

NOAA California B-WET Program **KIDS for the BAY**

School Wide Watershed Action Program 2010-11 Evaluation Report

Organization Title: KIDS for the BAY
Project Title: School Wide Watershed Action Program
Award Number: NA09NOS4290073
Report Period: August 1, 2010 – July 31, 2011

Executive Summary

Introduction

This evaluation of the School Wide Watershed Action Program (SW WAP) was conducted to assist the KIDS for the BAY (KftB) staff and the National Oceanic and Atmospheric Administration's Bay-Watershed Education and Training Program (NOAA B-WET Program) with determining the impact and effectiveness of their in-depth school-wide watershed education and action program on teacher and student participants. The evaluation also serves as an invaluable tool in informing future programming and future program evaluation.

Each class in every grade level, including twelve elementary school teachers and 242 students, participated in the SW WAP at John Muir Elementary School in Berkeley, CA during the 2010-11 school year. Evaluation tools were administered to all classroom teachers, and KIDS for the BAY received completed evaluation surveys from nine teachers. Evaluation data from students in first and fifth grade were also included in this report. This executive summary focuses on highlights of and conclusions from the evaluation results. A full report follows the summary.

The objectives of the School Wide Watershed Action Program for teachers are that they will:

- increase their knowledge of their local watershed and the National Marine Sanctuaries;
- increase their confidence to use the local watershed environment and the National Marine Sanctuaries as a learning resource;
- increase their confidence to teach an environmental science unit in the classroom and in the field; and
- increase their confidence to facilitate an environmental action project with their students.

The specific objectives of the students included in this evaluation report are as follows:

First Grade Student Objectives (from Lesson One)

- Explain that water in the ocean is salty and water in rivers and creeks is fresh.
- Describe how fresh water from rivers and creeks mixes with salt water from the ocean to make an estuarine environment in the San Francisco Bay.

Fifth Grade Student Objectives (from Lesson Two)

- Identify the three National Marine Sanctuaries located closest to the San Francisco Bay.

- Share at least two ways the National Marine Sanctuaries benefit the ocean ecosystem.
- Describe at least four individual and group actions that help protect the ocean and the marine sanctuaries.

In addition to the program objectives, the evaluation process focused on assessing whether several of the questions in the Evaluation Goals section were achieved. Questions within the Evaluation Goals section apply to the impact of the program on students and teachers and on the evaluation process itself.

To gather the data needed to assess whether these objectives were met, KftB administered a pre- and post-program survey to all teacher participants. Nine of the twelve teachers who participated in the SW WAP completed both surveys, and the results are included in this report. A pre- and post-program survey was also administered to all students in first and fifth grades. Twenty-nine first grade students and 40 fifth grade students completed both surveys, and the results from these surveys are included in this report.

Results: Highlights and Conclusions

Results from the 2010-11 school year evaluation process indicate that the goals of the School Wide Watershed Action Program and those of the NOAA B-WET program were achieved. The SW WAP provided meaningful watershed experiences for elementary school students, and also provided professional development to classroom teachers in environmental education. In particular, evaluation results show that the SW WAP had an extremely positive impact on both student and teacher participants.

Program Impact on Teachers

- The majority of teachers increased their confidence levels in using the local environment as a learning resource and leading hands-on environmental science lessons. Most teachers either already had a high level of confidence or increased their confidence in leading an outdoor environmental field trip with their students.
- The majority of teachers either already had a high level of confidence or increased their confidence in facilitating an environmental action project and facilitating the process of scientific inquiry with their students.
- All teachers felt prepared to teach the SW WAP in their classrooms the following school year, reflecting a positive response to KftB's Teacher Training Model, which included modeling of all lessons and activities, detailed grade-level curriculum given to each teacher, and on-going one-on-one support in teachers' classrooms and in the field.

Program Impact on Students

- Results from the first grade students' pre- and post-program surveys were very positive. The results indicate that the students gained specific knowledge relating to the concepts and information taught in the SW WAP. The grade-level objectives listed in the "Evaluation Goals" section of this evaluation report have been met.
- Results from the fifth grade students' pre- and post-program survey were similarly positive. The results indicate that the students gained knowledge about the National Marine Sanctuaries. The grade-level objectives listed in the "Evaluation Goals" section of this report have been met.
- Teachers strongly expressed that the SW WAP increased their students' concern about the local environment. This sentiment is supported by the written feedback received from many classroom teachers, displayed in the "Results and Conclusions" section of this report.
- All teachers felt that participation in the SW WAP increased their students' interest in learning, which indicates a high level of enjoyment and engagement from the students.

