NOAA California B-WET Program
Evaluation Report
Example

XYZ SUMMER 2006 WORKSHOP
EVALUATION REPORT

Organization Title
Project Title
Award Number
Report Period

Executive Summary

Introduction

This evaluation was conducted to assist the XYZ project staff and partners with determining the effectiveness of their week-long teacher professional development workshop held during the summer. Twenty teachers attended this workshop. This executive summary focuses on the results highlights. A full report follows the summary.

The XYZ Wetlands Workshop is designed to

1) enhance teachers' understanding of how wetlands field research data are used and collected in resource management/protection of the marine environment, and
2) provide teachers with means (content, skills and lessons) for incorporating their experiences into their core science curriculum.

To gather the data needed to answer the evaluation questions, teacher participants completed a pre-workshop survey and a post-workshop survey (an abbreviated version of the pre-workshop survey). Seventeen of the 20 participants completed all of the surveys.

Results

Generally, teachers were satisfied with the workshop: 47% of teachers rated the workshop as good and 35% rated it as excellent. Teachers reported gains in their knowledge about wetlands and local issues, and acquiring new computer skills that they could use back at school.

Overall, results indicate that the goals of this workshop and those of the B-WET program (the funder) were partially achieved. The workshop's goal of enhancing teachers' understanding of how research data are collected and used in resource management/protection of the marine environment was met. The workshop's other main goal, that is, to provide teachers with techniques for incorporating watershed experiences into core science curriculum, was not met by the end of the workshop. Teachers were disappointed that they did not gain new activities or labs that would translate directly into lesson plans. Teachers did not have a clear sense of how to apply their new learning/insights in the classroom.

At the end, teachers stated they were very concerned about the work it will take to add the lessons/activities to their teaching, and about access to the technology to teach the content (about one-third stated they didn't have the equipment to replicate activities at school and/or were unable to take students into the field to collect data). This feedback was due in part to the workshop and in part to the selection of participants. Pre-survey results indicated that about a third of the teachers were mis-matched to the workshop's curriculum and goals.

Given the selection of participants and the evaluation results, the evaluators doubt this workshop will impact the teaching practices of the participants..

XYZ Summer 2006 Workshop
EVALUATION REPORT

Overview
This evaluation was conducted to assist the XYZ workshop staff with determining the effectiveness of their wetlands teacher professional development workshop, held during the summer of 2006. Twenty middle-school teachers attended this workshop.

The goals for the XYZ Wetlands Workshop are to:
1) enhance teachers' understanding of how wetlands field research data are used and collected in resource management/protection of the marine environment, and
2) provide teachers with means (content, skills and lessons) for incorporating their experiences into their core science curriculum.

Evaluation Goals & Audience
The evaluation plan for this teacher professional development project identified four main questions (evaluation goals):

1. Which aspects of the workshop worked well? Which didn't work? Is the workshop length, format, etc., appropriate? What changes would improve the workshop?
2. What did teachers gain from the workshop? Did the workshop provide teachers with meaningful experiences and learning opportunities? Are they excited about the possibilities of using what they learned in their classrooms?
3. What's the impact of the workshop on the teachers who attend? Which of the workshop ideas, methods, materials do they use? Does the workshop change their teaching and in what ways?
4. What's the impact of the workshop on the students of the teachers who attend?

Given that the funding of this particular grant ends in the fall at the beginning of the school year, this evaluation report focuses on addressing Goals #1 and 2 with the teachers who participated in the summer workshop. Goals #3 and #4 are for a subsequent evaluation (funding permitting).

Methods & Data Analysis
To answer the evaluation goals of satisfaction, learning and intent, we asked all 20 participants to complete a pre-workshop survey (Appendix 1) on the first day of the workshop. On the last day of the workshop, participants completed a post-workshop survey (Appendix 2), which was an abbreviated version of the pre-workshop survey. Because 3 teachers did not complete the workshop and most of the surveys, their data were dropped from the analysis. Thus, a total of 17 respondents were included in this evaluation.

