Padilla Bay Reserve
B-WET Education Programs Evaluation Project

Prepared by Shelley Stromholt, Stromholt Evaluation
August 2010
Acknowledgments

This evaluation project was a collaborative effort between the Padilla Bay Reserve staff and Stromholt Evaluation and was completed with the assistance of numerous others. Funding for the project was generously provided by the Padilla Bay Foundation. Special thanks are due to Katie Gell, of the Padilla Bay Reserve staff, for the time and energy she invested in assessment tool design and data collection and analysis, which contributed immensely to this project. Glen “Alex” Alexander and Susan Wood were instrumental in their contributions of expertise and support throughout this project. Our appreciation also goes to the teachers and students who shared their thoughts and ideas with us along the way.
Introduction
Padilla Bay National Estuarine Research Reserve is a governmental organization for research and education about the Salish Sea. Teachers, students and other groups learn about this valuable estuarine system. Through field trips, teacher workshops, and public programs, Padilla Bay Reserve strives to increase understanding and appreciation of estuaries and foster stewardship and engagement through education. In April 2010, Stromholt Evaluation was contracted to partner with the staff of the Padilla Bay Reserve to conduct an evaluation of a Bay-Watershed Education Training (B-WET) education program. About 7000 students per year in grades K-12 visit the Reserve and take part in indoor and outdoor lessons taught by environmental educators as part of their studies. The focus of the evaluation was on upper elementary students and teachers who took part in the Padilla Bay professional development workshops about estuary education.

The primary objectives of the evaluation project were to:
1. Create a logic model for this B-WET program, including an evaluation plan
2. Review and analyze the current evaluation tools, methods and results
3. Report recommendations for improvements

Results Overview
This evaluation was a collaboration between the outside evaluator and the education team at Padilla Bay. We worked together to review and clarify the goals of the Padilla Bay educational programs, develop appropriate assessment tools that address the goals, and examine the results of the pilot evaluation carried out in spring, 2010. The staff was enthusiastic and thoughtful in considering their programs and the learning outcomes for students and teachers. Katie Gell, of the Padilla Bay Reserve, was able to devote many hours to collecting, coding, and analyzing the student work that came back. The team reviewed her findings, as well as the work of the consultant on the teacher surveys, to agree on revisions and give input for future evaluation. As a result, the evaluation and this report draw heavily on the outcomes of Katie’s work. The results of this evaluation project were very positive. We found that the Padilla Bay programs have a very positive impact on students and teachers alike. The assessment tools that we developed together address all of the goals that the staff identified as integral to their programs. The tools yielded data that was both rich and informative, providing educators with pre and post data, as well as a better understanding of what students walk away with. Teachers had an overwhelmingly positive response to the professional development training they received from Padilla Bay and have shared what they have learned with their students and other teachers. Several teachers reported a willingness to share their work and examples of student learning with Padilla Bay in an effort to show the merits of the program.
<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities</th>
<th>Participants</th>
<th>Short-term</th>
<th>Medium-term</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>Field Study: Students investigate the local environment of Padilla Bay through experiential activities in the field and in their classroom. Focus is on conservation, appreciation and understanding of relationships with the environment including stewardship. Teachers are encouraged to do pre and post trip lessons in the classroom to support activities at Padilla Bay Reserve. Logistics: Long (four to five hours) or short (90 minutes) program. The long program may include Estuary Soup Skit, the Padilla Bay video, exploration of the mud flats, plankton sampling, use of microscopes and the &quot;chalk talk&quot; showing how estuaries have changed in Puget Sound over time due to human development. The short program includes all of these activities except the visit to the beach and use of microscopes.</td>
<td>Upper elementary school students</td>
<td>Participants will: Demonstrate interest in and enthusiasm for estuaries. Understand the interconnectedness of natural and social communities, including their own position. Describe the cultural, economic, aesthetic, biological and environmental values of healthy estuaries and watersheds. Recognize how science can be used to learn more about and improve the health of estuaries. Describe stewardship behaviors over which they have control that affect estuary resources. Share information with parents and peers. Show citizenship behavior back in the classroom.</td>
<td>Participants will: Show continued interest and enthusiasm for estuaries. Develop increased connection to their local environment and community. Become inspired to take initiative and responsibility for conservation behaviors. Demonstrate increased knowledge of environmentally sound behaviors. Show citizenship behavior across settings.</td>
<td>Participants will: Take action to promote conservation in their community. Apply concepts learned in this program to their everyday life and community. Participate in government and other citizenship activities.</td>
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<tr>
<td>Program Budget</td>
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<tr>
<td>Materials</td>
<td></td>
<td></td>
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<tr>
<td>Curriculum:</td>
<td>Developed by staff and partner teachers and provided online.</td>
<td></td>
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<tr>
<td>Staffing:</td>
<td>Program Instructors Program Coordinator Other org. staff Volunteers</td>
<td></td>
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<tr>
<td>Partners:</td>
<td>Public and private schools K-12</td>
<td></td>
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</table>

