or materials for particular grade levels. Trunks or kits that are focused on specific topics designed for specific grade levels as they tie into state/district standards
>
> I enjoy learning through DOING. If I were able to watch a lesson or resource in action, I could recreate it on my own a different time. I have learned so much from the Discovery Labs. I wish they were a bit longer in time; I often feel rushed to complete. I guess a format would be visual or digital.
>
> “Lessons with facilitator with pre and post follow up activities.”

Questions 19, 20 and 21:

19. There is a National Estuarine Research Reserve located in Homer, Alaska at the Kachemak Bay National Estuarine Research Reserve, one of 28 Reserves around the country protected for the purposes of education, research, water-quality monitoring and coastal stewardship. Were you aware that Alaska has a National Estuarine Research Reserve?

Answer Options	Response Percent	Response Count
Yes	85.7%	30
No	14.3%	5
answered question		**35**
skipped question		**5**

20. If yes, which Research Reserve services or products do you use?

Answer Options	Response Percent	Response Count
Discovery Labs	88.5%	23
Field trips	80.8%	21
Curriculum	23.1%	6
Website	23.1%	6
Professional Development	23.1%	6
Other (please specify)		2
answered question		**26**
skipped question		**14**

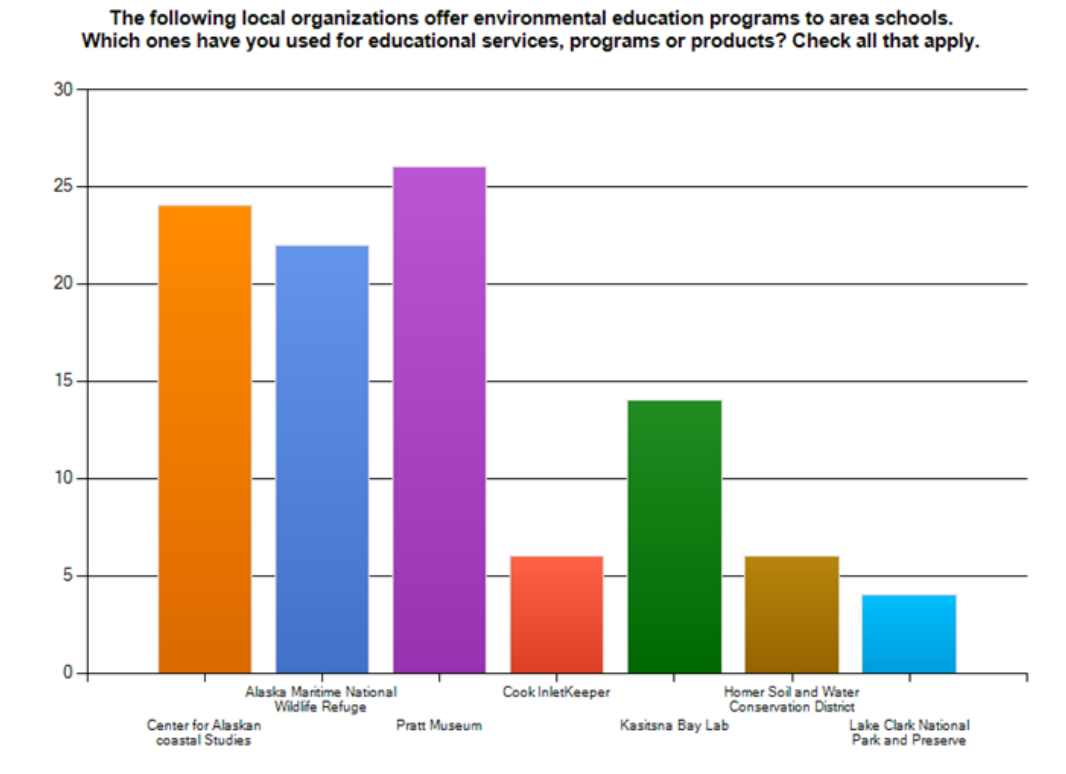
21. If you have not used any of their educational services or products, why not?

Answer Options	Response Count
	5
answered question	**5**
skipped question	**35**

Most of the teachers who participated in the needs assessment were aware of KBNERR (87.7%), and of these teachers, 88.5% have participated in Discovery Labs, which is now the main method for educational program delivery, followed by 80.8% of respondents who have participated in KBNERR field trips. Far fewer (23.1%) have participated in Professional development with KBNERR, likely due to the infrequency of professional development opportunities. Under "other" teachers specified that they had used KBNERR's System Wide Monitoring Program (SWMP) data and direct contact with researchers. Teachers who have not used KBNERR services or products indicated that the information was not relevant to their curriculum, that they were unaware of it, or that they used other data (Alaska Ocean Observing System).

Question 22:

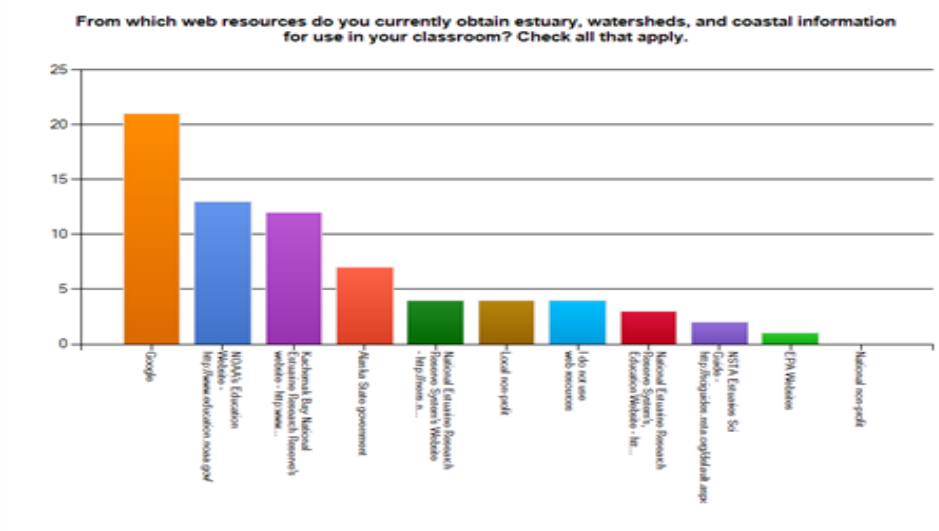
22. The following local organizations offer environmental education programs to area schools. Which ones have you used for educational services, programs or products? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Center for Alaskan coastal Studies	75.0%	24
Alaska Maritime National Wildlife Refuge	68.8%	22
Pratt Museum	81.3%	26
Cook InletKeeper	18.8%	6
Kasitsna Bay Lab	43.8%	14
Homer Soil and Water Conservation District	18.8%	6
Lake Clark National Park and Preserve	12.5%	4
	answered question	**32**
	skipped question	**8**