Summary

Evaluation results show that the specific program objectives we measured for the 2010-11 evaluation process were met. KftB recommends continuing to implement the SW WAP at John Muir Elementary School while working towards partnering with a new school to engage in a three- year partnership in the SW WAP.

School Wide Watershed Action Program 2010-11 Evaluation Report

Project Overview

Project Summary

KIDS for the BAY's (KftB) School Wide Watershed Action Program (SW WAP) provides 1) meaningful watershed experiences for elementary school students and 2) professional development in the area of environmental education for elementary school teachers. The specific program objectives are as follows:

Student Objectives: Provide meaningful watershed education for 240 kindergarten - fifth grade students at John Muir Elementary in Berkeley, California. Students will:

- increase their understanding of how their school neighborhood connects with the local creek, the San Francisco Bay, the Pacific Ocean and the three National Marine Sanctuaries and describe the pathway that connects all of these elements together;
- increase their knowledge of the animals and plants that live in creek, bay and ocean/marine sanctuary habitats within their watershed;
- increase their understanding of the ways in which human activities can positively or negatively impact the local watershed and the Marine Sanctuaries; and
- take action to improve the health of creek, bay and ocean watershed habitats.

Students will also feel more connected to and responsible for keeping their local water bodies – including three National Marine Sanctuaries – clean and healthy.

Teacher Objectives: Provide professional development opportunities in the area of environmental education related to watersheds for 12 classroom teachers at John Muir Elementary School in Berkeley, California. Teachers will:

- increase their knowledge of their local watershed and the National Marine Sanctuaries;
- increase their confidence to use the local watershed environment and the National Marine Sanctuaries as a learning resource;
- increase their confidence to teach an environmental science unit in the classroom and in the field; and
- increase their confidence to facilitate an environmental action project with their students.

Program Description

The SW WAP provides three years of in-depth, hands-on programming to John Muir Elementary School in Berkeley, a low-income, urban elementary school. The program engages the entire elementary school – the principal, faculty of teachers, students at every grade level and parents – in connecting with their local watershed.

In the SW WAP each grade level focuses on a specific watershed habitat within the Harwood Creek-San Francisco Bay-Pacific Ocean watersheds. One or more central questions relating to their habitat is posed to the students at the beginning of the program. The students participate in various hands-on program activities and engage in the process of scientific inquiry to derive answers to their habitat focus questions.

For each class the SW WAP consists of:

- two 1-hour interactive classroom lessons during which students learn about their local watershed and its connection to the larger San Francisco Bay and Pacific Ocean watersheds, including the three local National Marine Sanctuaries, through hands-on science experiments, visual aids, and experiential learning.
- an all-day field trip to a creek, bay, or ocean habitat where students learn the science and ecology of the habitat.
- an environmental action project relating to their watershed habitat. The action projects give students an opportunity to clean up, restore, and teach others about their local environment.
- a Share-Out presentation for students to inform their “buddy class” at another grade level about what they have learned about their watershed.

The SW WAP is also a teacher-training experience. The teachers at John Muir Elementary learn the program as it is modeled by a KftB Instructor with their students. In addition to the direct modeling of all program activities and lessons, teachers receive a comprehensive curriculum guide and one-on-one support from a KftB Instructor. KftB also sets up an Equipment Resource Center at the school for teachers to borrow the equipment and materials needed to teach the program. In the third year of the program, the teachers start to take more ownership of the program and lead the lessons and activities themselves as KftB provides support and guidance. By the end of the three-years, KftB has set the school up to successfully continue the program themselves as a completely integrated component of the school curriculum.

In the 2009-10 school year, the SW WAP was delivered to the kindergarten, first grade, and second grade classes (116 students and 6 teachers) at John Muir Elementary. In the 2010-11 school year, the upper grade levels were integrated into the SW WAP and the program was delivered to every kindergarten - fifth grade class at the school, totaling 242 students and 12 teachers.