*Figure 1. Logic Model for upper elementary programs at Padilla Bay Reserve*
Analysis of results from current programs

Student Program Evaluation: Tool Development

The evaluation of Padilla Bay programs started with the creation of a logic model. After meeting with education staff, and collecting information from staff and teachers who have participated in Padilla Bay Reserve’s school programs, the consultant worked with the education team to create a logic model that focuses on the inputs and outcomes for upper elementary students (see Figure 1). In doing this we agreed that though the existing assessment for students, a multiple choice survey focused on content, was a useful tool for measuring what students learned, there was a need to create another tool that addressed the wide range of other outcomes that staff believed were a part of their program. To keep the pilot evaluation manageable, we created an evaluation plan in which we chose to focus on five of the program outcomes (see Appendix 2). The evaluation plan illustrates potential indicators that we would see if students had been successful in achieving the outcomes. We also tied each outcome directly to an assessment tool. After field trips to Padilla Bay, teachers implemented either the multiple choice survey or piloted a new student “letter” tool, back in the classroom. The multiple choice survey included one open-ended question asking students to identify the most important thing they learned at Padilla Bay. The letter tool included a series of open-ended questions in the form of a letter to Padilla Bay staff.

In the spring 2010 pilot, 392 students took the survey and 155 students completed the letter tool. After piloting the tools and reviewing the student data, the education team reviewed the evaluation plan to make sure the tools used in the pilot did in fact address the outcomes in the evaluation plan. The team agreed that all of the outcomes in the evaluation plan were addressed by the student letter, with the exception of Outcome 4, and several were also met by the survey. The overlap in tools addressed the indicators in different ways, allowing for a wide range of possible answers and ways of answering. Staff agreed that Outcome 4 is an important outcome of the program that could be made more explicit for students and would then be better addressed by the student letter tool.

The education staff agreed that by using the two different tools, they had the opportunity to gain a broad sense of what students are learning. Even if ongoing data collection in future years is not needed, the process of creating the logic model clarified curricular goals and has already proved valuable in helping the educators to learn from their students about the success of their programs. While the educators learned a lot from the open-ended questions, they also found that pre/post survey was particularly helpful in understanding what students already knew coming in to the program.

A summary of highlights from the spring pilot evaluation is found below (see Figure 2). This figure links the evaluation plan, including several outcomes chosen from the logic model, to the data collected in the student survey and letter assessment tool.
### Student Program Evaluation: Learning Outcomes

<table>
<thead>
<tr>
<th>Outcomes linked from Logic Model</th>
<th>Data</th>
<th>Student Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1: Attitudes</strong></td>
<td>Demonstrate interest in and enthusiasm for estuaries.</td>
<td>More than 90% of students reported that they enjoyed the field trip and more than 50% identified the beach as their favorite part. Teachers who responded to the question reported an increase in student enthusiasm in their classroom.</td>
</tr>
<tr>
<td><strong>Outcome 2: Content Knowledge</strong></td>
<td>Understand how a healthy estuary functions</td>
<td>98% of students were able to identify at least one interdependent relationship in an estuary.</td>
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<tr>
<td><strong>Outcome 3: Content Knowledge</strong></td>
<td>Describe the cultural, economic, aesthetic, biological and environmental values of healthy estuaries and watersheds</td>
<td>All students who responded were able to name at least one way that humans depend on healthy estuaries, including food, oxygen, research, and recreation, among other answers.</td>
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<tr>
<td><strong>Outcome 4: Science Process</strong></td>
<td>Recognize how science can be used to learn more about and improve the health of estuaries</td>
<td>Most students were not able to do satisfactorily. Future work is needed to clarify the nature of scientific investigations for students.</td>
</tr>
<tr>
<td><strong>Outcome 5: Awareness</strong></td>
<td>Describe stewardship behaviors over which they have control that affect estuary resources</td>
<td>96% of students were able to identify at least one thing they could personally do to keep estuaries healthy.</td>
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</tbody>
</table>