Because KBNERR often partners with other coastal education organizations, the question below was included in an effort to provide coastal education partners with insight regarding their outreach efforts.

Question 23:

23. From which web resources do you currently obtain estuary, watersheds, and coastal information for use in your classroom? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
NOAA's Education Website - http://www.education.noaa.gov/	44.8%	13
National Estuarine Research Reserve System's Website - http://nerrs.noaa.gov/	13.8%	4
National Estuarine Research Reserve System's, Education Website – http://www.estuaries.gov	10.3%	3
NSTA Estuaries Sci Guide - http://sciguides.nsta.org/default.aspx	6.9%	2
Kachemak Bay National Estuarine Research Reserve's website - http:www.kbayrr.org	41.4%	12
EPA Websites	3.4%	1
Google	72.4%	21
Alaska State government	24.1%	7
National non-profit	0.0%	0
Local non-profit	13.8%	4
I do not use web resources	13.8%	4
Other (please specify)		2
	answered question	**29**
	skipped question	**11**



The majority of respondents (72.4%) utilize Google for web information on estuaries, watersheds and coastal information, with the noaa.gov site and KBNERR's website garnering 44.8% and 41.4% respectively. This relatively high level of use of the KBNERR website validates efforts to keep the website up to date and to use it as a calendar for upcoming educational opportunities. Educators that responded to "other" named AOOS and NOAA weather data as web sources they utilize for information in the classroom.

Questions 24 and 25:

24. 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.

Answer Options	Response Percent	Response Count
algal blooms	34.5%	10
animal tag/tracking	55.2%	16
atmospheric carbon dioxide	37.9%	11
bathymetry/topography	31.0%	9
currents	37.9%	11
dissolved oxygen (DO)	27.6%	8
fish species & abundance	48.3%	14
nutrients	34.5%	10
ocean color	31.0%	9
pH	41.4%	12
salinity	37.9%	11
sea level rise	44.8%	13
temperature: air	51.7%	15
temperature: water	58.6%	17
water depth	20.7%	6
water contaminants	34.5%	10
water turbidity (clarity/cloudiness)	24.1%	7
waves	24.1%	7
zooplankton species	51.7%	15
None of the above	10.3%	3
Other (please specify)		3
answered question		**29**
skipped question		**11**

25. Which of the following real-time/archived data sets do you currently use for teaching? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
algal blooms	0.0%	0
animal tag/tracking	3.3%	1
atmospheric carbon dioxide	0.0%	0
bathymetry/topography	3.3%	1
currents	10.0%	3
dissolved oxygen (DO)	6.7%	2
fish species & abundance	10.0%	3
nutrients	3.3%	1
ocean color	6.7%	2
pH	13.3%	4
salinity	0.0%	0
sea level rise	6.7%	2
temperature: air	20.0%	6
temperature: water	16.7%	5
water depth	3.3%	1
water contaminants	3.3%	1
water turbidity (clarity/cloudiness)	10.0%	3
waves	3.3%	1
zooplankton species	3.3%	1
None of the above	56.7%	17
Other (please specify)		0
	answered question	**30**
	skipped question	**10**

Real time and archived data sets appear to be underutilized by respondents, with 56.7% stating that they use none of the above. Temperature and air data garnered the highest response rate at 20%. This correlates with respondents' reply to question 10 with 81% of respondents indicating that they offer curriculum on weather and climate.

KBNERR and other coastal educators should do more to outreach real-time and archived data sets to teachers. Question 24 indicates a broad interest in having data sets presented in ways that are grade appropriate and can be integrated into curriculum. This information could be developed and included in upcoming teacher workshops offered by KBNERR and other local coastal educators.

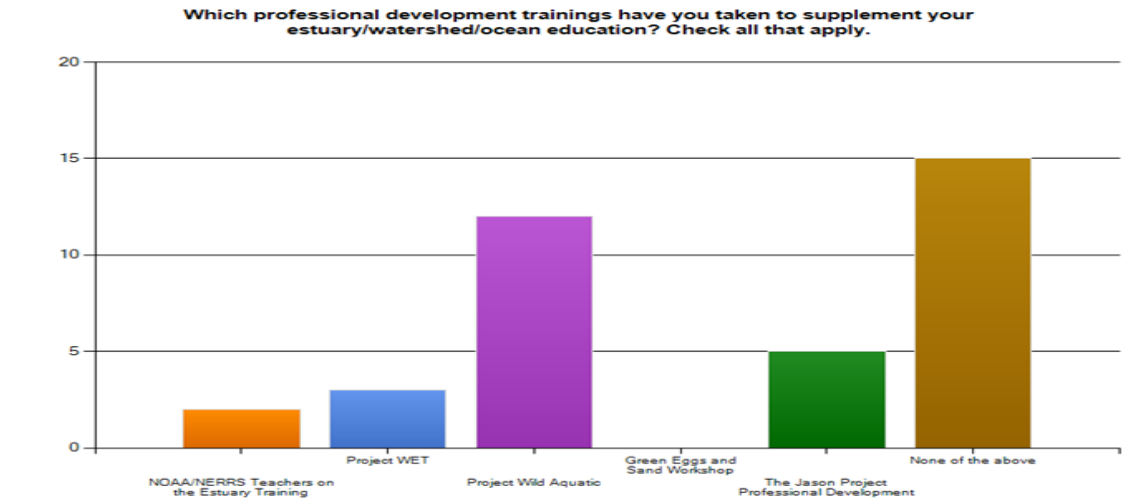
Teachers who replied "other" in question 24 provided the following input:

> "I would use anything that would help me to support the classroom teachers with the students I works with"
>
> "Not sure if any would be useful in K/1; need examples of how could be used with this age-group"

Questions 26 and 27:

26. Are Continuing Education (CE) credits important or required in determining which professional development opportunities you participate in?		
Answer Options	**Response Percent**	**Response Count**
Yes	66.7%	22
No	33.3%	11
	answered question	**33**
	skipped question	**7**

27. Which professional development trainings have you taken to supplement your estuary/watershed/ocean education? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
NOAA/NERRS Teachers on the Estuary Training	6.5%	2
Project WET	9.7%	3
Project Wild Aquatic	38.7%	12
Green Eggs and Sand Workshop	0.0%	0
The Jason Project Professional Development	16.1%	5
None of the above	48.4%	15
Other (please specify)		5
	answered question	**31**
	skipped question	**9**



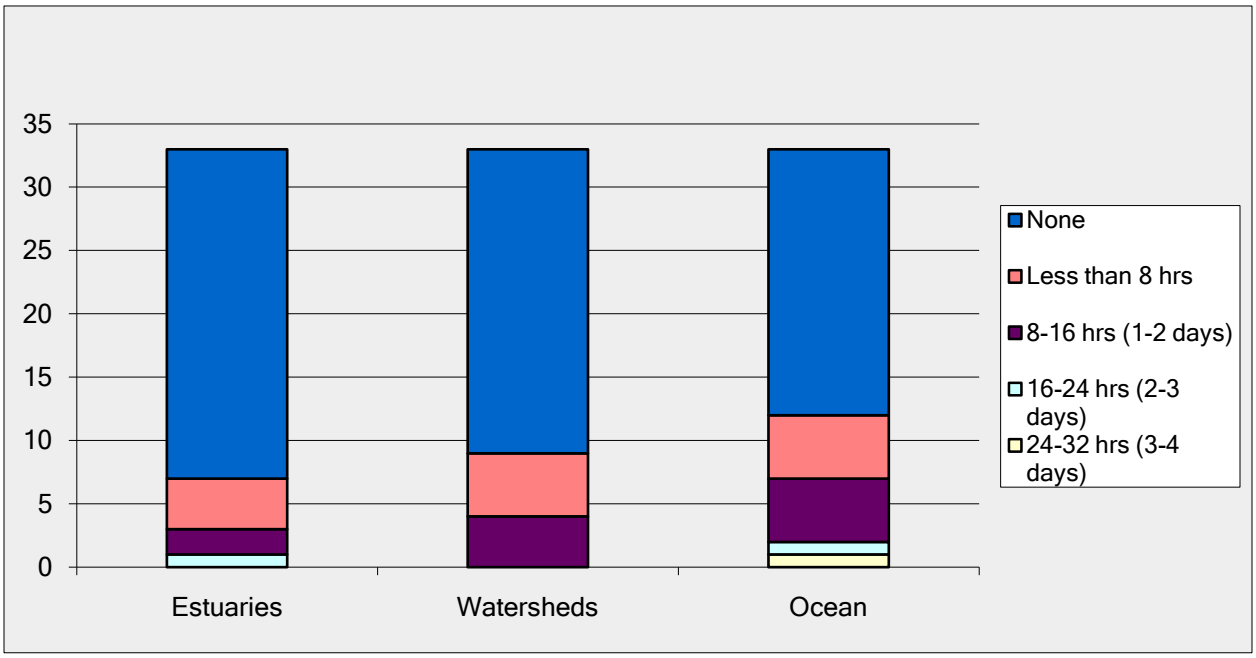
Two-thirds of respondents indicate that Continuing Education credits are important when determining which professional development opportunities to participate in. Of the programs listed, 38.7% had participated in Project WILD Aquatic.

None of the other professional trainings listed have been made available in the Homer area, so teachers who participated in these trainings likely did so in another community or state.

Question 28:

