

**Padilla Bay National Estuarine Research Reserve**  
**Education Needs Assessment Report**

**February 2012**

**Glen Alexander**

**Washington State Department of Ecology**  
**Shorelands & Environmental Assistance Program**  
**Padilla Bay Reserve**  
**10441 Bay View-Edison Rd**  
**Mount Vernon WA 98273**

## ACKNOWLEDGEMENTS

Padilla Bay National Estuarine Research Reserve in Washington State is part of the National Estuarine Research Reserve System, established by Section 315 of the Coastal Zone Management Act, as amended.

Additional information about the System can be obtained from the Estuarine Reserve Division, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, US Department of Commerce, 1305 East-West Highway – N/ORM5, Silver Spring MD 20910

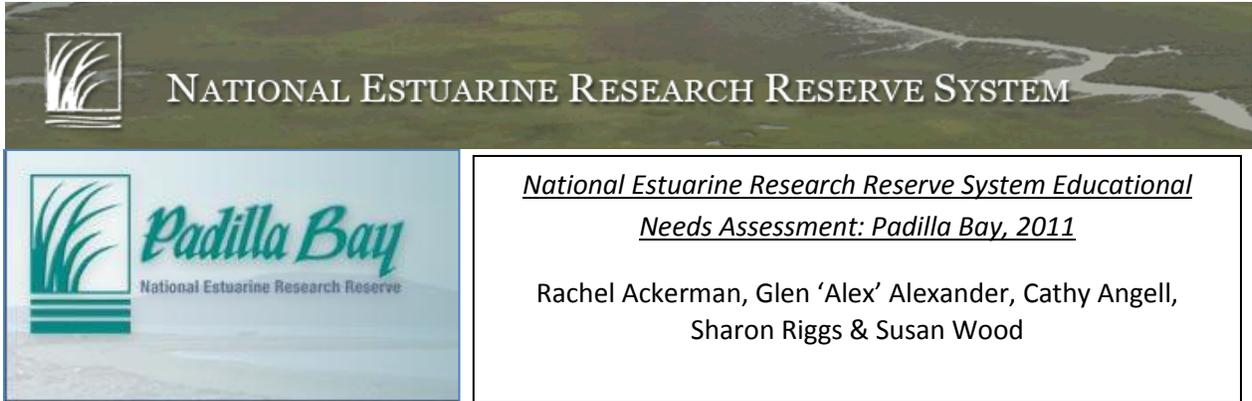


Thanks to the Padilla Bay Reserve Market Analysis/Needs Assessment Work Group: Glen Alexander, Susan Wood, Cathy Angell and Sharon Riggs. Rachel Ackerman, Hollings Scholar and Reserve Intern worked with the data and wrote the first draft. Other people that contributed to this needs assessment include: Terry Stevens, Reserve Manager; Chris Ellis, Coastal Services Center; Suzanne Shull, Reserve GIS Analyst; Atziri Ibanez, NOAA/ERD, Bree Murphy, NOAA/ERD, and Chandler Colahan, Padilla Bay educator. The Padilla Bay Reserve Education Advisory Committee also contributed including Joanne Johnson, Northwest Educational Service District 189; Mike Thimgan, teacher, Mount Vernon High School and Justine Asohmbom, WA Department of Ecology.

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## Introduction

As part of the National Estuarine Research Reserve System (NERRS), Padilla Bay National Estuarine Research Reserve (the Reserve) conducted a market analysis and a needs assessment to meet the requirements of the NERRS K-12 Estuary Education Program (KEEP). Completed in 2011, this is the first time this kind of analysis and assessment has been done for the K-12 program at this Reserve. This document describes the results of the needs assessment. The intended audience of this report is educators at the Reserve and the NERRS. Also associated with this project is an Implementation Plan describing how the Reserve plans to implement K-12 programs as a result of the needs assessment and market analysis. The Implementation Plan will be produced in 2012.

The Market Analysis (Riggs, 2011) sought to discover the existing gaps and overlap of estuary education in Puget Sound in order to determine the target audience for the needs assessment. The target audience was identified as K-12 classroom teachers in Skagit, Snohomish, Whatcom and Island counties. This Needs Assessment serves to evaluate the needs of the target audience so modifications can be made to the Reserve's environmental education programs and professional development opportunities. Guiding questions for this Needs Assessment were:

- What does our target audience (regional K-12 teachers) think they need from Padilla Bay Reserve?
- What resources is our target audience lacking for effective estuary education for their students?
- What type of professional development would be most helpful to the target audience?
- How can the Reserve improve services for this audience?

## Background

NERRS guidance for the Needs Assessment (ERD, 2008) specified required questions and required data. Required questions were questions that had to be included verbatim in a survey of the target audience. Required data was information that must be reported in this document but the Reserve had discretion on how to phrase the questions or gather the data. With this in mind, Reserve staff

created a 43-question survey including 38 closed-response questions and 5 open-ended questions. Twelve questions were required questions, 19 questions addressed the needs of required data and 12 questions were created to meet additional needs of the Reserve.

An invitation to complete the survey was distributed to the target audience in several ways:

- An email via surveymonkey.com to 1,222 teachers
- Regional curriculum specialists were asked over the phone to invite teachers in their district to complete the survey
- Invitations were sent to several regional automated email lists including Washington Science Teachers Association (WSTA), Environmental Education Association of Washington (EEAW), Northwest Aquatic and Marine Educators (NAME)
- An email was sent to just over 300 teachers on an email list maintained by the Reserve.

Survey questions are included at the end of this report. Survey items that include a rating system are averaged by assigning values to each response (e.g. 1 - not interested, 4 - extremely interested). Some items show response percentages and others show response counts; each labeled on the corresponding graph axis. "Clock Hours" refers to continuing teacher certification credits sanctioned by the Washington State Superintendent of Public Instruction.

## Executive Summary

More detail of results is provided below in this Report. A summary of significant findings is listed here.

1. Responding teachers represented 87% of the 31 school districts in the target area.
2. There were teachers from all grades, kindergarten through 12<sup>th</sup>.
3. Of the entire target population (about 8,000 teachers), just over 3% responded to the survey.
4. A large percentage (84%) of responding teachers were aware of the Reserve. This seems high but is possibly because teachers that know us are more likely to respond to our request to participate.
5. Most of the teachers that know about the Reserve (64%) have brought their students to the Reserve for a field trip.
6. Some teachers that were aware of the Reserve have not used services provided by the Reserve. The most common reason given for this is that they did not know about the services that were available.
7. Hispanic families make up the largest minority ethnic group in the target area.
8. Lack of time is the greatest barrier to teachers attending teacher workshops.
9. A majority of teachers that have not attended teacher workshops at the Reserve said they did not know about these programs.
10. Teachers said they are more likely to attend workshops that are one day in length than multi-day workshops.
11. When asked about the preferred method to receive teacher information from the Reserve, workshops in their district were favored and workshops at the Reserve were next. Printed

materials were less favored and distance learning (using technology that allows not face-to-face communication such as video conferencing and the Internet) was least favored.

12. Teachers showed a high level of interest in services for students that focus on inquiry-based, hands-on activities and science skill such as how to work with data and planning science projects. However, science content such as data analysis, writing scientific reports and the scientific methods rated lower when compared to systems concepts such as food webs, habitat, and human interactions with natural systems.
13. Most teachers not already involved in estuary studies don't understand how estuary studies relate to their curriculum.
14. More teachers use the Reserve web page than any other web resources they listed. Web resources are not extremely popular with these teachers.

## Results

The first group of questions provided information about teachers and their schools (questions 1 – 17)

**Questions 1-4.** Two hundred forty-nine teachers completed the survey. Participants represented 27 of the 31 different school districts in the target area and 108 different schools (Figure 1). There were 7,992 teachers in public schools in the target area. We had responses from 3.1% of this total.