The focus questions and habitats for kindergarten - fifth grade are displayed in the following table:

Grade Level	Focus Question(s)	Habitat
Kindergarten	How does water flow from our neighborhood to our creek?	Harwood Creek
First Grade	What makes the San Francisco Bay an estuary? How is this a special habitat?	San Francisco Bay
Second Grade	What does the ocean provide for humans? How can our actions help or harm the ocean?	Pacific Ocean/National Marine Sanctuaries
Third Grade	Is our creek healthy? How can our actions benefit the creek?	Harwood Creek
Fourth Grade	How do human activities impact the health of the San Francisco Bay ecosystem? How does the health of the bay ecosystem affect human health?	San Francisco Bay
Fifth Grade	How do the National Marine Sanctuaries benefit the ocean ecosystem?	Pacific Ocean/National Marine Sanctuaries

Evaluation Goals

KIDS for the BAY's program evaluation process is both summative and formative. The evaluation data that has been and will be collected from student and teacher participants during the course of the three-year SW WAP will enable us to assess 1) the impact of the program on students, teachers, and the school community, 2) the effectiveness of the program content and delivery, and 3) how we can improve our teaching methods and curricula for future programming. An added benefit to the evaluation process is being able to assess the effectiveness of the evaluation tools themselves in gathering the desired data from program participants. Information on the types of responses we receive, the quality of the responses, and the amount of data we collect from each evaluation tool administered during one school year will allow us to improve the tools themselves as well as the overall evaluation plan for the following school year.

The 2010-11 school year evaluation plan focused on assessing whether specific teacher and student objectives were achieved. Teachers at every grade level were included in the 2010-11 school year evaluation process. The teacher objectives that were measured are as follows:

Teacher Objectives

Teachers will:

- increase their confidence to use the local watershed environment and the National Marine Sanctuaries as a learning resource;
- increase their confidence to teach an environmental science unit in the classroom and in the field; and
- increase their confidence to facilitate an environmental action project with their students.

Evaluation data was gathered from students in every grade level. For the purpose of this report, only data from students in first and fifth grade was analyzed. The student objectives that were measured are as follows:

First Grade Student Objectives (from Lesson One)

- Explain that water in the ocean is salty and water in rivers and creeks is fresh.
- Describe how fresh water from rivers and creeks mixes with salt water from the ocean to make an estuarine environment in the San Francisco Bay.

Fifth Grade Student Objectives (from Lesson Two)

- Identify the three National Marine Sanctuaries located closest to the San Francisco Bay.
- Share at least two ways the National Marine Sanctuaries benefit the ocean ecosystem.
- Describe at least four individual and group actions that help protect the ocean and the marine sanctuaries.

The SW WAP evaluation plan also sought to answer additional questions that are identified in this Evaluation Goals section. The evaluation plan for the 2010-11 school year focused on only the bolded questions.

Program Effectiveness and Improvement

- **Are we reaching our stated program goals and objectives for teacher and student participants?**
- **How can we improve the Watershed Action Program based on the feedback collected from teachers and the results of the evaluation process?**

Student Participants

- What was the students' overall experience of the program?
- **Has students' participation in the program increased their concern about the local environment?**
- **Has students' participation in the program increased their interest in learning?**

Teacher Participants

- Overall, were teachers satisfied with the program?
- What suggestions do they have to improve the program content and delivery?
- **Were there any increases in teachers' confidence level and perceived ability in:**
 - **leading hands-on environmental science lessons?**
 - **facilitating the process of scientific inquiry with their students?**
 - **using the local environment as a learning resource?**
- What support do teachers need in order to teach the SW WAP in their classrooms?
- Did the SW WAP help teachers to teach California State Science Standards to their students?
- **How useful were the various program components (in-class training, curriculum guide) in providing teachers with what they need to teach the program?**
- **Do teachers feel prepared to teach their grade-level unit to their students in the following school year, with support from KftB?**

Evaluation data was collected from teacher participants at each grade level. Teachers provided survey data to KftB that gave insight on the experience of the program for themselves and their students. Evaluation data was also collected from student participants at each grade level. For the purpose of this report, only data from first and fifth grade students was analyzed and displayed.

Methods

The SW WAP (intervention) at each grade level consisted of two one-hour classroom lessons; an environmental action project; a field trip to a creek, bay, or ocean habitat; and a Share-Out for students to share their learning with a buddy class at the school. Each grade level focused on a specific watershed habitat for all of their program activities and sought to answer one or more questions about their habitat. Twelve kindergarten - fifth grade classroom teachers and 242 students at John Muir Elementary School participated in the SW WAP during the 2010-11 school year.