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

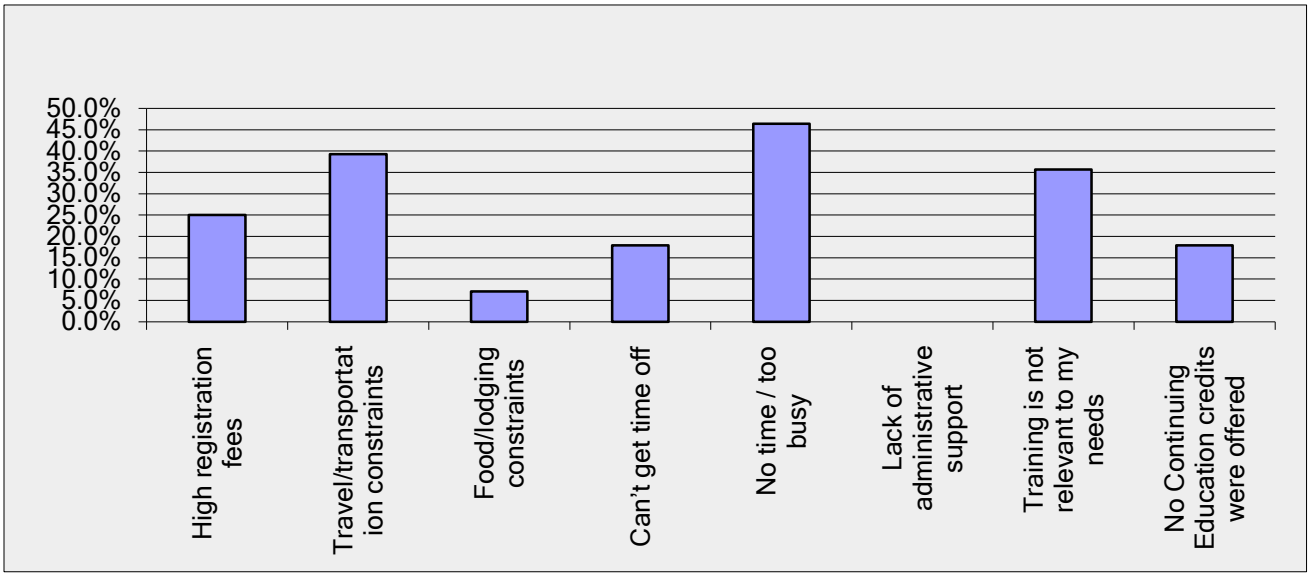
Answer Options	None	Less than 8 hrs	8-16 hrs (1-2 days)	16-24 hrs (2-3 days)	24-32 hrs (3-4 days)	32-40 hrs (4-5 days)	More than 40 hours	Response Count
Estuaries	26	4	2	1	0	0	0	33
Watersheds	24	5	4	0	0	0	0	33
Ocean	21	5	5	1	1	0	0	33
							answered question	33
							skipped question	7



Less than one-third of the teachers participating in the survey have participated in professional development related to estuaries, watersheds and oceans. Oceans drew the highest response with 12 teachers indicating that they had received eight or more hours of training, and only one teacher indicating that they had received 3 -4 days of training. This is of interest in light of the fact that in question #7 the majority of teachers have been teaching about estuaries, watersheds and oceans for 3 – 15 years, and many of them dedicate three to 15 class periods per school year to each of these subjects (per question #8).

Question 29:

29. What factors prevent you from attending professional teacher development? Please choose the most important three factors.		
Answer Options	**Response Percent**	**Response Count**
High registration fees	25.0%	7
Travel/transportation constraints	39.3%	11
Food/lodging constraints	7.1%	2
Can't get time off	17.9%	5
No time / too busy	46.4%	13
Lack of administrative support	0.0%	0
Training is not relevant to my needs	35.7%	10
No Continuing Education credits were offered	17.9%	5
Other (please specify)		6
answered question		**28**
skipped question		**12**



The three main factors that prevent teachers from attending professional teacher development workshops are (1) lack of time, (2) travel/transportation constraints, and (3) lack of training that is relevant to their needs. KBNERR may be able to address factors 2 and 3 by offering local professional teacher development workshops that target training that teachers need. Teachers that marked "other" gave the following responses:

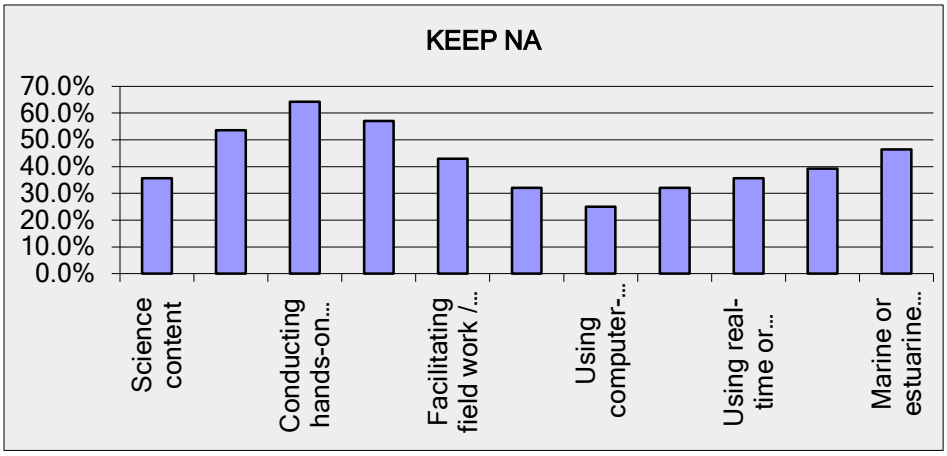
"local tide pooling info"

"I don't NEED professional development training in science, but I would like to find more ways to integrate science and English"

"any of the above, but with age-appropriate focus"

Question 30:

30. What type of professional development training do you need? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Science content	35.7%	10
Facilitating inquiry-based activities	53.6%	15
Conducting hands-on activities	64.3%	18
Incorporating new lab activities	57.1%	16
Facilitating field work / data collection	42.9%	12
Analyzing data	32.1%	9
Using computer-generated visualizations of data	25.0%	7
Using new websites	32.1%	9
Using real-time or archived data from monitoring sites	35.7%	10
Climate change science	39.3%	11
Marine or estuarine science	46.4%	13
Other (please specify)		4
	answered question	**28**
	skipped question	**12**