**Figure 1. Public school districts in the target area showing the number of teachers that responded to the survey over the total number of teachers in that district.**

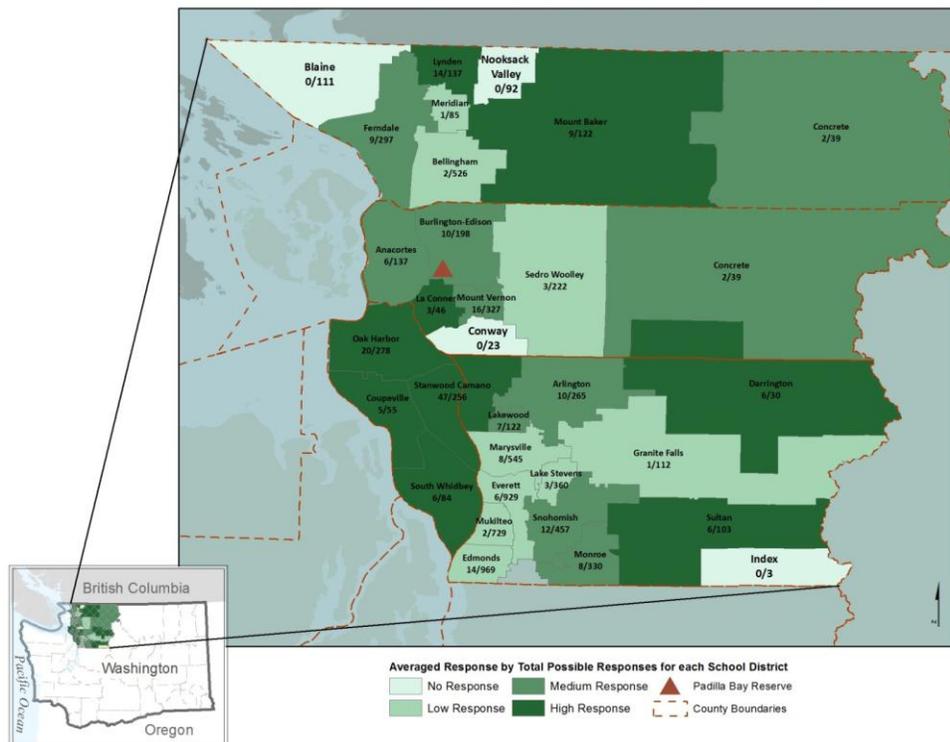
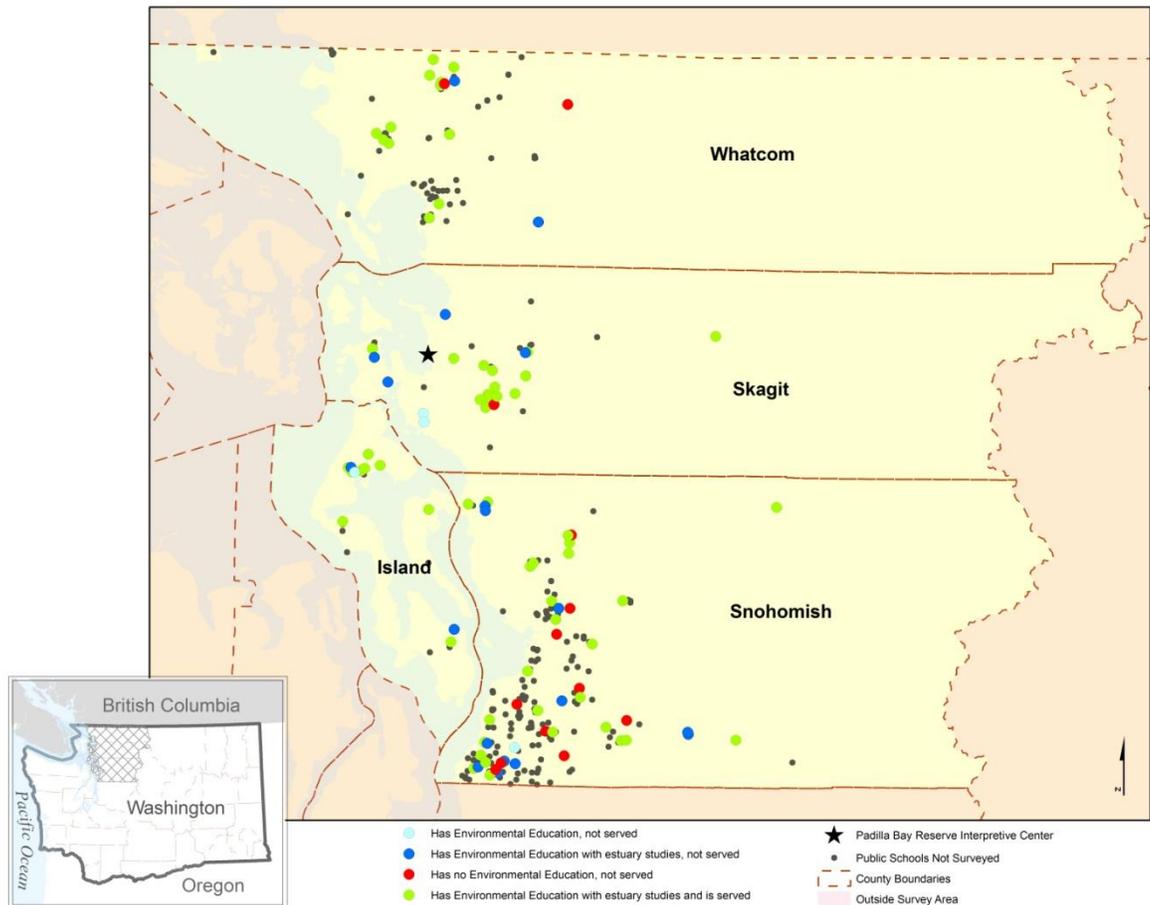
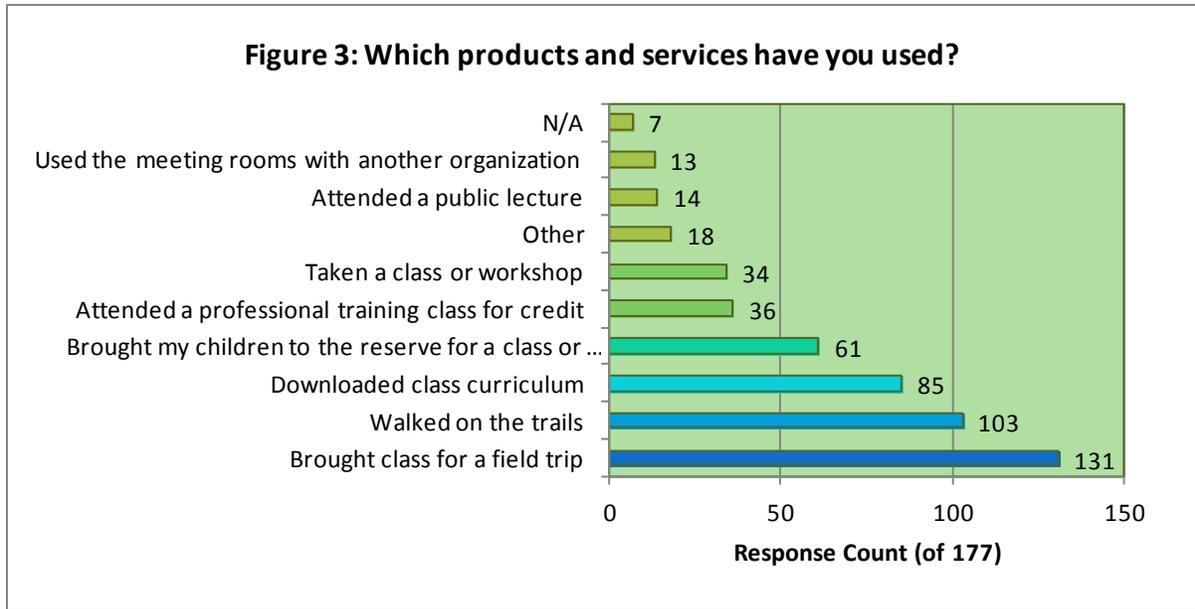


Figure 2 shows public schools in the target region. It also shows those that responded to our survey, and whether they provide environmental education, whether that environmental education includes estuary education and whether they are served by the education programs at Padilla Bay Reserve.