The surveys used a mix of questions (items) to collect qualitative and quantitative data. Responses to qualitative items were categorized based on the data, then tallied. The top responses in each category are reported here as frequencies and percentages. Responses to quantitative items (rating-scales, numerical responses) were tallied and are reported as percentages and averages in some cases.
Some data from the post-workshop survey have been compared to responses from the pre-workshop survey to show changes during the week. (Note: Those data would also be used if a follow-up evaluation is conducted to track changes in participants over time.)

Results

Teacher Characteristics

Based on pre-workshop survey results, below are some basic characteristics of the teachers who participated in the summer workshop. These results are provided because they will be used later to interpret other survey results and draw conclusions about the success of the workshop.

1a. What grades do you teach?

Teachers taught a range of middle- and high-school grades. The majority (82%) taught 9th through 12th grade. One teacher (6%) stated she was currently not teaching.

Grades teaching	*Frequency*	*%*
9th through 12th grade	14	82%
6th grade	1	6%
7th grade	1	6%
not currently teaching	1	6%

1b. What subject/subjects do you teach?

The majority of teachers indicated they taught more than one subject. Biology (including introductory, general and AP) was the top response, with nearly two-thirds (65%) of teachers indicating they taught at least one course of this type. The second most-frequent response was marine biology/oceanology, taught by 41% of teachers.

Subject	*Frequency*	*%*
biology	11	65%
marine biology/oceanology	7	41%
chemistry	3	18%
earth science	3	18%
physical science	2	12%
general science	1	6%

2. How many years have you been teaching?

Teacher responses ranged from 2 to 29 years of teaching experience. The average time teaching was 12.8 years. Most participants (59%) were mid-career professionals.

Years teaching	*Frequency*	*%*
1 to 5	2	12%
6 to 10	6	35%
11 to 15	4	24%
16 to 20	3	18%
21 to 25	1	6%
26 to 30	1	6%

3. What is your training/schooling in the sciences? (check all that apply)
Most (88%) of the participating teachers had a BA or BS. Nearly half (47%) had a teaching credential with science emphasis, and 18% had an MA or MS. Many of the participants (41%) had had additional coursework/workshops in their subject area.

Training	*Frequency*	*%*
None	0	0%
Inservice/professional development workshops	7	41%
Teaching credential with science emphasis	8	47%
BA/BS in a science field	15	88%
MA/MS in a science field	3	18%
Ph.D. in a science field	0	0%
Other	2	12%

4. What is your professional training/schooling in the use of computers and the Internet? (check all that apply)
All participants have had at least some computer/Internet training. Over half (59%) are self-taught. Most (88%) have received computer/Internet training through inservices or professional development workshops. Two teachers (12%) hold a teaching credential with computer/technology emphasis.

Training	*Frequency*	*%*
None	0	0%
Self-taught	10	59%
Inservice/professional development workshops	15	88%
Teaching credential w/computer/tech. emphasis	2	12%
BA/BS in a computer/tech.-related field	0	0%
MA/MS in a computer/tech.-related field	0	0%
Ph.D. in a computer/tech.-related field	0	0%
Other	2	12%

5a. What is the computer set-up at your school? (check all that apply)
All participants had access to computers at school. Most teachers (82%) stated they have computers in their classrooms, also in labs (76%) and in school libraries/media centers (59%). One teacher (6%) stated that each student has his or her own computer.

Response	*Frequency*	*%*
each student has his/her own computer	1	6%
computers in my classroom	14	82%
computers in a computer lab	13	76%
computers in a library/media center	10	59%
other	4	24%
digital high school with portable laptops or computers on a cart		
my own laptop @ school and @ home		

5b, c & d. How many computers in the classroom? …in the computer lab? …in the library/media center?

Of those teachers who have computers in the classroom, the majority (64%) has between 2 and 6 computers; 29% had only one computer in the classroom.

# of computers in classroom	*Frequency*	*%*
1	4	29%
2 to 6	9	64%
40	1	7%

# of computers in lab	*Frequency*	*%*
30 or fewer	5	38%
more than 30	7	54%
no answer	1	8%

#of computers in library/media center	*Frequency*	*%*
10 to 30	9	90%
many	1	10%

Most teachers use computer labs or the library/media center when students work on computer-related projects during class time. In all but one case (where each student has a computer), students typically share when working on computers at school.