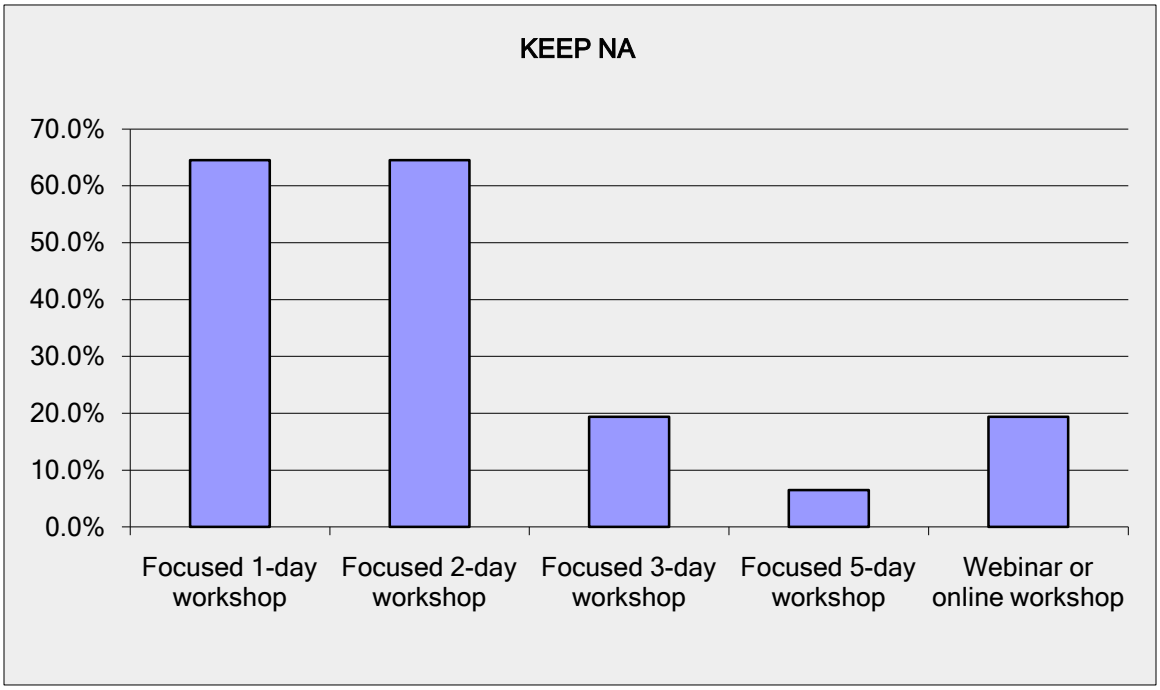
The top five professional teacher development needs identified are

(1) conducting hands-on activities based on 64.3% of respondents,
(2) incorporating new lab activities based on 57.1% of respondents,
(3) facilitating inquiry-based activities based on 53.6% of respondents,
(4) marine or estuary science based on 46.4% of respondents, and
(5) facilitating field work and data collection based on 42.9% of respondents.

KBNERR and other area coastal educators already offer educational programs to K-12 classrooms that address all of these needs. With sufficient funding support KBNERR can work independently or collaboratively with other coastal educators to incorporate many or most of the identified needs into professional teacher trainings.

Question 31:

31. What is your preferred delivery format for professional development? Check all that apply.		
Answer Options	**Response Percent**	**Response Count**
Focused 1-day workshop	64.5%	20
Focused 2-day workshop	64.5%	20
Focused 3-day workshop	19.4%	6
Focused 5-day workshop	6.5%	2
Webinar or online workshop	19.4%	6
Other (please specify)		2
	answered question	**31**
	skipped question	**9**



Ideally, teachers would prefer a 1-day or 2-day focused workshop. Response rates drop off significantly for longer workshops (8 responses) or for webinar or online workshops (6 responses).

Teachers that marked “other” provided the following information:

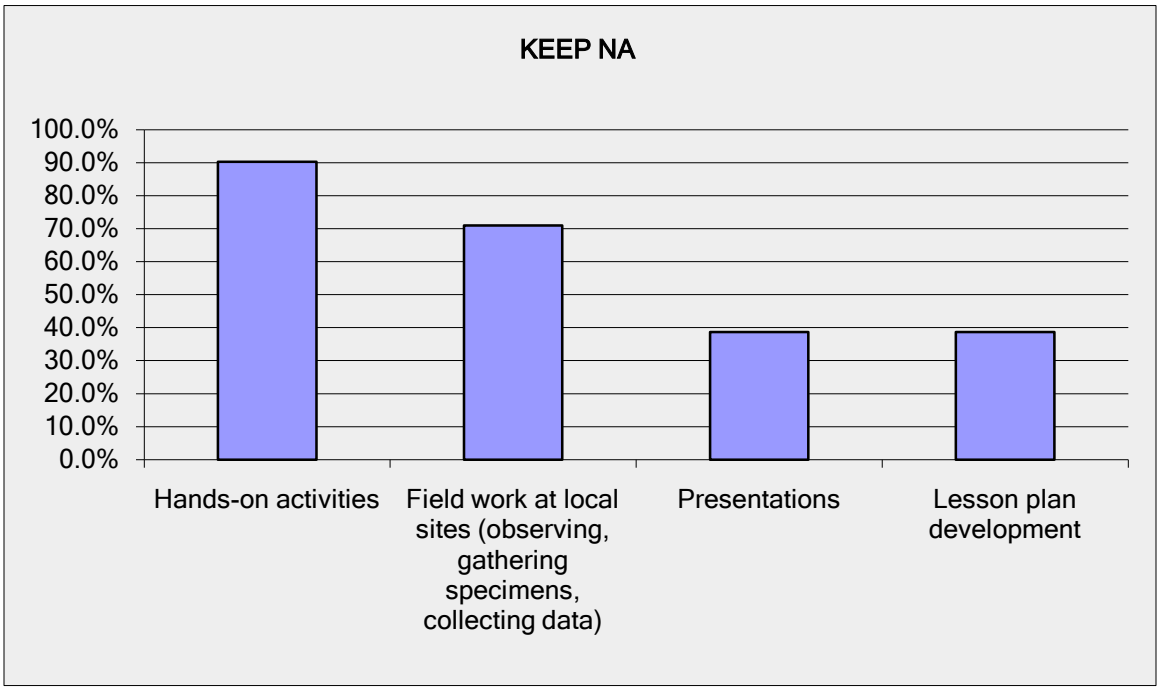
> “longer in summer OK”
>
> “I like as much time as possible, but spread out over some time. I need to process and I need to try things out, too. I like coming back together and having some experiences attempted.”