**Figure 2. Schools offering environmental and estuary education**



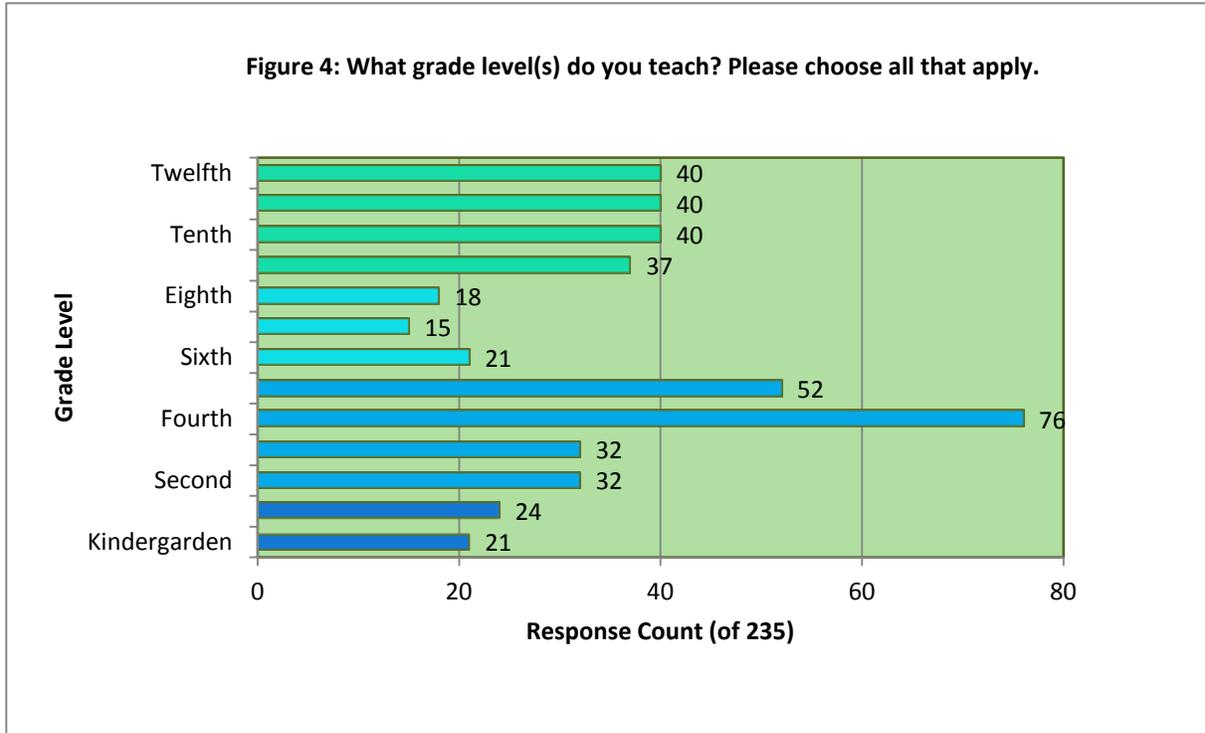
**Questions 5-8.** Of the 236 teachers that responded to Question 5, 84.3% were aware that a National Estuarine Research Reserve site exists in the state of Washington. Of the 211 “aware” respondents, 80.6% reported having utilized the site’s educational services or products in the past. In reply to question 8, 177 respondents indicated specific uses of Padilla Bay facilities: over 70% have brought a class for a field trip and nearly 60% have used Padilla Bay’s recreational hiking trails. Very few (less than 10%) have attended a public lecture or used meeting rooms with other organizations (Figure 3).



Of those that selected “other,” the only responses that did not fit into the categories above were: “research lab,” “used printed materials provided by the Reserve,” and “had a guest speaker visit my class years ago.”

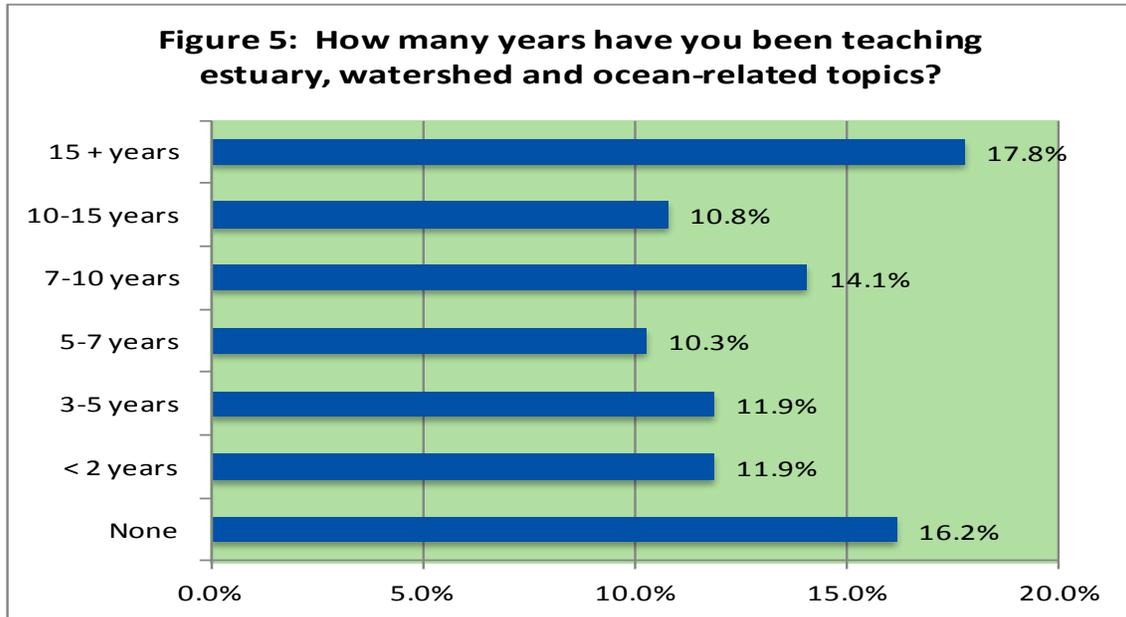
Those that knew there was a reserve but have not utilized the Reserve’s educational services or products gave these reasons: unaware of these programs (35%), finding no relevance to class curriculum (26%), too far or unfeasible (13%), too expensive (11%), Padilla Bay is studied by students in other grades in our school (11%), and Padilla Bay’s field trip schedule was already full when we called (4%).

**Questions 9-10.** Predominantly, 32.3% of the respondents teach in the fourth grade. This may have been influenced by the fact that Washington State’s fourth grade curriculum incorporates standards relating to estuary knowledge and the fact that Padilla Bay’s teacher email list has a concentration of fourth grade teachers from past visits. After the fourth and fifth grades, high school grades were evenly represented with the highest percentages (Figure 4). Seventy-two survey participants teach in grades 7-12 and about half of them (48.6%) teach science.