*Figure 2. Results for the five outcomes from the logic model which were the focus of the pilot evaluation plan.*
Teacher Workshop Evaluation: Tool Development

Padilla Bay Reserve education staff wanted to learn more about how the teacher professional development program is impacting student learning and teacher development. To this end, we revised and implemented an existing teacher survey nearly a year after the 2009 workshop in order to learn about what teachers were doing in their classrooms. 24 teachers participated in one of two workshops and nine teachers responded to the survey. Staff were interested in how teachers were using what they learned at the workshop back in the classroom and teachers’ perceptions of the impact of this work on their students. In addition, staff wanted to know how the curriculum work teachers were doing aligned with the Meaningful Watershed Experience goals and how they were sharing their work in this area with other teachers. Teachers who participated in the Teacher Workshop in summer 2010 also took a survey regarding their experience.

Teacher Workshop Evaluation: 2009 Outcomes

Teachers who participated in the 2009 Estuary Education Teacher Workshop reported doing a variety of estuary-based activities with their students. These activities ranged from second-grade teachers working with their students to create a mural of the plants, animals, and habitats in an estuary to taking fourth graders to the local water treatment plant to creating graphs based on data students collected at the beach. One pair of teachers reported that they did estuary-based activities in conjunction with the FOSS science kits. Two of the respondents were non-traditional educators who have used what they learned in a variety of informal educational settings.

All teachers who responded to the survey reported using lessons and activities they created themselves and including a field trip to an estuary. Eight of the nine who responded also reported using lessons from the Padilla Bay website and curriculum, while six used those presented at the Padilla Bay Workshop. Most teachers have also used some kind of journaling activity, a method encouraged in the workshop.

Eight teachers reported that due to their participation in the Padilla Bay workshop, they believed their students showed improvements in interest and enthusiasm for the environment, content knowledge, including the interconnectedness of humans and nature, and stewardship behavior. Six teachers reported that they had evidence of these gains. Seven teachers indicated that they believed their students showed an increased interest in science or science activities, while three stated that they have evidence of this.

Generally, teachers felt more comfortable and confident with the background information needed to teach about...
estuaries. They felt enthusiasm and saw it in their students as well. They have been sharing with others and feel they have new teaching methods, resources, and contacts as a result of participation in the workshop. Teachers are commonly sharing what they learned in the workshop with one or two partner teachers. Some have shared with the general staff at their school and in informal conversations.

Overall, teachers stated that their lessons met at least some of the Meaningful Watershed Experiences (MWE) expectations. The results are tallied below.

| Make a direct connection to the marine or estuarine environment. | 7 Yes | No | Unsure |
| Are an integral part of the instructional program. The experience is a part of the curriculum being taught in the classroom. | 4 Yes | No | 3 Unsure |
| Part of sustained activity. It includes preparation, an outdoor experience, analysis, and reporting. | 6 Yes | 1 No | Unsure |
| Reflects an integrated approach to learning. Other disciplines besides science (art, history, English, economics) are incorporated. | 5 Yes | 1 No | 1 Unsure |
| Projects involve external sharing and communication. Students share what they have learned with each other and the community (i.e., newsletters, journals, community presentations, letters). | 4 Yes | 2 No | 1 Unsure |

*Figure 3. Teachers felt that the lessons they taught met some of the MWEs better than others.*

**Teacher Workshop Evaluation: 2010 Outcomes**

The Estuary Education Teacher Workshops in Olympia and Padilla Bay in summer 2010 provided high-quality, meaningful training to 19 teachers. Teachers were overwhelmingly positive about their experience, citing the workshop leaders’ enthusiasm and organization consistently as highlights of the workshops.