Question 32:

Respondents clearly prefer hands-on activities and field work at local sites as the delivery methods for science-related professional development (90.3% and 71% respectively). There is much less interest in lesson plan development and presentations (38.7% each). These results mesh well with KBNERR's efforts to outreach the Reserve's research methods and findings through educational programming.

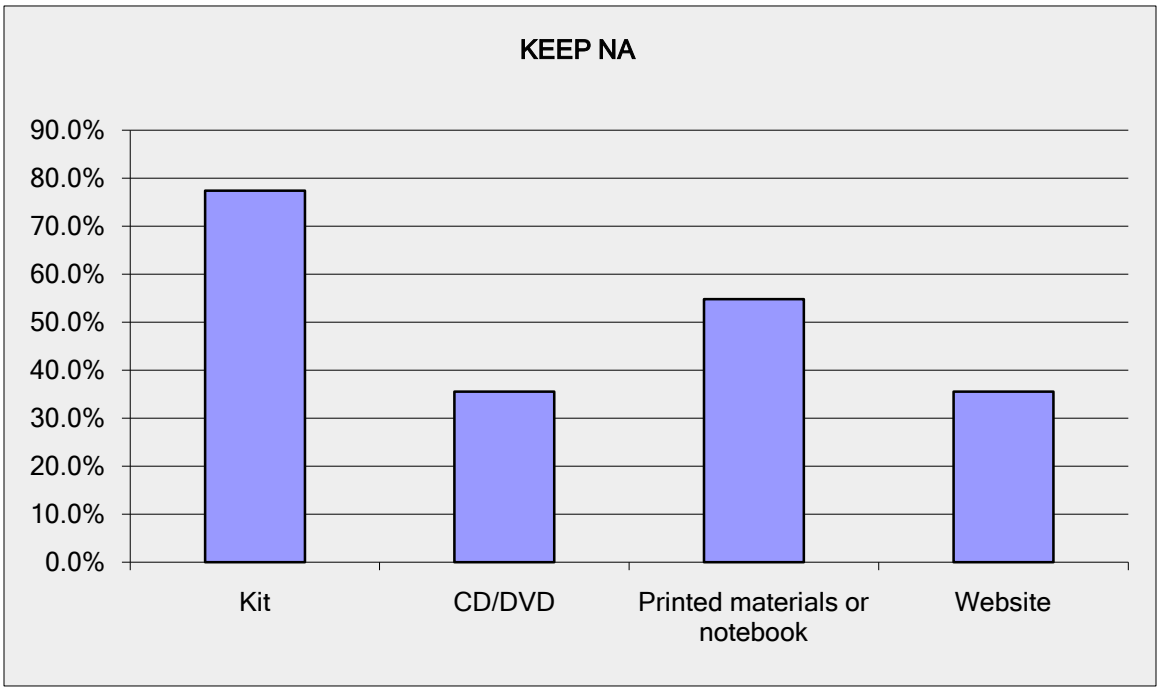
32. What is your preferred delivery method for science-related professional development? Check all that apply.

Answer Options	Response Percent	Response Count
Hands-on activities	90.3%	28
Field work at local sites (observing, gathering specimens, collecting data)	71.0%	22
Presentations	38.7%	12
Lesson plan development	38.7%	12
Other (please specify)		0
answered question		**31**
skipped question		**9**



Question 33:

33. In what format do you prefer to receive training materials?		
Answer Options	**Response Percent**	**Response Count**
Kit	77.4%	24
CD/DVD	35.5%	11
Printed materials or notebook	54.8%	17
Website	35.5%	11
Other (please specify)		2
answered question		**31**
skipped question		**9**



Respondents clearly prefer to receive training materials as kits (77.4%) that they can utilize in the classroom over other forms of materials. Printed materials or a notebook are also favorable (54%), while websites, CDs and DVDs both fall to 35.5%. This aligns with the responses provided in question 18 where several teachers identified kits as a useful format for providing information. Websites, CDs and DVDs may receive a lower rating because teachers are utilizing the web (especially Google) for scientific information on their own (see Question 23).

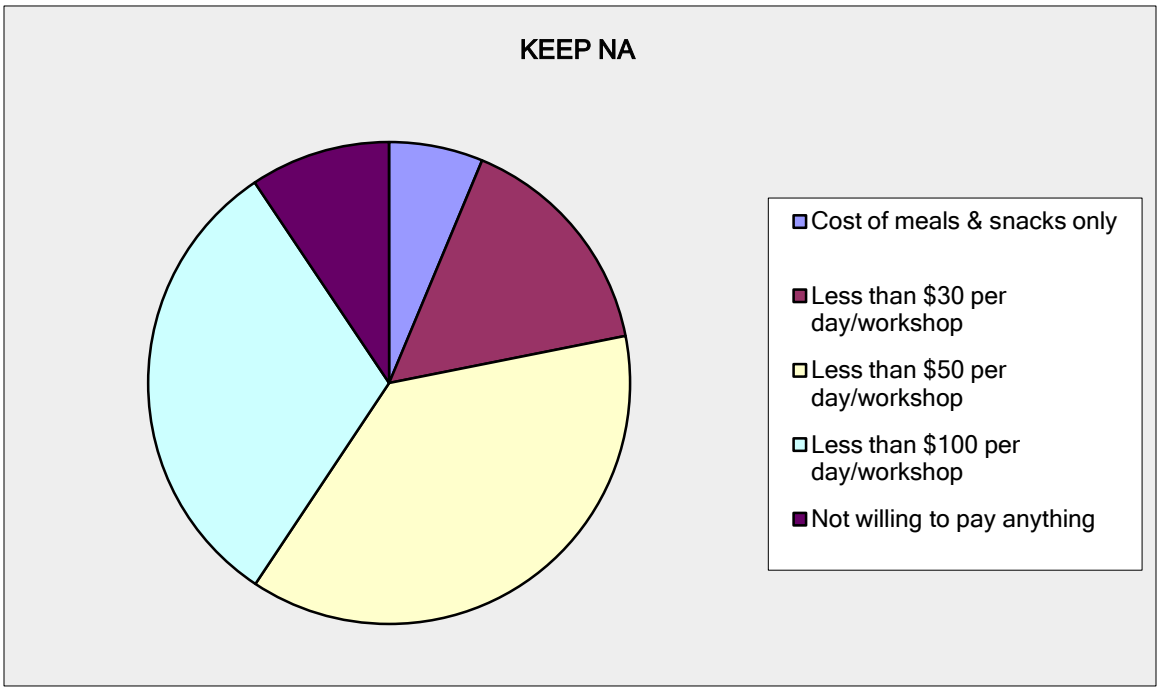
Teachers who entered "other" had the following to suggest:

"and in person"

"any are helpful; electronic materials that can be revised, if necessary, are especially helpful"

Question 34:

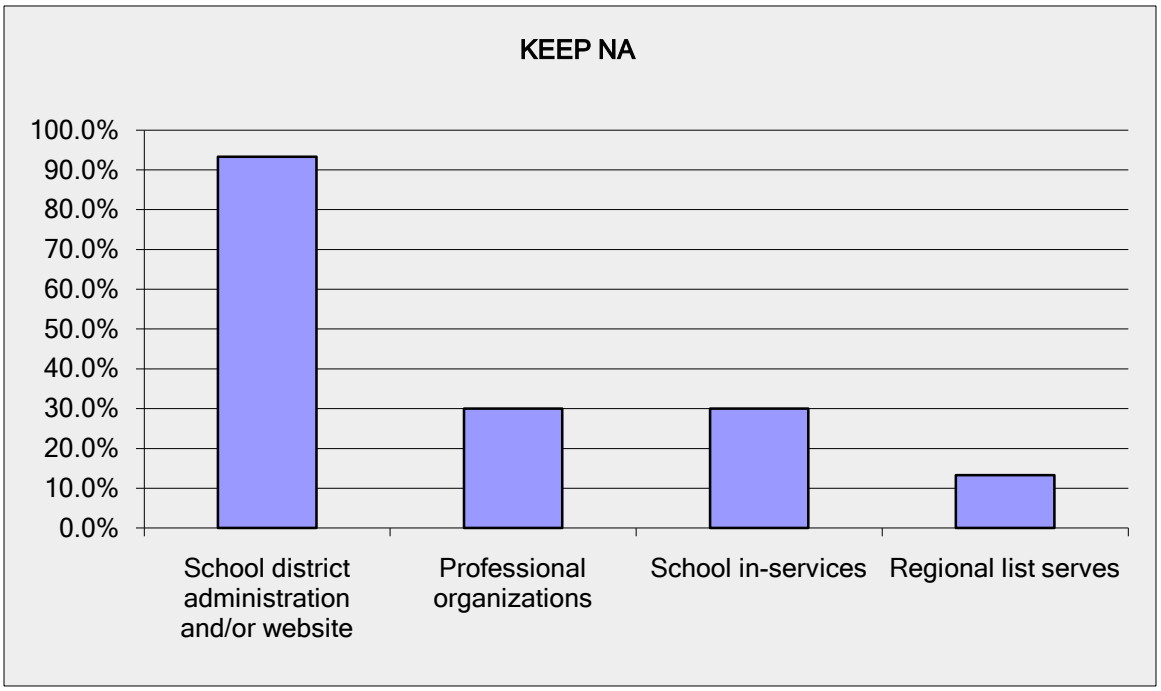
34. How much would you be willing to pay for a professional development program?		
Answer Options	**Response Percent**	**Response Count**
Cost of meals & snacks only	6.3%	2
Less than $30 per day/workshop	15.6%	5
Less than $50 per day/workshop	37.5%	12
Less than $100 per day/workshop	31.3%	10
Not willing to pay anything	9.4%	3
	answered question	**32**
	skipped question	**8**



The ability or willingness to pay for professional development programs varies widely, with 31.3% of respondents willing to pay nothing to less than $30 per day, 37.5% willing to pay up to $50 a day, and the balance (31.5%) willing to pay up to $100 per day for a workshop. KBNERR cannot charge for teacher workshops due to a State of Alaska policy, but other local coastal educational organizations can and do. For these partners, keeping costs low will allow for the greatest number of teachers to attend and may increase participation levels.

Question 35:

35. How do you typically learn about professional development opportunities?		
Answer Options	**Response Percent**	**Response Count**
School district administration and/or website	93.3%	28
Professional organizations	30.0%	9
School in-services	30.0%	9
Regional list serves	13.3%	4
Other (please specify)		2
answered question		**30**
skipped question		**10**



Most teachers (93.3%) hear about professional development opportunities through the school district. The Kenai Peninsula School District and the neighboring Anchorage School District have staff that work collaboratively with workshop providers to help structure the workshop to comply with District requirements, and advertise these workshops on a webpage specific to teacher development. This partnership works well and reduces the need to advertise. Additional methods of outreaching teacher workshops include speaking at or hosting a table at a school in-service and through advertisement and flyers produced by the professional organizations hosting the workshops (effective among 30% of respondents), and through regional list serves. KBNERR has employed all of these methods at one time or another.

Questions 36 and 37:

36. Approximately what percentage of students in your school or program identify with the following racial/ethnic groups? Please round to the nearest 5%.