6a. How many students will you teach this school year?
6b. Number of classes? 6c. Number of students in each class?

Each teacher will teach from 60 to 200 students. Most (71%) will teach 5 classes. Nearly half (47%) will teach 30 or fewer students, and 47% will teach more than 30 students per class.

total # of students	*Frequency*	*%*
60 to 125	5	29%
150 to 200	11	65%
unknown	1	6%

# of classes	*Frequency*	*%*
3 to 4	4	23%
5	12	71%
unknown	1	6%

# of students per class	*Frequency*	*%*
15 to 30	8	47%
30 to 35+	8	47%
unknown	1	6%

7. What is the ethnic mix of the students at your school? (provide percentages for each)
Almost every teacher reported having traditionally underserved (minority) students as part of their student bodies. The greatest percentage of participants (41%) worked in schools where the White/Caucasian student population was greater than 70%. Twenty-three percent were in schools with a nearly equal ratio of White and Latino students. Nearly 18% worked in schools where the Hispanic/Latino population was greater than 70%. One teacher worked at a school with an ethnically/racially mixed student body. Many of the teachers noted the percentages they reported were approximations. Two teachers left this question blank.

8. How regularly do you have your students use computers at school as part of their lessons? (circle one)
All teachers have their students use computers to some degree. Just over a third (35%) of the teachers reported using computers often, 29% reported using them sometimes and 35% reported using them rarely. None use them regularly, such as weekly.

Students use computers	*Frequency*	*%*
never	0	0%
rarely	6	35%
sometimes	5	29%
often	6	35%
regularly (weekly)	0	0%
no answer	0	0%

9a. Have you ever used real-time data in science lessons with your students?
9b. If yes, how often do you use real-time data in science lessons with your students? (check one)
Nearly half (47%) of the teachers said they had used real-time data in their lessons; nearly half (47%) said they had not. Of those who had used real-time data, when asked how often, 50% said rarely and 50% said sometimes.

Use real-time data?	*Frequency*	*%*
yes	8	47%
no	8	47%
don't know	0	0%
no answer	1	6%

If so, how often?	*Frequency*	*%*
rarely	4	50%
sometimes	4	50%
often/regularly	0	0%
no answer	0	0%

9c. What kind of real-time data have you used and what was the data source?
When asked about the kinds and sources of real-time data responses varied. Of the eight teachers who said they did use real-time data, four teachers (50%) mentioned the Internet, 38% mentioned hands-on data collected by students. (Note: Some of these sources do not represent real-time data in the true sense of the word. Teachers may not have been clear on what the term real-time data means.)

Source and type of real-time data	*Frequency*	*%*
Internet	4	50%
GLOBE		
Population data - Census Bureau, U of Delaware data on deep sea exploration, & weather/ocean data		
Weather database called "weather bug" for about 3 weeks with my G.P.S. students; glencoe.com webpage of data collection for a lab set-up (wouldn't let me download)		
Hands-on data collected by students	3	38%
Limpets—monitoring sand crabs at Half Moon Bay		
Vernier probes (temp, pH, etc.), onset data-logger (temp)		
Our own lab results, simulated sources like Virtual genetics labs, Alu results from DNALC		
Other	1	12%
population biology study of seals and sea lions plus the distribution of algae provided by a prior institute		

10a. Do you take your students into the field to collect data?
10b. If yes, how often during the school year do you take your students into the field?
When asked whether or not they took their students into the field to collect data, 76% said yes and 24% said no. Of those who take their students into the field to collect data, most (69%) go once or twice a year. The rest (31%) go about once a month.

Collect data in field?	*Frequency*	*%*
yes	13	76%
no	4	24%
not sure	0	0%
no answer	0	0%

If so, how often?	*Frequency*	*%*
once or twice	9	69%
about once a month	4	31%
more than once a month	0	0%
no answer	0	0%

11a. During the school year do your students conduct experiments using the scientific method?
11b. If yes, how many experiments during the school year?
Teachers involve their students in performing experiments—almost all teachers (94%) said they have students conduct experiments.