All of the teachers stated that the workshop increased the likelihood that they would include a field experience for their students. One teacher said, “the resources I received in class prompted me to plan a beach field experience”. Teachers felt that it was important that they were able to try activities, use observation skills, and learn from their peers, making what seemed overwhelming in the beginning seem very accessible for them by the end of the workshop. Another teacher mentioned, “I feel prepared to lead my class in a series of meaningful field trips with a different main goal for each- and an interconnecting goal”.

The Meaningful Watershed Education Experiences (MWEE) “opened a whole new world” to teachers. Across the board, teachers felt that the framework provided structure for their units/lesson plans, while emphasizing goals that should be included in all curricula. Many teachers commented on how useful it was to talk about the MWEE with the other teachers from diverse backgrounds and experiences because it helped them to think about best practices in the classroom from a variety of viewpoints. “MWEE has helped me
justify my belief in project based, inquiry driven, cross curricular education." One teacher said, “This workshop was a meaningful watershed experience”. Another stated, “The MWEEs were helpful to me in reinforcing the need/necessity to make science relevant, engaging and current. I plan to share the information we received from B-WET with my science department and other colleagues in my district”. Teachers voiced the importance of allowing “students to understand their role as a member of a watershed” and how “the application of field study with inquiry gives real world context for children to draw more visceral meaning and experience”.

Other teachers mentioned specific aspects of the MWEEs that they appreciated, including the notebooks, the positive environmental message, the chance to “try on” being a scientist, collaboration with others, and the wealth of resources available to teachers and classrooms. Teachers also liked the inclusion of KWL charts, a graphic organizer designed to build on students’ prior knowledge. Using this organizer, teachers and students work together to construct three lists during the course of a unit or activity, including: what we Know, what we Want to know, what we’ve Learned.

Every teacher who participated in the workshops said that they plan to use the teaching materials introduced in class. The websites and online curriculum were mentioned repeatedly as resources that could be used for years to come. Several teachers mentioned the importance of using music in their classrooms and their appreciation of its inclusion in the materials provided. Videos, the barnacle inquiry lesson, and identification charts were also mentioned by more than one teacher. Generally, teachers felt that they left the workshop with a ton of new ideas, inspired and ready to start implementing field and classroom based investigations about estuaries.

The feedback about the workshop itself was very positive, but there were a few suggestions for improvement. Some teachers mentioned that they felt they needed more assistance with the names and taxonomy of critters and suggested using some kind of visual to help, possibly powerpoint slides, an id list, or just writing things on a white board. One teacher felt that they missed out on what others found in the field investigation and would have liked more time and organization for sharing. The workshop included a lot of information in a short time, and one or two teachers stated or implied that it was a little bit overwhelming. Another teacher noted that there is a need for more information upfront about the gear needed that would help the teachers prepare appropriately for being outside.

Teachers appreciated that the workshop leaders were prompt, enthusiastic, and helpful. Snacks, drinks, and a relaxed atmosphere helped them feel comfortable and ready to engage. The balance of classroom and field experiences was just right and what most teachers would like to plan for their students. Several teachers said that they felt the workshop leaders were able to create a community of learners in the workshop, allowing teachers to learn from each other, network, and support one another. One teacher felt overwhelmed at first, but by the end of the workshop felt ready and prepared to implement the skills, content, and activities gained in the workshop.
Recommendations for future evaluation

Based on the outcomes of the evaluation pilot in spring 2010 and the needs of the program and staff, there are several recommendations for future evaluation.

Student Evaluation

Staff agreed that using the mixed methods approach of the survey and the student letter tool was helpful. The survey allowed them to see change in student knowledge from pre to post, while the open-ended questions of the student letter provided an opportunity to see deeper learning. Due to concerns about the time required for teachers to implement the tools and the staff capacity at Padilla Bay to manage the data, the education staff agreed to target specific age groups with the two tools, though each tool would be available to all teachers. Though the survey data is easier to manage, the education team has a strong commitment to providing opportunities for students to communicate what they have learned in a variety of ways, which is part of the Meaningful Watershed Experience Padilla Bay is providing.