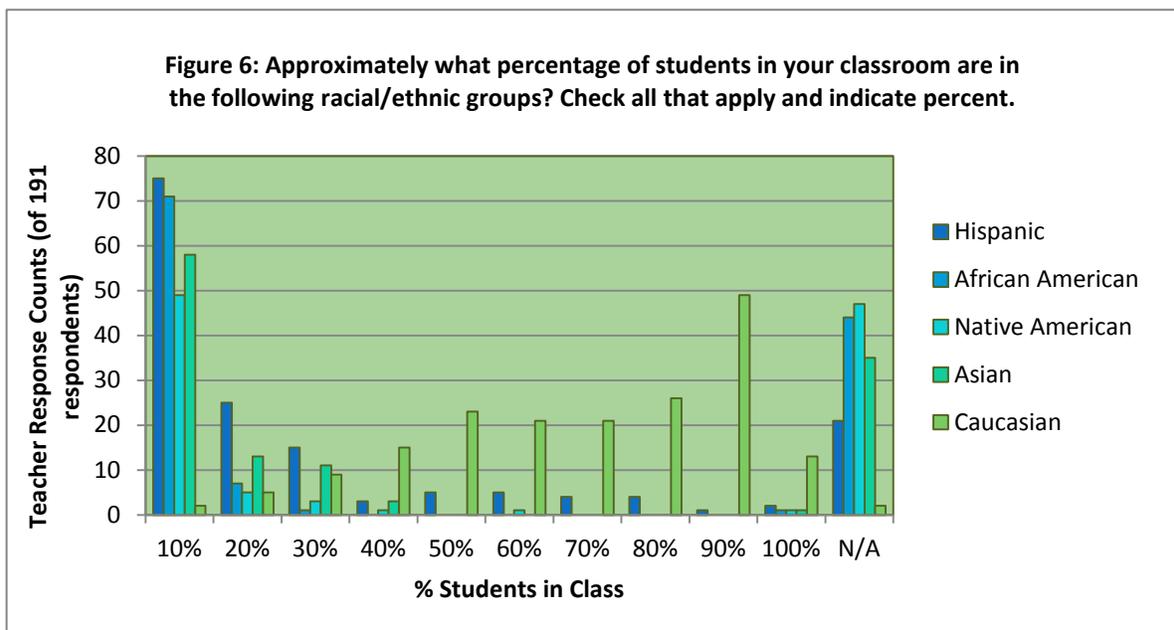
**Questions 11-12.** Of the participating teachers, 48.5% report that environmental education classes are offered at the school where they teach. Of those teachers, 75.2% (36.4% of total 255 respondents) are aware of estuary concepts being taught in the environmental curriculum. A discrepancy in this data is that 97 people answered “yes” to Question 11 (Does your school offer environmental education classes?), but 117 answered Question 12, which prompted a response only if a “yes” answer was provided for Question 11. Fifty-five teachers did not answer question 11.

**Questions 13-14.** Asked how many years of experience in teaching estuary, watershed and ocean-related topics, participating teachers were very evenly spread across the range of choices (7% to 18%) (Figure 5).



Of the 184 teachers who answered Question 14 (Have you used outdoor exploration activities with your students in the past two years?), 65.8% have and 34.2% have not.

**Questions 15-17.** Nearly all teachers (99%) reported having at least 10% minority ethnic groups represented in their classrooms (Hispanic, African American, Native American, and/or Asian) (Figure 6).



Students in the “other” category were reported to be, “bi-racial,” “Russian,” and “Middle Eastern.” According to the 2010 US Census, this four-county region has a total population of 1,109,882 (U.S. Census, 2011). The most significant minorities are Hispanic and Asian (Figure 7) (US Census, 2011).

**Figure 7: The percentage of various ethnic groups in the four-county region according to US Census data.**

Caucasian	75%
Hispanic	9.70%
Asian	6.80%
African American	2.00%
Native American	1.70%

Of surveyed teachers, 71.2% do not foresee a need for estuary, ocean and watershed-related materials in different languages. Of the 22.2% that feel they need materials in different languages, Spanish was needed the most (68.2%), followed by Russian (15.2%). Three languages were selected by one teacher each, Chinese, Japanese and Italian.

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### **The second group of questions provided information about teacher training (questions 18 – 29)**

**Questions 18-20.** Of 194 teachers responding to Question 18 (Which professional development trainings have you taken to supplement your estuary/watershed/ocean education?), 69.1% attended none of the listed trainings. “Project WET” and “Project Wild Aquatic” were attended by 22.2% and 16% of respondents, respectively. Just over 6% attended “NOAA/NERRS Teachers on the Estuary Training.” No one attended the “Green Eggs and Sand Workshop” or the “Jason Project Professional Development” which is reasonable since these are not offered in our area.

Responses for Question 19 (In the last three years, how many hours of professional development training in science have you obtained related to estuaries, watersheds and the ocean?) showed that over 62% had not had any. Another 22% had less than eight hours, 12% had one to three days and 8% more than three days.

The four highest-ranking (ratings greater than 2.0) factors preventing the respondents from attending professional teacher development were: no time/too busy (the clear favorite), high registration fees and not being able to take time off (Figure 8).

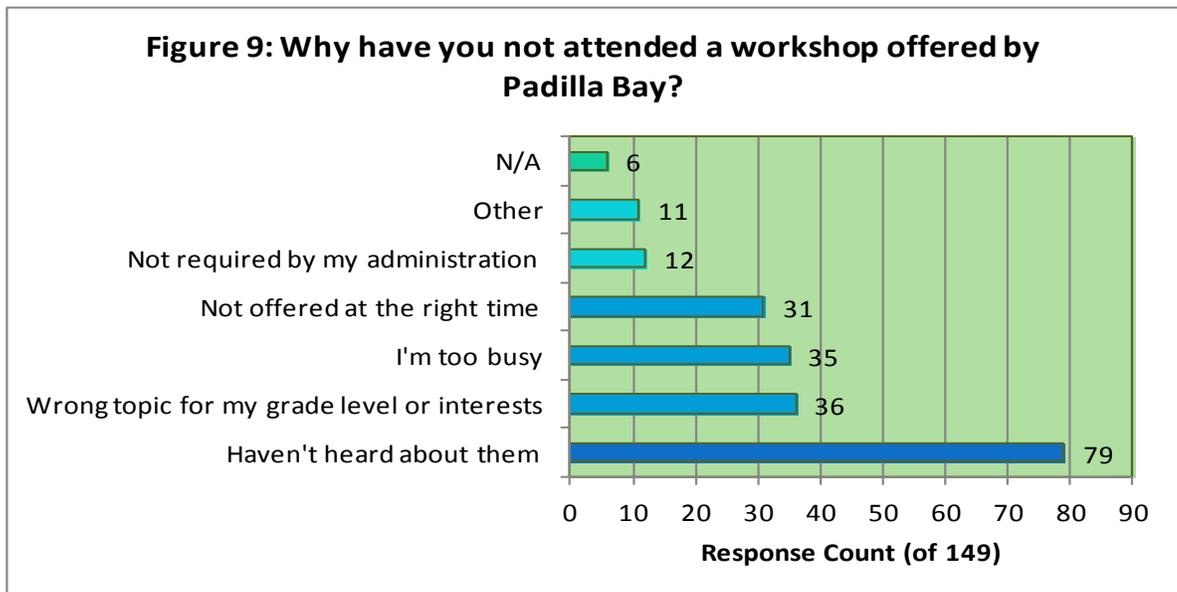
**Figure 8: What factors prevent you from attending professional teacher development?**

	Rating Average
No time/Too busy	2.44
High registration fees	2.17
Can't get time off	2.04
Travel constraints	1.93
Not relevant to my needs	1.84
Lack of administration support	1.75
Food/Lodging constraints	1.70
No educational credits are offered	1.67

Twenty responses entered in a text box fall into these groups: unaware of such programs being offered (7), irrelevance to curriculum (6), too busy (4), Strong district or personal interest in other subject areas (3), sufficient familiarity with the topics (3), new teacher (3), retiring (1) and travel constraints (1).

**Questions 21-22.** Of 196 respondents, 76.5% have never attended a teacher workshop offered by Padilla Bay staff, mostly because they have not heard about them. “Wrong topic for my grade level or interests”, “I’m too busy” and “not offered at the right time” were nearly equally represented as reasons for not attending Padilla Bay workshops (Figure 9).