Conduct experiments?	*Frequency*	*%*
yes	16	94%
no	1	6%
not sure	0	0%
no answer	0	0%

Of those who said their students had conducted experiments, 1 teacher (6%) had students conduct 1 or 2 experiments during the year, 1 (6%) had them conduct between 3 and 5 experiments during the year, and most (88%) had students conduct more than five experiments.

If so, how often?	*Frequency*	*%*
1 or 2	1	6%
3 to 5	1	6%
more than 5	14	88%
no answer	0	0%

12. Do your students develop their own experimental topics/ issues or are they provided with experimental topics/issues?
When asked about the source of the experiments or topics their students conduct, most (65%) teachers said they provide some of the experiments/topics but let their students develop their own topics for other experiments. A few (35%) teachers said they provide all the experiments or topics, and none said their students develop their own topics exclusively.

Response	*Frequency*	*%*
develop their own topics	0	0%
are provided topics	6	35%
both	11	65%
no answer	0	0%

14a. Do you currently involve your students in activities/actions to protect the Monterey Bay National Marine Sanctuary and/or its watershed?
When asked if they currently involve their students in activities/actions to protect the Monterey Bay National Marine Sanctuary and/or its watershed, 59% said yes and 35% said no.

Involve students in protecting MBNMS?	*Frequency*	*%*
yes	10	59%
no	6	35%
don't know/not sure	0	0%
no answer	1	6%

14b. If yes, what kind of activities or actions?

Of the 10 teachers who did involve their students in activities to protect the Sanctuary, the top activity, (30%) was stream study/monitoring/clean-up. The second most common responses, with 20% for each, was Gulf of the Farallones NMS LIMPET project at Half Moon Bay, water testing and started/participated in clubs.

Types of activities	*Frequency*	*%*
stream study/monitoring/clean-up	3	30%
Gulf of the Farallones NMS LIMPET project @ Half Moon Bay	2	20%
water testing	2	20%
started/participate in clubs (ecology, biology, environmental science)	2	20%
beach clean-ups	1	10%
erosion studies	1	10%
intertidal monitoring	1	10%
raise and plant native riparian plants	1	10%
class research forum	1	10%
organic garden	1	10%
activities and games that teach conservation	1	10%

Workshop Results (Pre & Post)

13 (Pre). What do you hope to gain from this workshop?
4 (Post). What did you gain from this workshop and was it what you hoped to gain?
When asked about what they hoped to gain the top response, given by 88% of teachers, was to acquire lesson plans, labs or other hands-on activities to use in the classroom. Nearly half (47%) hoped to gain knowledge or content, and 41% hoped to learn about or get updated on current research.

When asked what they had gained from the workshop, the top response (35%) was computer skills. In addition, 29% stated they had gained knowledge/content, and 24% had acquired lesson plans, labs or other hands-on activities to use in class.

Hoped to gain/Gained	*Hoped to Gain (Pre) Frequency*	*%*	*Did Gain (Post) Frequency*	*%*
acquire lesson plans, hands-on activities or labs	13	76%	4	24%
gain knowledge/content	8	47%	5	29%
see what scientists do, or update on current research	7	41%	3	18%
learn about and/or ways to teach about environment and/or watershed issues	4	24%	1	6%
get an update on current technology	2	12%	0	0%
acquire real or real-time data	2	12%	4	24%
have grad students visit classroom during the year	2	12%	1	6%
professional development hours	1	6%	0	0%
computer skills	0	0%	6	35%
resources to incorporate into curriculum	0	0%	3	18%

5 (Post). How do you plan to use what you gained from this workshop with your students?
When asked how they plan to use what they gained from this workshop, the top response (53%) was to have students analyze data, including using Excel. The next most-frequent responses (41% each) were to use SIMoN and to do a plankton tow.

How do you plan to use what you gained?	*Frequency*	*%*
do data analysis, including using Excel	9	53%
use SIMoN; do a plankton tow	7	41%
do a plankton tow	7	41%
study seabird ID / taxonomy	5	29%
do a beachwalk (including bird mortality and trash exercises)	4	24%
graphing	3	18%
have graduate students or scientists visit the classroom	2	12%
use the PowerPoint info and data; use technology / websites	1 each	6% each
don't know / not sure	3	18%

15 (Pre). Tell us about a Monterey Bay environmental issue that you have read or heard about recently and why it attracted your attention.
When asked about a Monterey Bay environmental issue, the most-frequent response (51%) was marine mammal mortality. Of the 9 teachers who mentioned marine mammal mortality, 6 mentioned sea otters and cat litter, 1 mentioned whales getting the bends from military testing and 1 mentioned the effect of sonar on marine mammals. The next most-frequent responses, from 18% of teachers each, were overfishing, pollution and elevated bacteria levels.