Recommendations for future evaluation of the student programs:

- Identify staff time available for assessment, especially as the staff person who has spent significant time working on assessment will be leaving soon. This will have the biggest implications for what is possible to take on in the future. Keep track of how much time is required for each task (coding, organizing, spreadsheets, etc) as you go and decide how much time can be dedicated to assessment with or without a new staff member. If possible, consider which tasks could be given to volunteers or high school interns.
- Offer teachers a choice to do one, both, or no assessment tools. Consider how many classes the team would like to do assessments and how many teachers will opt in. If there is a large response rate, randomly select classes or student work to code and analyze. Ideally, the classrooms that participate will (at least somewhat) represent the breadth of kinds of classrooms (urban, rural, age, student demographics, etc) that participate in the educational programs, so contact of specific teachers may be desirable if the response rate is not as large or as varied as is desirable.
- Each year, consider creating a new evaluation plan. Two possibilities for doing this include:
  - Continue to focus on the same five outcomes used in spring 2010, especially Outcome #4. Staff agreed that it was not well addressed in the assessment tools in spring 2010, but it was acknowledged that it may not be an explicit part of the program. It was considered worthwhile to retain this outcome and to consider how/if programmatic changes should be made.
  - Choose new outcomes from the logic model to focus on. This might require revision of assessment tools or development of new tools, but will help the team continue to learn about the program and their teaching, which was one of the biggest benefits they identified in this process.
In relation to Outcome #4, make the investigations portion of the field trip or classroom work more explicit to students as a way to learn about estuaries. This could include a conversation or activity about how scientists ask and answer question and the methods they might use to learn more about estuaries.

- Collapse the coding scheme for open-ended questions where possible. Codes should be grouped into approximately 10-12 codes to make coding more manageable.

Teacher and Curriculum Evaluation

The education staff agreed that the teacher workshop survey met the program needs and does not need to be revised at this time. A teacher field trip survey has been sent to teachers with the student assessment documents, but very few teachers have returned these to date. The goal of this short survey is to gather information about the activities the students are doing the assessments have taken part in. This information will help the educators better understand the results of the student assessments, especially as the classrooms vary in their activities and the material covered. Revisions were made to this document to make it more clear, concise, and easy for teachers to quickly fill out and return with the assessments.

Recommendations for future evaluation of the teacher professional development:

- Continue to implement surveys for teachers regarding the professional development. These surveys offered useful information for how teachers are using what they learned with Padilla Bay that can inform future professional development workshops and curriculum development.
- Contact teachers who have agreed to be contacted, to collect examples of student work that demonstrate the outcomes in the logic model.
- Increase the response rate for the professional development workshop survey and the fieldtrip curriculum surveys teachers receive with the student assessments by emailing or calling to remind teachers. If needed, call teachers to implement the fieldtrip curriculum survey by phone.
- If it is a priority, consider how to help teachers meet the MWEs consistently. Find out how teachers who have indicated that they have met the MWEs are doing so and what support could be provided to better meet these goals.
Appendices
Appendix 1: Logic Model
Appendix 2: Evaluation Plan
Appendix 3: Revised Student Letter
Appendix 4: Revised Student Survey
Appendix 5: Teacher Workshop Survey
Appendix 6: Teacher Fieldtrip Curriculum Survey
Appendix 7: Teacher instructions for implementing student assessments
### Logic Model: Upper Elementary Programs Spring 2010
Padilla Bay National Estuarine Research Reserve