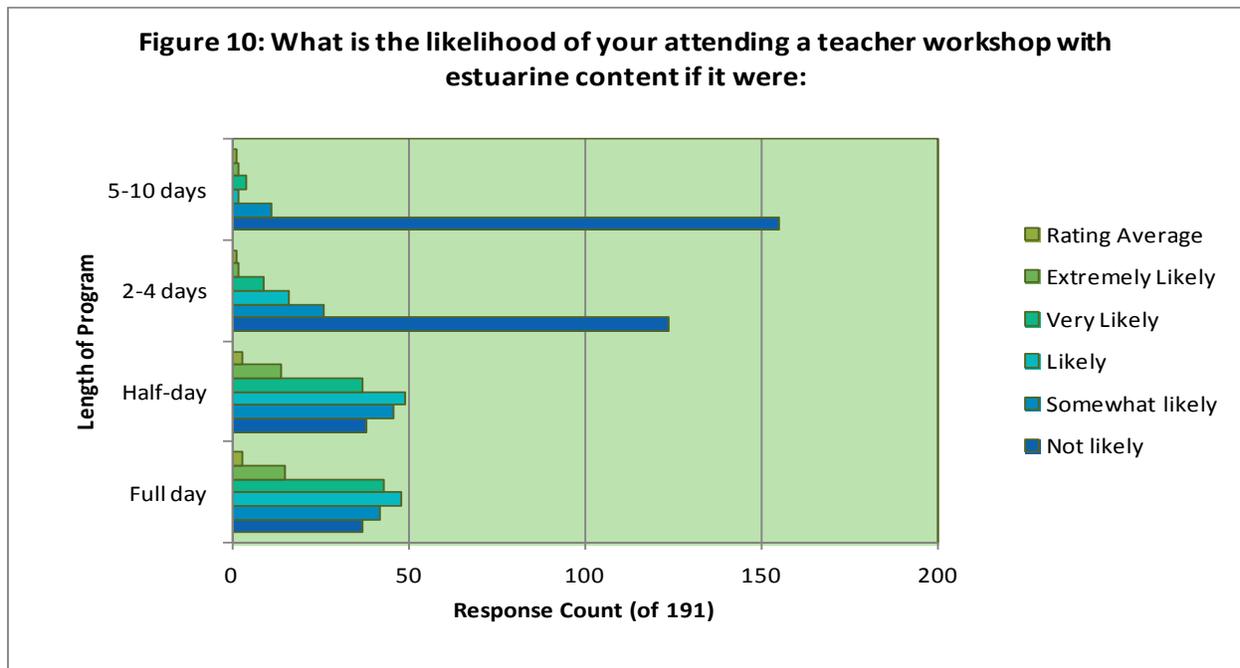
Eleven “other” responses all fit into these categories: “I don’t teach science,” “not applicable to my curriculum”, and “distance to the Reserve’s facility”.



**Questions 23-26 and 29.**

This group of questions explored how likely teachers would be to attend a training session based on given conditions. Of teachers responding, 81.2% were “not likely” to attend a workshop spanning 5-10 days in length. Reducing the length of training to 2-4 days did not improve the likelihood much. Full-day and half-day trainings were decidedly preferred (Figure 10).

	Rating Average
Full day	2.77
Half-day	2.69
2-4 days	1.53
5-10 days	1.20



These teachers are least likely to attend workshops given during winter, mid-winter or spring break. Saturdays and during the summer are the most likely to attract these teachers.

Of 191 respondents, 174 (91%) felt that clock hours were important or required. College credit is required or important to 61 (32%). 16.8% responded “none of the above”.

Of 186 responding to Question 26 (If you attend a teacher workshop, how important is it that you receive a stipend?), 47.3% replied that a stipend is “not important”. About 45% felt it was somewhat or moderately important and only 7.5% feel that a stipend is very or extremely important.

Participants find it most useful to receive teacher training from teacher workshops in their districts, with the highest rating average of 3.57, followed by “teacher workshops at Padilla Bay Reserve”

with 3.24. “Printed materials (such as books or curriculum)” came next with 3.02, with the most counts for “useful” and mid-range counts for the remaining rating categories. Distance learning (not face-to-face learning using technology such as the Internet) was favored least by respondents.

**Questions 27-28.** These questions relate to teacher interest in subjects that might be offered in teacher workshops. Based on rating averages, participants were most interested in building skills for conducting hands-on activities, followed by using computer-generated visualization of data, facilitating fieldwork/data collection, and using real-time archived data. Conducting hands-on activities received the highest counts for “extremely interested,” “very interested” and “interested” as well as the lowest count for “not interested.”

Of the provided responses for Question 28 (Please rank your level of interest in the following possible teacher workshop topics), “Inquiry-based hands-on activities outdoors” and “inquiry-based hands-on activities in the classroom” came out on top (Figure 11). “Planning for science project” and “inquiry-based hands-on activities in a non-formal setting” both received rating averages above 3.00. The responses below 2.50 were “using statistical software packages to analyze data,” “writing scientific reports,” and “using spreadsheet software to create simple charts and graphs.”

**Figure 11: Level of interest in workshop topics.**

	Rating Average
Inquiry-based hands-on activities outdoors	3.61
Inquiry-based hands-on activities in the classroom	3.57
Planning for science project	3.14
Inquiry-based hands-on activities in a non-formal setting	3.06
How to use real-time data in the classroom	2.99
How to locate real-time data for use in the classroom	2.97
Recording and analyzing data	2.86
Organizing and collecting samples	2.84
Inquiry-based hands-on activities in a laboratory	2.74
How to use archived data in the classroom	2.62
How to locate archived datasets	2.52
Using spreadsheet software to create simple graphics	2.34
Writing scientific reports	2.32
Using statistical software package to analyze data	2.00

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**The following group of questions provided information about services teachers would like to receive from the Reserve (questions 30 – 40)**

**Questions 30-31.** When prompted to consider the level of emphasis teachers will place on specific skills for the entire class year, “scientific inquiry skills” surpassed the other given topics that teachers

plan to emphasize with a rating average of 2.40 (Figure 12). “Stewardship activities” received the least emphasis along with “data analysis, statistics and probability.” But “data analysis” is still a skill that a majority (65.9%) wants their students to learn.

**Figure 12: The level of emphasis given to these science activities.**

	Rating Average
Scientific inquiry skills	2.4
Outdoor experiential activities	1.85
Lab or field work/data collection	1.74
Data analysis, statistics, and probability	1.65
Stewardship projects or activities	1.64

**Figure 13: The kinds of programs that are most useful to teachers based on rating averages:**

Padilla Bay educators coming to your classroom	3.76
Curriculum you can implement in the classroom	3.73
On-site experiential education	3.35
A library of video clips you could access/view	3.33
Educational television programs	3.05
Distance learning such as live video programs	2.70
Distance learning such as Padilla Bay	2.36
Distance learning such as webinars	2.02
Podcasts	1.98
Educational radio programs	1.79
Social networks such as Facebook or Twitter	1.42

Of the surveyed teachers, 76.4% would like to incorporate more outdoor education activities in their teaching. Only 5.6% do not wish to incorporate more outdoor activities and 18% do not know (**Question 33**). Of those who wish to incorporate more outdoor activities, 61.1% would need “instruction on conducting hands-on activities” (**Question 34**) “Instruction on facilitating inquiry-based activities” and “instruction on facilitating fieldwork and data collection” acquired 58.8% and 53.4% respectively. “Backpacks with field guides, etc.,” “guidance on implementing monitoring activities,” and “unstructured outdoor experiential activities” ranged between 35.1-49.6%. The items of least need were “administrative support” (18.3%), and “parent volunteers” (1.5%).

**Question 35.** Figure 14 shows how many class or activity periods of estuary, watershed, and/or ocean instruction students receive in a typical school year.