Monterey Bay environmental issue (Pre)	*Frequency (Pre)*	*%*
marine mammal mortality [including sea otter deaths due to cat litter and other sources, and the effects of military testing and sonar on whales]	9	51%
overfishing	3	18%
pollution [incl. metals in sediments, and sunblock]	3	18%
bacterial contamination	3	18%
harmful algal blooms	2	12%
saltwater intrusion	2	12%
introduced species (algae, *Mytilus*)	2	12%
development of wetlands (Harkins Slough)	1	6%
ocean water temperature increases	1	6%
impacts of ecotourism	1	6%
desalinization	1	6%
gray whale migration and *Orca* attacks	1	6%
pesticides	1	6%

6 (Post). Name one major policy or management issue for the Monterey Bay National Marine Sanctuary.

On the post-workshop survey, when asked to name a major policy or management issue for the Monterey Bay National Marine Sanctuary, gill nets was the top response, mentioned by 25% of teachers, followed by pesticides and other agricultural pollutants, non-point source pollution, and fisheries management issues. Each of these was mentioned by 18% of teachers.

Monterey Bay NMS policy or management issue (Post)	*Frequency (Pre)*	*%*
gill nets	5	29%
pesticide and other agricultural pollutants	3	18%
non-point source pollution including from storm drains	3	18%
fisheries management	3	18%
land use and resulting erosion	2	12%
educating the public about watershed issues	1	6%
plastics at sea	1	6%
water quality and monitoring	1	6%
informing the managers/decision makers	1	6%

(Note: It may be interesting to compare the responses to these two questions to those seen on other Sanctuary surveys, as well as track these teachers' responses over time.)

7 (Post). Compared to other workshops, how would you rate this one?

Most teachers (47%) rated this workshop as good. About one-third (35%) rated it as excellent, and the rest (18%) rated it as fair.

Workshop rating	*Frequency*	*%*
excellent	6	35%
good	8	47%
fair	3	18%
poor	0	0%
awful	0	0%

8 (Post). How would you rate the length of the 5-day workshop?

Participants rated the length of this workshop favorably—most (82%) felt it was just right.

Workshop length	*Frequency*	*%*
too long	3	18%
just right	14	82%
too short	0	0%
no answer	0	0%

9 (Post). How would you rate the pacing of the activities overall during this week?