**Program Goals:** Through a field trip to Padilla Bay supported by activities back in the classroom, students and teachers investigate human relationships with their local estuary. Program staff and teachers partner to engage students through direct exploration of habitat using scientific methods, materials, and skills. Experiential curriculum focuses on fostering appreciation, enthusiasm, and understanding of local natural and social communities in order to promote conservation and stewardship.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short-term</th>
<th>Medium-term</th>
<th>Long-term</th>
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</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>Field Study: Students investigate the local environment of Padilla Bay through experiential activities in the field and in their classroom. Focus is on conservation, appreciation and understanding of relationships with the environment including stewardship. Teachers are encouraged to do pre and post trip lessons in the classroom to support activities at Padilla Bay Reserve. Logistics: Long (four to five hours) or short (90 minutes) program. The long program may include Estuary Soup Skit, the Padilla Bay video, exploration of the mud flats, plankton sampling, use of microscopes and the &quot;chalk talk&quot; showing how estuaries have changed in Puget Sound over time due to human development. The short program includes all of these activities except the visit to the beach and use of microscopes.</td>
<td>Participants: Upper elementary school students</td>
<td>Participants will: Demonstrate interest in and enthusiasm for estuaries Understand the interconnectedness of natural and social communities, including their own position Describe the cultural, economic, aesthetic, biological and environmental values of healthy estuaries and watersheds Recognize how science can be used to learn more about and improve the health of estuaries Describe stewardship behaviors over which they have control that affect estuary resources Share information with parents and peers Show citizenship behavior back in the classroom</td>
<td>Participants will: Show continued interest and enthusiasm for estuaries. Develop increased connection to their local environment and community Become inspired to take initiative and responsibility for conservation behaviors Demonstrate increased knowledge of environmentally sound behaviors Show citizenship behavior across settings</td>
<td>Participants will: Take action to promote conservation in their community Apply concepts learned in this program to their everyday life and community Participate in government and other citizenship activities</td>
</tr>
</tbody>
</table>

**Program Budget**

- Materials
- Curriculum: Developed by staff and partner teachers and provided online
- Staffing: Program Instructors, Program Coordinator, Other org. staff, Volunteers
- Partners: Public and private schools K-12
**Evaluation Plan:** Upper Elementary Programs Spring 2010

<table>
<thead>
<tr>
<th>Logic model link</th>
<th>Outcome</th>
<th>Indicators</th>
<th>Tool</th>
<th>Managing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1:</strong></td>
<td>Students will...</td>
<td>How will we know it?</td>
<td>How will we gather the data?</td>
<td>When will the information be collected?</td>
</tr>
<tr>
<td><strong>Attitudes</strong></td>
<td>Demonstrate interest in and enthusiasm for estuaries</td>
<td>Students indicate that they enjoyed learning about estuaries and/or that they would like to learn more.</td>
<td>Student letter</td>
<td>May 2010</td>
</tr>
<tr>
<td></td>
<td>Understand how a healthy estuary functions</td>
<td>Students identify relationships between specific elements in healthy estuaries and watersheds. Students can hypothesize about the impacts of an environmental event and/or human behaviors.</td>
<td>Student letter Survey</td>
<td>May 2010</td>
</tr>
<tr>
<td><strong>Outcome 3:</strong></td>
<td>Describe the cultural, economic, aesthetic, biological and environmental values of healthy estuaries and watersheds</td>
<td>Students explain how humans benefit from healthy estuaries and watersheds.</td>
<td>Student letter Survey</td>
<td>May 2010</td>
</tr>
<tr>
<td><strong>Content Knowledge</strong></td>
<td>Recognize how science can be used to learn more about and improve the health of estuaries</td>
<td>Students identify important steps or the kinds of investigations they might do to learn more about estuaries.</td>
<td>Student letter Survey</td>
<td>May 2010</td>
</tr>
<tr>
<td><strong>Awareness</strong></td>
<td>Describe stewardship behaviors over which they have control that affect estuary resources</td>
<td>Students identify personal choices that will help the environment.</td>
<td>Student letter</td>
<td>May 2010</td>
</tr>
</tbody>
</table>

Padilla Bay National Estuarine Research Reserve
Padilla Bay Student Letter

Dear Students,

Thanks for visiting Padilla Bay and taking the time to learn about estuaries. We would like to know if you enjoyed your trip and what you learned from it. Please write us a letter and answer the following questions –

1. Did you have fun on the field trip and why? What part was the most fun?
2. Describe one way that plants, animals, and non-living things in an estuary depend on each other. Please be specific.
3. What is one thing you can do to keep estuaries healthy and clean?
4. What is one reason why humans need healthy estuaries?
5. Is there anything else you would like to tell us about your trip to Padilla Bay Estuary Reserve?