**Figure 14**

3-5 classes per year	25.1%
6-15 classes per year	24.0%
1-2 classes per year	17.7%
None	16.0%
More than 15 classes per year	9.1%
A portion of one class	8.0%

**Question 36.** What barriers are there to bringing your classes to Padilla Bay Reserve?

“Declining budgets” had the highest response percentage of 149 respondents, 81.2%. “Busing/transportation” followed with 64.4%. “Time availability” came third at 41.6% and lastly “restrictive curriculum” had 32.2%. Other comments included: distance, “does not apply to my specialty”, parent volunteers, rotating class schedules, “another grade level in the school goes on the trip” and “programs at the Reserve are often booked quickly”. Most “other” responses were redundant to the provided options.

**Question 37.**

This question rates the level of need for educational materials on various topics related to estuaries. Figure 15 shows that although survey participants place the least emphasis on stewardship activities, materials related to human impacts and stewardship actions reflect the highest need, indicating that teachers would like to teach about stewardship activities but are less likely to implement stewardship projects as part of the learning experience.

**Figure 15: Rates level of need for educational materials on various estuary topics.**

	Rating Average
Human Impact and Stewardship actions	3.01
Ecology	2.81
Scientific research	2.67
Use of data in the classroom	2.60
Climate change/sea level rise	2.52
Cultural Heritage	2.51

**Question 38.** Are you interested in educational materials on any of the following? Please check all that apply. (Figure 16)

**Figure 16: Response percentages**

	Rating Average
Estuary food webs	74.8%
Estuary habitats	74.8%
What actions can we take to protect water quality wherever we live?	67.5%
How do human activities in the watershed affect estuaries	66.3%
Adaptation of organisms to estuary conditions	56.4%
Fish migration/life cycles	54.6%
How climate change may affect estuary animals	54.0%
Value of estuaries to current culture	54.0%
How to gather good scientific data	51.5%
The scientific method	49.7%
How to analyze scientific data	49.1%
Invasive species in estuaries	47.2%
How to use web-based scientific datasets in the classroom	44.8%
Bird migration	42.3%
Estuary nutrient cycles	41.7%
How to form hypotheses	40.5%
How sea level rise may affect estuary plants and animals	39.9%
How sea level rise may affect humans in coastal communities	35.6%
Data analysis	35.0%
Relationship of early settlers to estuaries	33.1%
Historical tribal relationships to estuaries	29.4%
Current tribal relationships to estuaries	28.8%
How to write a scientific paper	27.0%

**Questions 39-40.** Less than half of the 173 respondents (45.7%) want to incorporate more discussion about the effects of climate change on coastal areas into the classroom while 24.9% do not and 29.5% do not know. It is possible that climate change is not relevant to the grade level curriculum and teachers are unmotivated to incorporate additional material. Of those that want to incorporate more climate change discussion, 86% reported that lesson plans and curriculum are needed followed by: activities for teachers (75.3%), background information for teachers (65.6%), reading assignments and materials for students (62.4%) and teacher workshops (44.1%). Fourteen teachers responded to question 40 that answered question 39 with “no” even though they were prompted to respond to question 40 only if a “yes” was provided for question 39.

**Web Resources (questions 41 – 43)**

**Questions 41-43.** These questions refer to resources found on the Internet. (Figure 17)

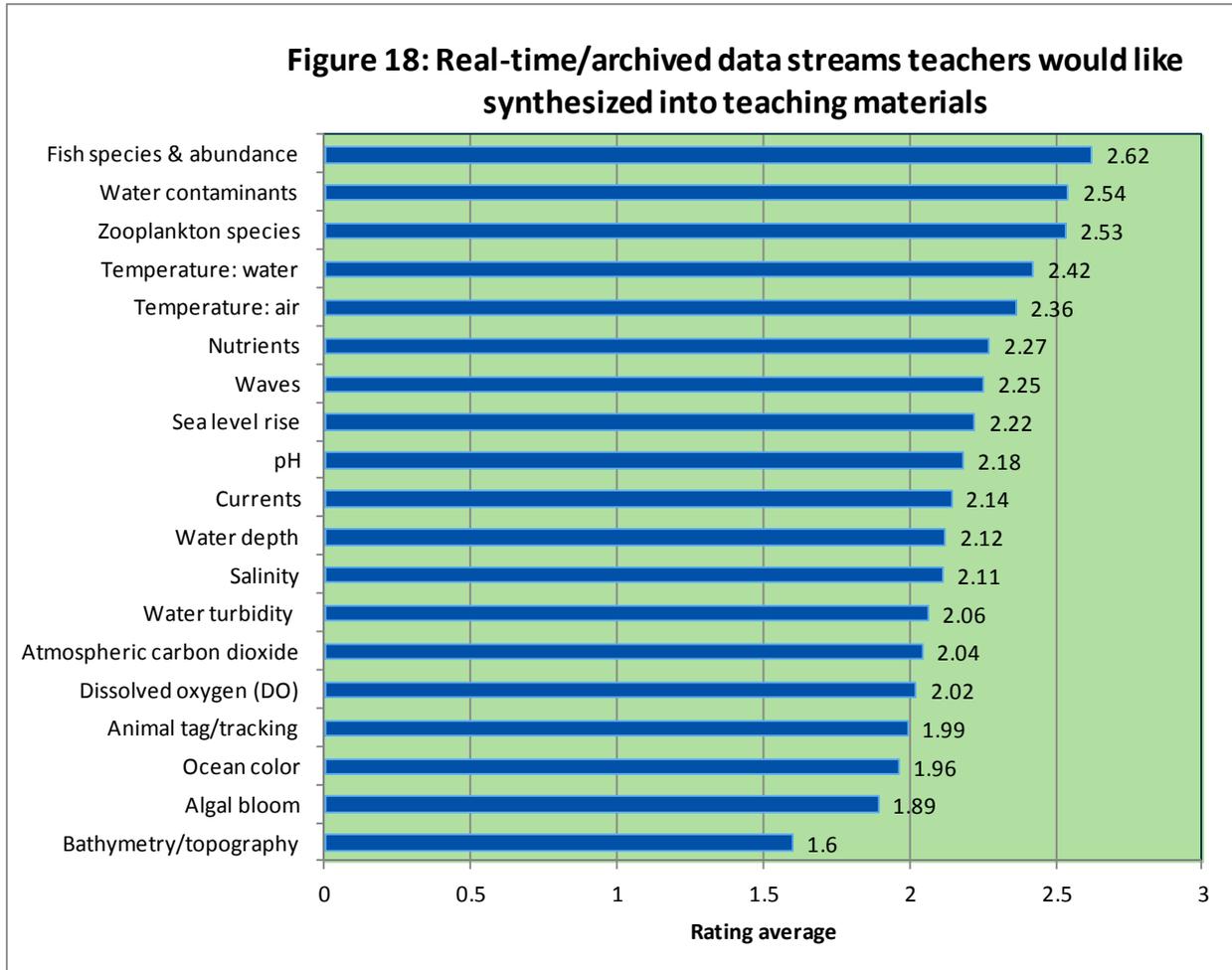
**Figure 17: Response percentages for Question 41 (From which web resources do you currently obtain estuary, watershed, and ocean information for use in your classroom?).**

	<b>Rating Average</b>
Padilla Bay Reserve’s website ( <a href="http://www.padillabay.gov">http://www.padillabay.gov</a> )	46.30%
NOAA’s education website ( <a href="http://www.education.noaa.gov">http://www.education.noaa.gov</a> )	35.00%
I do not use web resources.	26.30%
Washington State Department of Ecology’s website ( <a href="http://www.ecy.wa.gov">http://www.ecy.wa.gov</a> )	23.10%
National Estuarine Research Reserve System’s education website ( <a href="http://www.estuaries.gov">http://www.estuaries.gov</a> )	13.80%
Wikipedia ( <a href="http://wikipedia.org">http://wikipedia.org</a> )	13.80%
National Estuarine Research Reserve System’s website ( <a href="http://nerrs.noaa.gov">http://nerrs.noaa.gov</a> )	9.40%
EPA Education website ( <a href="http://www.epa.gov/enviroed/">http://www.epa.gov/enviroed/</a> )	8.10%
Local non-profit websites	6.30%
NSTA Estuaries Sci Guide ( <a href="http://sciguides.nsta.org">http://sciguides.nsta.org</a> )	5.00%
National non-profit websites	5.00%