Answer Options	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	Response Count
African American	9	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
Alaska Native	4	15	6	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	30
Asian	6	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
Caucasian / White	1	0	0	0	0	0	0	0	0	1	3	0	1	1	5	2	1	4	2	9	1	31
Hispanic	8	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
Russian Old Believer	2	11	2	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	24
Other	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8

37. Do you foresee a need for new estuary/ocean/watershed related educational materials in different languages? If yes, which languages?

Answer Options	Response Count
	7
answered question	**7**
skipped question	**33**

While the majority of Kenai Peninsula school students are Caucasian, the borough does have a diverse ethnic mix which includes African Americans, Alaska Natives, Asians, Hispanics, and Russian Old Believers.

The information collected in Question 36 doesn't have sufficient data to allow for an overall breakdown of ethnicity for all schools considered. However, three schools report that 100% of their population is Russian Old Believer.

This explains why Russian is the only option listed under Question 37 with four respondents indicating that new estuary/ocean/watershed related educational materials in Russian would be helpful.

Summary:

KBNERR provides coastal education for adults and school groups through public and K-12 Discovery Lab programs, Estuary Walks, and other family-oriented events. The information gathered in this survey best targets school-age education, as respondents were all teachers, or working as aides in the classroom. As such, the findings pertain to K-12 educators and their students.

Fieldtrips and Outdoor Education:

The majority of respondents include some outdoor activities in their curriculum, either on the school grounds or off site. The vast majority (97.4%) of teachers are interested in learning how to include more outdoor education into their classroom structure through facilitated hands-on or inquiry-based activities. Based on the results for Question 16, the majority of teachers (65.8%) give outdoor experiential activities moderate or heavy emphasis when they plan for the entire school year.

Teaching about Estuaries, Watersheds and the Ocean:

Homer area teachers are making time to teach students about estuaries, watershed and the ocean, with 55% or respondents (21 teachers) indicating that they have taught students about these subjects for 10 years or more. In fact many of them dedicate 3 – 15 class periods per year to each of these subjects.

Most of the teachers who responded to the Needs Assessment were aware of KBNERR (87.7%), and have participated in KBNERR Discovery Labs and field trips. Far fewer (23.1%) have participated in Professional development with KBNERR, likely due to the infrequency of professional development opportunities. In fact, less than one-third of the teachers surveyed have participated in professional development related to estuaries, watersheds and oceans. This is clearly an area of need which KBNERR and partner coastal organizations can and should address.

Teachers are currently getting much of their information on estuaries, watersheds and oceans from the web, with the majority of respondents (72.4%) utilizing Google for web information, followed by the noaa.gov site and KBNERR's website (44.8% and 41.4% respectively). This use of the KBNERR website indicates the importance of keeping the website up to date as a research resource, and for a calendar to announce upcoming educational opportunities.

Conversely, real time and archived data sets are underutilized, with the majority of respondents (56.7%) stating that they don't use them. Temperature and air data had the highest response rate at 20%. Yet teachers indicate a strong interest in having data sets presented in ways that are grade appropriate and can be integrated into curriculum (Question 24).This presents another outreach opportunity at a K-12 Discovery Lab or at a professional teacher development training. KBNERR can teach teachers how to access and utilize the Reserve-wide SWMP data as well as local data sets from KBNERR, AOOS and others.

The Science of Climate Change:

The majority of teachers who participated in the survey (68%) are teaching about the science of climate change. Teachers are mainly teaching about the impacts of climate change to Alaska, and about climate change as it pertains to weather and climate. Given that 51.5% of respondents indicated that climate change is a required part of their school's curriculum (per Question #15), it would appear that some teachers are teaching about climate change even when it's not a curriculum requirement.

Based on the interest expressed in Question 12, teachers are hungry for a broad range of climate change education, from sea level rise, to ocean acidification and stewardship actions. The KBNERR Discovery Labs format, along with targeted teacher workshops, can help to provide information on the impacts of climate change to Alaska's ocean waters, ocean life, weather, and climate.

Professional Teacher Development:

Two-thirds of respondents look for Continuing Education credits when determining which professional development opportunities to participate in. National continuing education programs often bypass Alaska with the notable exception of Project WILD. 38.7% of teachers responding to the survey had participated in Project WILD Aquatic.

Homer area teachers face time constraints, travel and transportation issues, and a lack of training options that will meet their needs. They prefer a one or two day workshop and about two-thirds can pay $50 - $100 a day to attend. This is a moot point for KBNERR, as State policy limits the Reserve from charging a fee for any programs or generating program receipts.

Teachers identified a need for professional teacher development opportunities in; conducting hands-on activities; facilitating lab activities; including inquiry-based activities; incorporating marine or estuary science; and facilitating field work and data collection.

KBNERR and other area coastal educators often work collaboratively to offer educational programs to K-12 school groups that address all of these subjects. However, KBNERR lacks the funding structure to offer teacher workshops without a new funding source. With sufficient funding support KBNERR can develop a professional teacher training curriculum that addresses all to the needs identified.

Respondents showed a strong preference for hands-on activities, and field work at local sites as the delivery methods for science-related professional development (90.3% and 71% respectively). While lesson plan development and presentations were much less desirable (38.7% each). KBNERR's efforts to outreach the Reserve's research methods and findings through educational programming are well suited to these delivery methods, given the emphasis for hands-on learning and field research that takes place in the Discovery Labs. It's also possible that professional teacher training could be offered in conjunction with citizen science efforts currently being conducted on the Reserve.

Conclusion:

KBNERR appears to be meeting the needs of area teachers for hands-on, inquiry-based field trip opportunities. Most teachers surveyed were aware of the Reserve and had participated in some form of educational programming at the Reserve or off site. They are utilizing the KBNERR website for information, so keeping it up to date is imperative.

There is a clear need among teachers for professional teacher development opportunities that offer in depth information on estuaries, watersheds and oceans, and that address climate change as it pertains to changes in the ocean, food chain, and weather in Alaska.