Dear Padilla Bay teachers,

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(Please write on the back of the page if you need more space.)
Padilla Bay Student Survey

Circle One:  **Pre-trip**  **Post-trip**

Date__________________ Name ________________________________

School ________________________________

Grade _______________ Teacher ________________________________

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**Estuary Questions**

1. What is an estuary?
   a. A place where wildlife is protected from hunting and fishing  
   b. A muddy beach  
   c. A place where fresh water from the land mixes with salt water from the ocean  
   d. A bay where building and development are not allowed  
   e. Not sure

2. What is a watershed?
   a. A tank to collect rainwater for gardening  
   b. The area of land that drains into a body of water  
   c. The top blades of eelgrass that shed rainwater  
   d. All the animals that live in a single body of water  
   e. Not sure

3. How are pipefish adapted to life in an eelgrass meadow?
   a. They look like eelgrass (thin and green), and are camouflaged.  
   b. They can live with very little oxygen in the water.  
   c. Because the eelgrass meadow is very dark, they have learned to give off their own light like fireflies.  
   d. They close up their shells to keep from drying out.  
   e. Not sure

4. Why is detritus important in an estuary?
   a. It is food for many animals.  
   b. It gives the water its beautiful blue color.  
   c. It captures sunlight energy and turns it into food for animals.  
   d. All of the above  
   e. Not sure

(Turn over for side two)
5. Why are estuaries important to salmon?
   a. Adult salmon eat the estuary eelgrass.
   b. Young salmon find food, shelter, and a place to adapt to salt water.
   c. Salmon lay their eggs on eelgrass in the estuary.
   d. They hide in the mud at low tide.
   e. Not sure

6. How do phytoplankton get their energy?
   a. They eat zooplankton
   b. They eat dead stuff
   c. They use the sun's energy to make food
   d. They eat baby salmon
   e. Not sure

7. Have people built cities on estuaries?
   a. Yes – most of the world's largest cities are on estuaries.
   b. No – estuaries are protected from building.
   c. No – mud around estuaries is too soft to build on.
   d. Not sure

8. Do you live in the watershed of an estuary?
   a. Yes
   b. No
   c. Not sure

9. What is the most important thing you learned at Padilla Bay Reserve?
   ______________________________________________________
   ______________________________________________________
Padilla Bay Estuary Teacher Workshop 2009  
Post Workshop Survey

Dear Teacher,

You are receiving this survey because in the summer of 2009 you participated in a teacher workshop at Padilla Bay Reserve. It should take about 10-20 minutes of your time. We would like to know how you have used your training in the past year. Please take a moment to briefly answer the questions below. Thank you for your time and dedication to teaching about our local environment.

Name: ________________________________

1. Describe briefly the estuary studies you have conducted with your students.

2. What kinds of activities did your estuary studies include? (check all that apply)
   _____ Lessons and activities I created myself.
   _____ Lessons and activities from the Padilla Bay website and curriculum
   _____ Lessons and activities from other resources presented at the Padilla Bay Workshop
   _____ A field trip to an estuary
   _____ A test
   _____ Journaling or other writing activity
   _____ Other (please describe)

3. Through our participation with Padilla Bay Reserve, I believe students are showing improved: (check all that apply)
   _____ Interest and enthusiasm for the environment
   _____ Content knowledge, including the interconnectedness of humans and nature
   _____ Stewardship behavior
   _____ Interest in science or science activities
   _____ Other (please explain)
4. Through our participation with Padilla Bay Reserve, *I have evidence* that students are showing improved: (check all that apply)
   - Interest and enthusiasm for the environment
   - Content knowledge, including the interconnectedness of humans and nature
   - Stewardship behavior
   - Interest in science or science activities
   - Other (please explain)

4b. If you stated that you have evidence of student improvement, please describe the type of evidence you have (test, written work, student quotes, observation, projects, etc).

4c. Would you be willing to be contacted to share some of these examples with Padilla Bay?
   - Yes
   - No

5. Now that you’ve used the lesson plan(s) that you created as a result of the workshop, would you recommend making any changes?
   - Yes
   - No

5b. If yes, are you willing to be contacted to share these changes with Padilla Bay and other teachers via the Padilla Bay web site?
   - Yes
   - No

6. Has your experience with Padilla Bay Reserve made you more comfortable teaching about estuaries or the environment? Please explain.
7. How did you share information from the Padilla Bay 2009 Teacher workshop with other teachers and colleagues? Please describe who you shared information with, how you shared it, and approximately with how many people.