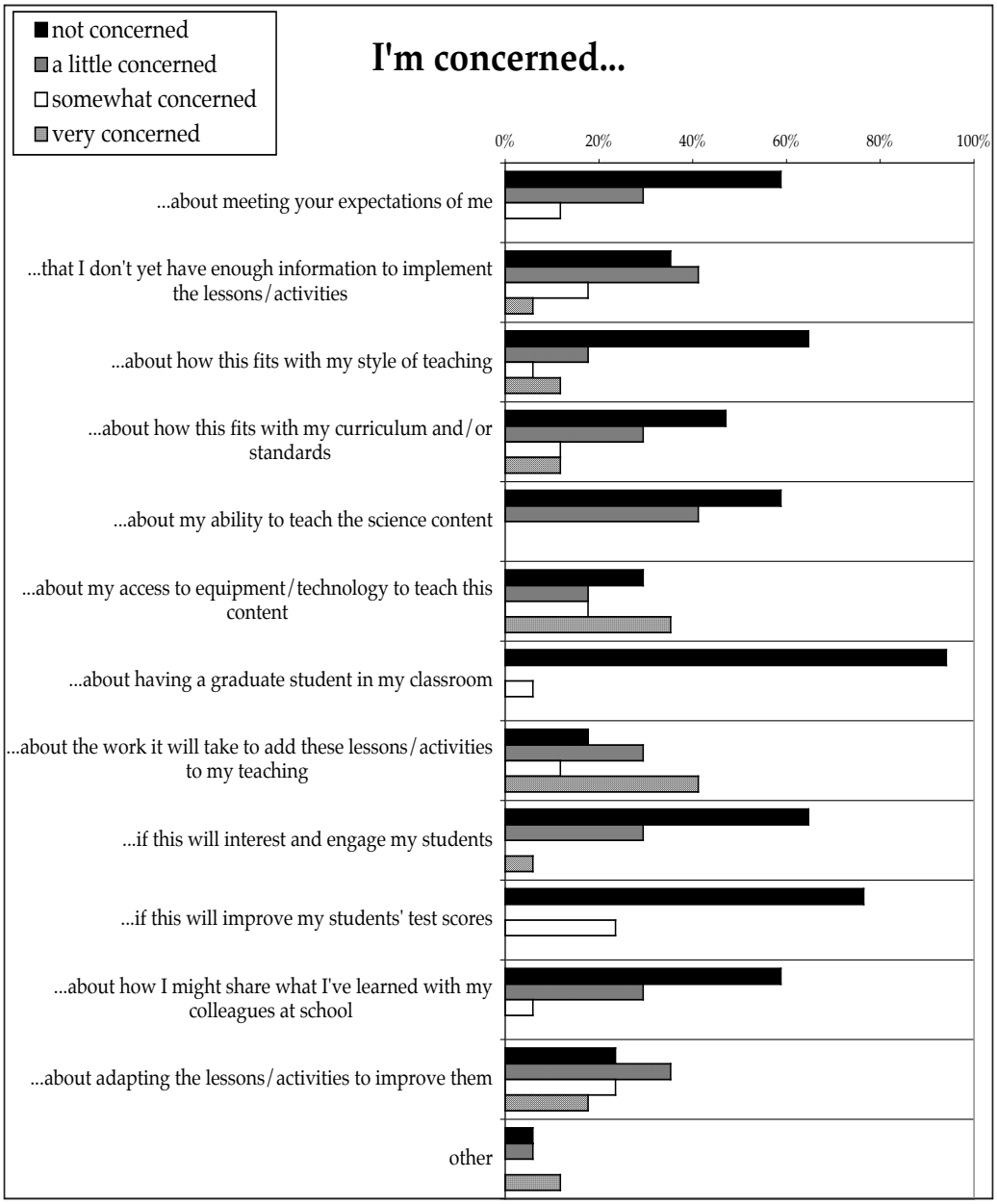
Most teachers (71%) state the workshop pacing was just right. Some (23%) felt it was too slow.

Response	*Frequency*	*%*
too fast	0	0%
just right	12	71%
too slow	4	23%
no answer	1	6%

10 (Post). When you think about implementing what you've learned in this workshop back in your classroom, what are your concerns?

Overall, teachers were not concerned about implementing what they had learned in the workshop back in the classroom. There were, however, some important exceptions as evidenced by the top responses for the following statements (see details on page 14).

- In regards to the amount of work required to add these lessons/activities to their teaching, 41% stated they were very concerned.
- When asked about their access to equipment/technology to teach this content, 35% stated they were very concerned.
- When asked about having enough information to implement the lessons/activities, 41% said they were a little concerned.
- In regards to adapting lessons/activities to improve them, 35% stated they were a little concerned.



Discussion and Conclusions

Workshop Goals

This workshop's goals were two-fold: 1) to enhance teachers' understanding of how wetlands field research data are used and collected in resource management/protection of the marine environment, and 2) to provide teachers with means (content, skills and lessons) for incorporating their experiences into their core science curriculum. Overall, results indicate that the goals of this workshop and those of the B-WET program (the funder) were partially achieved. Although teachers learned new content (marine research topics and resource management issues) from this workshop, they did not gain what they had hoped to gain—lessons for use in their classroom.

By the end of the workshop, most teachers demonstrated that they learned new content (through daily quizzes) and understood the connections between identifying an environmental issue or problem, data collection and analysis, and drawing appropriate conclusions.