**Question 42** was an open-ended question gathering a list of websites used by survey participants:

- Sea Doc Society, <http://www.seadocsociety.org/>
- Nooksack Salmon Enhancement Association, <http://www.n-sea.org/>
- Maxwelton Outdoor Classroom, [http://www.whidbeywatersheds.org/outdoor\\_classroom.html](http://www.whidbeywatersheds.org/outdoor_classroom.html)
- Teachers’ Domain, <http://www.teachersdomain.org/>
- United Streaming, <http://streaming.discoveryeducation.com/>
- Snohomish County Public Utility District, <http://www.snopud.com/>
- United States Geological Survey, <http://www.usgs.gov/>
- National Geographic, <http://www.nationalgeographic.com/>
- Island County Beach Watchers, <http://beachwatchers.wsu.edu/island/>

Figure 18 shows results for **Question 43**: Which of the following real-time/archived data streams would you need synthesized into age-appropriate learning materials and visualizations for your teaching?



Those who replied to Question 43 with “Other” wrote, “This is hard to answer,” “I would not use at my grade level,” “anything to do with ocean acidification,” “1st grade - not sure how I'd use” and “all of these are interesting subjects!!”

## References

Riggs, S. R. 2011. Padilla Bay National Estuarine Research Reserve Education Market Analysis Report. Washington State Department of Ecology, Shorelands & Environmental Assistance Program, Padilla Bay NERR, Mount Vernon, Washington.

U.S. Census Bureau, *State and County Quick Facts*. 17 August 2011. Web. Retrieved from <http://quickfacts.census.gov/qfd/index.html>

ERD. 2008. Market Analysis/Needs Assessment Guidance Document: for NERRS educators planning to implement the K-12 Estuarine Education Program. Estuarine Reserves Division, NOAA/OCRM, Silver Spring, Maryland.

## 1. Welcome

This survey is for classroom teachers in Skagit, Whatcom, Island, and Snohomish counties. The information gathered from this survey will help us plan and revise our K-12 estuary education programs and will help us better meet the needs of teachers.

Thank you for your time.

Glen Alexander, Education Coordinator  
Susan Wood, Estuary Educator  
Padilla Bay National Estuarine Research Reserve

## 2. Please use these definitions for this survey

Estuary: An estuary is 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.

### 1. Do you teach in one of these counties: Skagit, Whatcom, Island, Snohomish?

- Yes  
 No

## 3. Teacher and school information, cont.

### 2. What is the name of the school where you teach?

### 3. In what town or city is your school located?

### 4. What is your school district?

## 4. Teacher and school information, cont.

**5. There is a National Estuarine Research Reserve located in Skagit County, Washington, called the Padilla Bay National Estuarine Research Reserve that 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?**

- Yes  
 No

**6. If "yes" have you ever used any of their educational services or products?**

- Yes
- No

**7. If yes, which products and services have you used?**

- Brought class for a field trip
- Downloaded class curriculum
- Attended a professional training class for credit
- Brought my children to the reserve for a class or activity
- Taken a class or workshop (i.e., birding, raptor identification, poetry workshop....)
- Attended a public lecture
- Walked on the trails
- Used the meeting rooms with another organization
- N/A

Other (please specify)

**8. If no, why not? (Please skip if N/A)**

**5. Teacher and school information, cont.**

**9. What grade level(s) do you teach? Please choose all that apply.**

- K
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

**10. If you teach grades 7-12, do you teach science?**

- Yes
- No

**6.**

**11. Does your school offer environmental education classes?**

- Yes
- No
- I don't know

**12. If you answered "yes", does the environmental education include estuaries or estuary-related topics (such as salmon, watersheds, Puget Sound, marine organisms)?**

- Yes
- No
- I don't know
- N/A

**7. Teacher and school information, cont.**

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

**14. Have you used outdoor exploration activities with your students in the past two years?**

- Yes
- No

**15. Approximately what percentage of students in your classroom are in the following racial/ethnic groups? Check all that apply and indicate percent.**

	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	N/A
Hispanic	<input type="radio"/>										
African American	<input type="radio"/>										
Native American	<input type="radio"/>										
Asian	<input type="radio"/>										
Caucasian	<input type="radio"/>										

Other racial/ethnic group (please specify)

**16. Do you foresee a need in your classroom for estuary, ocean and watershed-related materials in different languages?**

- Yes
- No
- Don't Know

**17. If yes, what languages? Please check all that apply.**

- Spanish
- Japanese
- Chinese
- French
- Russian
- N/A

Other (please specify)

**8. Training**

**18. Which professional development trainings have you taken to supplement your estuary/watershed/ocean education. Please check all that apply.**

- NOAA/NERRS Teachers on the Estuary Training
- Project WET
- Project Wild Aquatic
- Green Eggs and Sand Workshop
- The Jason Project Professional Development
- None of the above

**9. Training, cont.**

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

- None
- Less than 8 hours
- 8-16 hours (1-2 days)
- 16-24 hours (2-3 days)
- 24-32 hours (3-4 days)
- 32-40 hours (4-5 days)
- More than 40 hours

**20. What factors prevent you from attending professional teacher development? Please rank the following (n/a, low, med, high)**

	Low	Medium	High	N/A
High registration fees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel/transportation constraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food/lodging constraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Can't get time off	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No time/too busy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of administration support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training is not relevant to my needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No educational credits are offered	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

## 21. Have you ever attended a teacher workshop offered by Padilla Bay staff?

- Yes
- No

## 22. If no, then why not? Please choose all that apply.

- Haven't heard about them
- Wrong topic for my grade level or interests
- Not offered at the right time
- Not required by my administration
- I'm too busy
- N/A

Other (please specify)

## 10. Training, cont.

Hooray! You're over half-way there!

## 23. What is the likelihood of your attending a teacher workshop with estuarine content if it were:

	Not likely	Somewhat likely	Likely	Very Likely	Extremely Likely
A half-day in length	<input type="radio"/>				
A full day in length	<input type="radio"/>				
2-4 days	<input type="radio"/>				
5-10 days	<input type="radio"/>				

## 24. What is the likelihood of your attending a professional training during the following times?

	Not likely	Somewhat likely	Likely	Very Likely	Extremely Likely
Evenings	<input type="radio"/>				
Weekends	<input type="radio"/>				
Saturday only	<input type="radio"/>				
Sunday only	<input type="radio"/>				
Winter, mid-winter or spring break	<input type="radio"/>				
On a school day with substitute reimbursement	<input type="radio"/>				
During the summer	<input type="radio"/>				

**25. When determining which professional development opportunities you will participate in, are clock hours or college credit "important" or "required"**

- College credit is "important" to me or my school district
- College credit is "required" by my school district or state
- Clock hours are "important" to me or my school district
- Clock hours are "required" by to my school district or state
- None of the above

**11. Training, cont.**

**26. If you attend a teacher workshop, how important is it that you receive a stipend?**

- Not important
- Somewhat important
- Moderately important
- Very important
- Extremely important

**27. Please rate your level of interest in building your skills in the following areas (i.e., rate your interest in teacher workshops on the following topics).**

	Not interested	Somewhat interested	Interested	Very interested	Extremely interested
Conducting hands-on activities	<input type="radio"/>				
Facilitating fieldwork/data collection	<input type="radio"/>				
Using computer-generated visualizations of data (e.g., maps, charts, graphs)	<input type="radio"/>				
Using real-time or archived data	<input type="radio"/>				