8. Remember the concept of Meaningful Watershed Experience (MWE)? As required by our grant we described it as one possible framework for designing estuary studies. Please tell us if your estuary lessons included the following aspects of MWE. Of course we know that MWE is not a measure of the quality of your lessons. We just want to know if it’s something you picked up and used.

My estuary lessons (please mark your responses for each line):

| Make a direct connection to the marine or estuarine environment. Experiences demonstrate to students that local actions can impact the greater marine environment. | Yes | No | Unsure |
| Are an integral part of the instructional program. The experience is a part of the curriculum being taught in the classroom. | Yes | No | Unsure |
| Part of sustained activity. It includes preparation, an outdoor experience, analysis, and reporting. | Yes | No | Unsure |
| Reflects an integrated approach to learning. Other disciplines besides science (art, history, English, economics) are incorporated. | Yes | No | Unsure |
| Projects involve external sharing and communication. Students share what they have learned with each other and the community (i.e., newsletters, journals, community presentations, letters). | Yes | No | Unsure |

8b. Is there anything else you would like to tell us about how your lessons addressed the MWE guidelines?

9. Is there anything else you’d like us to know about your experience with Padilla Bay Reserve?

Thank you!
Padilla Bay Estuary Reserve  

Fieldtrip Curriculum Survey

Teacher Name: 
School: 
Grade: 

Please tell us about the estuary activities your class did before or after your field trip to Padilla Bay. Include activities from the *Estuary Guide* curriculum we provide and those that are not part of the *Estuary Guide* curriculum.

<table>
<thead>
<tr>
<th></th>
<th>Time Spent</th>
<th>Estuary Guide Activities</th>
<th>Other Activities</th>
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<tbody>
<tr>
<td><strong>Pre-Fieldtrip</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Post-Fieldtrip</strong></td>
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</tbody>
</table>

Did your students share the information with parents, other adults and/or their peers either verbally or in writing? Please explain.

Is there anything else you'd like us to know?

Thank you!
Dear Teachers,

We would like to invite your class to help us evaluate our program. Input from teachers and students is very important to us. It will help us improve our program and it may help us secure future grants. There are two different student assessment tools that can be downloaded from our webpage, and a short survey for teachers. You may choose to do one or both of the student assessment tools with your class. Instructions for each tool are below.

**Student Survey** – Recommended for grades 3 through 6.

There are two parts to the Student Survey –
1. Pre-trip questionnaire
2. Post-trip questionnaire

Please have your students complete the pre-trip questionnaire before they come to Padilla Bay on their field trip and before you do any in-class estuary curriculum with them. This will help us gauge how much your students already know before they begin their estuary studies. Please encourage your students not to guess on the questionnaire. It is just fine to mark “Not sure.” We are not expecting them to know all of the answers before they come.

Please have your students complete the post-trip questionnaire after their field trip and any wrap up activities you do with them in class.

If you would like to use this tool for your own assessment you may of course grade it. Otherwise please tell students it is not a test and will not affect their grade in anyway. (We don't want the questionnaires to feel like extra work them. They are helping us to know if we are doing a good job teaching them – so you can tell them they are really testing their Padilla Bay teachers!)

**Student Letter** – Recommended for grades 6 and above.

Please have your students write us a letter after their field trip. In their letter please have them answer the questions listed on the writing prompt. You may choose to have students answer all or some of the questions.

If you would like to use this tool for your own assessment you may grade it as a writing assignment. Otherwise please tell students it is not a test. We just want to read, in their own words, what they learned on their trip and what was memorable about their visit.

**Fieldtrip Curriculum Survey**

Along with the student evaluation tools, please also complete the brief field trip curriculum survey. It can be downloaded from our website.

**Mail us the Student Evaluation Tools**

After they are completed please mail Student Evaluation Tools to:

Attn: Student Evals
Padilla Bay National Estuarine Research Reserve
10441 Bayview-Edison Rd.
Mt Vernon, WA 98273

Thank you so much for your help! We hope you and your students enjoy your field trip to the Padilla Bay Estuary Reserve.