On the other hand, teachers did not complete the workshop with a clear sense of how to apply their new insights in the classroom. Not only was this a key workshop goal, but when asked what they wanted to gain from the workshop on the pre-workshop survey, teachers indicated that they wanted to acquire hands-on activities, labs and/or lesson plans that they could take back to school. Several workshop participants stated that although they enjoyed the topics that were presented, especially the hands-on activities such as plankton tows and bird identification exercises, they did not have the equipment available to replicate the lessons back at school, or the time or know-how to develop workable lessons from the material presented.

This is not to say teachers went away empty-handed. When asked what they gained from the workshop, many teachers stated computer skills. When asked how they planned to use what they gained from the workshop, over half the teachers said they would have their students analyze data using Excel, and many said they would use SIMoN—even though many teachers in this workshop do not have enough computers readily available to conduct in-class computer-based lessons efficiently. While computer skills are an important and integral component of data analysis, providing teachers new computer skills was not a goal of this workshop.

When asked about their concerns about applying what they've learned, teachers had few concerns—with a few poignant exceptions. They were very concerned about the work it will take to add the lessons/activities to their teaching and about access to the equipment/technology to teach the content provided during the workshop. In addition, teachers were somewhat concerned that they didn't yet have enough information to implement the lessons/activities.

Compared to other similar teacher workshops, this workshop received a relatively low ranking in terms of excellence and relevance. Most of the workshops the evaluators have evaluated receive on average a rating of 4.5 or better (on a 5-point scale with 5 being excellent). This workshop's average rating on excellence was 4.2.

We believe the reason for this comparatively poor feedback is due at least in part to the acceptance of applicants who would have difficulty meeting the workshop goals. Workshop topics included technical background material, such as chemistry and advanced mathematics. Some teachers indicated the material covered was confusing to them and/or would be too difficult for their students.

About a third of the teachers rarely use computers with their students (and another 29% use them sometimes). The graphing and PivotTable lessons using Excel were difficult for some

teachers to follow, and the calculations to estimate phytoplankton density would be beyond their students' capabilities. Applying such topics in their classroom requires teachers to have access to the appropriate technology (computers, fluorescence assay microscopes, etc.) but not all participants have this access.

About 25% of teachers stated they don't do field work with their students. One of the main goals of B-WET-funded programs is to use the outdoor environment as a platform for learning about the connection between human actions and the health of the environment. Yet several teachers indicated they were "not allowed" to take their students on field trips, or work too far from the ocean to take their students there. Responses like these provide further evidence that some participants were mis-matched to the workshop's curriculum and goals.

Overall, teachers reported making gains in their knowledge about marine science and local issues, and in having acquired new computer skills that they could use in class. The only consistent disappointment was not gaining new activities or labs that would translate directly into lesson plans.

Thus, the workshop's goal of enhancing teachers' understanding of how research data are collected and used in resource management and protection of the marine environment was met. The second goal, to provide techniques for incorporating meaningful watershed and experiences into core science curriculum was not. Given the selection of participants and the survey results, we question if this workshop will impact the teaching practices of the participants as desired. The plan to have graduate students visit classrooms during the school year may help, but they too will be challenged by the lack of equipment or ability to take students into the field.

Recommendations
In light of these results, the workshop evaluators have several recommendations to improve the workshop so that it meets its goals and to make the experience more meaningful for teachers.

- Continue to engage teachers in hands-on activities and field experiences, especially those that teachers can easily translate into lesson plans, and continue providing data and data sources, such as websites, that teachers can use with their students.

- Clearly state the goals and purpose of each lesson and/or activity, and of each day. Provide clearly written instructions and samples/examples for activities, especially computer lessons, during the workshop to help participants keep on track.

- Allow time during the workshop for teachers to develop their new skills/learning into lesson plans or labs that they can use in the classroom, or provide specific lesson plans to get them started when they get back to school.

- Offer low-cost, low-tech suggestions for modifying some of the techniques covered during the workshop so that they're feasible for schools with limited resources.

And, finally
- Use an application to screen and select applicants who have the technology capabilities and field opportunities needed to take full advantage of the materials and activities provided during the workshop (or help teachers acquire such as part of the workshop).

APPENDICES
EVALUATION INSTRUMENTS

NOT INCLUDED IN THIS SAMPLE REPORT
(see questions in report for examples)