**28. Please rank your level of interest in the following possible teacher workshop topics.**

	Not interested	Somewhat interested	Interested	Very interested	Extremely interested
Inquiry-based hands-on activities in the classroom	<input type="radio"/>				
Inquiry-based hands-on activities in a laboratory	<input type="radio"/>				
Inquiry-based hands-on activities in a non-formal setting (such as a museum, aquarium, interpretive center)	<input type="radio"/>				
Inquiry-based hands-on activities outdoors	<input type="radio"/>				
Planning for science project (Hypothesis, experimental design, references, data analysis, equipment for sample collection, etc.)	<input type="radio"/>				
Sample collection: Organizing and collecting samples.	<input type="radio"/>				
Recording & analyzing data	<input type="radio"/>				
Writing scientific reports:	<input type="radio"/>				
Using spreadsheet software to create simple graphs or charts	<input type="radio"/>				
Using statistical software packages to analyze data	<input type="radio"/>				
How to use real-time data in the classroom (such as weather or water quality)	<input type="radio"/>				
How to locate real-time data for use in the classroom	<input type="radio"/>				
How to use archived data in the classroom	<input type="radio"/>				
How to locate archived datasets	<input type="radio"/>				

**12. Training, cont.**

Blank area for notes or responses related to training topics.

**29. What is the most useful way for you to receive teacher training? Please rate the following.**

	Not useful	Moderately useful	Useful	Very useful	Extremely useful
Teacher workshops at Padilla Bay Reserve	<input type="radio"/>				
Teacher workshops in your district	<input type="radio"/>				
Distance learning (synchronous such as web conferencing, live streaming)	<input type="radio"/>				
Distance learning (asynchronous such as non-live web streaming, video, email, audio recordings, printed material)	<input type="radio"/>				
Printed materials (such as books or curriculum)	<input type="radio"/>				

**13. Classroom**

**30. 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
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"/>

**31. Is data analysis a skill that you want your students to learn?**

- Yes
- No
- Don't know

**32. What kinds of programs would be most useful to you? Please rank the following topics.**

	Not useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
On-site experiential education	<input type="radio"/>				
Curriculum you can implement in the classroom	<input type="radio"/>				
Padilla Bay educators coming to your classroom	<input type="radio"/>				
Distance learning such as webinars (a program that is advertised, people register and then connect to the program via internet on the day of the event)	<input type="radio"/>				
Distance learning such as Padilla Bay staff visiting your classroom via the internet (such as through videoconferencing)	<input type="radio"/>				
Distance learning such as live video programs (virtual field trip)	<input type="radio"/>				
A library of video clips you could access/view	<input type="radio"/>				
Educational television programs	<input type="radio"/>				
Educational radio programs	<input type="radio"/>				
Podcasts	<input type="radio"/>				
Social networks such as Facebook or Twitter	<input type="radio"/>				

**33. Do you want to incorporate more outdoor education activities in your teaching?**

- Yes
- No
- I don't know

**34. If yes, then what do you need in order to do that?**

- Unstructured outdoor experiential activities
- Backpacks with field guides, binoculars, magnifying glasses, activity guides, etc.
- Instruction on facilitating inquiry-based activities
- Instruction on conducting hands-on activities
- Guidance on implementing monitoring activities
- Instruction on facilitating fieldwork & data collection
- Lack of administrative support
- Lack of parent volunteers
- N/A

Other (please specify)

**14. Classroom, cont.**

**35. 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 classes per year
- 3-5 classes per year
- 6-15 classes per year
- More than 15 classes per year

**36. What barriers are there to bringing your classes to Padilla Bay Reserve?**

- Time availability
- Declining budgets
- Restrictive curriculum
- Busing/transportation

Other (please specify)

**37. Please rate your level of need for educational materials on the following topics related to estuaries.**

	No Need	Moderate need	Needed	Very needed	Extremely needed
Ecology [the science that explores the interrelationships between organisms and their living (biotic) and nonliving (abiotic) environments]	<input type="radio"/>				
Use of data in classroom	<input type="radio"/>				
Climate change/sea level rise	<input type="radio"/>				
Human impacts & stewardship actions	<input type="radio"/>				
Scientific research	<input type="radio"/>				
Cultural heritage	<input type="radio"/>				

**15. Classroom, cont.**

**38. Are you interested in educational materials on any of the following. Please check all that apply.**

- Estuary nutrient cycles
- Estuary food webs
- Estuary habitats
- Adaptation of organisms to estuary conditions
- Fish migration/life cycles (e.g. salmon)
- Bird migration
- Invasive species in estuaries
- How to use web-based scientific datasets in the classroom (such as weather data, water quality data, etc.)
- How to gather good scientific data
- How to analyze scientific data
- How climate change may affect estuary animals
- How sea level rise may affect humans in coastal communities
- How sea level rise may affect estuary plants and animals
- How do human activities in the watershed affect estuaries?
- What actions can we take to protect water quality wherever we live?
- The scientific method
- How to form hypotheses
- Data analysis
- How to write a scientific paper
- Historical tribal relationships to estuaries
- Current tribal relationships to estuaries
- Relationship of early settlers to estuaries
- Value of estuaries to current culture

**39. Do you want to incorporate more discussion in your classroom about the effects of climate change on coastal areas?**

- Yes
- No
- Don't know

**40. If yes, then what do you need to do that? Please check all that apply.**

- Lesson plans and curriculum
- Teacher workshops
- Background information for teachers
- Reading assignments and materials for students
- Activities for students

Other (please specify)

## 16. Web resources

**41. From which web resources do you currently obtain estuary, watershed, and ocean information for use in your classroom. Please check all that apply.**

- I do not use web resources.
- NOAA's education website (<http://www.education.noaa.gov>)
- National Estuarine Research Reserve System's website (<http://nerrs.noaa.gov>)
- National Estuarine Research Reserve System's education website (<http://www.estuaries.gov>)
- Padilla Bay Reserve's website (<http://www.padillabay.gov>)
- Washington State Department of Ecology's website (<http://www.ecy.wa.gov>)
- NSTA Estuaries Sci Guide (<http://sciguides.nsta.org>)
- EPA Education website (<http://www.epa.gov/enviroed/>)
- Wikipedia (<http://wikipedia.org>)
- National non-profit websites
- Local non-profit websites

Other (please specify)

**42. If you checked "national non-profit websites" or "local websites" in the question above, would you please list them here.**

## 17. Web resources, cont.

**43. Which of the following real-time/archived data streams would you need synthesized into age-appropriate learning materials and visualizations for your teaching? Please rank according to need.**

**\*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.**

	Not needed	Somewhat needed	Needed	Very needed	Extremely needed
Algal blooms	<input type="radio"/>				
Animal tag/tracking	<input type="radio"/>				
Atmospheric carbon dioxide	<input type="radio"/>				
Bathymetry/topography	<input type="radio"/>				
Currents	<input type="radio"/>				
Dissolved oxygen (DO)	<input type="radio"/>				
Fish species & abundance	<input type="radio"/>				
Nutrients	<input type="radio"/>				
Ocean color	<input type="radio"/>				
pH	<input type="radio"/>				
Salinity	<input type="radio"/>				
Sea level rise	<input type="radio"/>				
Temperature: air	<input type="radio"/>				
Temperature: water	<input type="radio"/>				
Water depth	<input type="radio"/>				
Water contaminants	<input type="radio"/>				
Water turbidity (clarity/cloudiness)	<input type="radio"/>				
Waves	<input type="radio"/>				
Zooplankton species	<input type="radio"/>				

Other (please specify)

## 18. Thank you!

Thank you so much for taking the time to complete this survey. Your answers will help inform the direction of our estuary education and teacher training program. <http://www.surveymonkey.com>