Quantitative and qualitative evaluation tools were administered to teacher participants between January 2010 and June 2011. KIDS for the BAY attempted to collect evaluation data from each of the twelve teacher participants, however due to teachers retiring and changing grade levels and new teachers being hired after the pre-program survey was administered, only evaluation data from nine teachers is included in this report.

Quantitative evaluation tools were administered to students at each grade level (kindergarten – fifth grade) at John Muir School during the 2010-11 school year. KIDS for the BAY chose to formally analyze evaluation data collected from students in first and fifth grades for this evaluation report. First grade students studied the San Francisco Bay and fifth grade students studied the Pacific Ocean and three local National Marine Sanctuaries (Cordell Bank, Gulf of the Farallones, and Monterey Bay). Evaluation data from 29 first grade students and 40 fifth grade students is included in this report.

The methodology behind each evaluation tool is described separately for each tool below.

Teacher Assessment Tool

Teacher Pre- and Post-Program Surveys:

Nine teachers completed a pre-program survey (Appendix A) in January 2010, before the program began, that contained six items. Teachers then completed a longer post-program survey (Appendix B) in June 2011 that contained the same six items in the pre-program survey, plus six additional items. This survey was administered at the completion of all program activities, including the field trip, action project, and Share-Out to a buddy class. The pre- and post-survey statements contained standard Likert-scale response options and asked teachers to mark the response that best matched their feelings about program-related statements, including their confidence level (self-efficacy) in using the local watershed environment as a learning resource and facilitating an environmental action project with their students. The additional statements included in the post-survey asked about the impact of the program on their students and how well the program structure prepares them to teach the program themselves. The response options were: “strongly disagree”, “disagree”, “neutral”, “agree”, and “strongly agree”.

Student Assessment Tools

First Grade Student Pre- and Post-Program Surveys:

Students in first grade completed a pre- and post-program survey to assess any changes in knowledge due to their participation in the SW WAP. Students completed a pre-program survey (Appendix C) in January and February 2010, before the program began in their classrooms. They completed an identical post-program survey (Appendix C) in spring 2011, at the completion of program activities. The survey contained two main items, with graphics for each item, and within these items were four questions. The first main item contained three separate questions and asked students to record three separate responses. Each question asked students to record the type of water (fresh, salt, or both fresh and salt) contained in a body of water: the Pacific Ocean, the San Francisco Bay, and the Sacramento/San Joaquin Rivers. The correct answer for each of these three questions was valued at 1 point; therefore, the possible point score for each of these three questions was either 0 or 1. The second item asked students to record one response for one question. This item gave students three response options (Pacific Ocean, San Francisco Bay, and Rivers) and asked students to circle the body of water that is an estuary. Because there was only one correct answer, the possible point score for this question was either 0 or 1. A total of 29 students completed both a pre- and post-program survey.

Fifth Grade Student Pre- and Post-Program Surveys:

Students in fifth grade completed a pre- and post-program survey to assess any changes in knowledge due to their participation in the SW WAP. Students completed a pre-program survey (Appendix D) in January and February 2010, before the program began in their classrooms. They completed an identical post-program survey (Appendix D) in spring 2011, at the completion of program activities. The survey contained five main items, two of which included graphics. The first four items assessed students' knowledge about National Marine Sanctuaries. The last item checked for knowledge on the relative amounts of fresh and salt water on Earth; this item was not analyzed and included in this evaluation report. The first item asked students to select three responses from a list of six response options. Each correct response was valued at 1 point, therefore the total possible point score ranged from 0 to 3. The second item required students to place their three responses from the previous item onto the geographically-correct location on a map. Each correct placement was valued at 1 point, therefore the total possible point score for the second item ranged from 0 to 3. The last three items contained questions with multiple-choice responses (four response options given). The possible point score for

items three and four were either 0 (incorrect), 1 (partially correct), or 2 (correct). The last item contained only one correct response, therefore the possible point score was 0 or 1. A total of 40 students completed both a pre- and post-program survey.

Data Analysis

Teacher Assessment Tool

Teacher Pre- and Post-Program Surveys:

The pre-survey and post-survey responses from each teacher were put into a spreadsheet and each item was compared to see what, if any, changes occurred as a result of the intervention. The changes in responses were put into a separate table and displayed in Table 1 (p.10) in the Results section. The items that were only posed to teachers in the post-program survey were compiled into a separate table along with the teachers' responses. The results from these statements are shown in Table 2 (p.11). Survey results from nine teacher participants who completed both a pre- and post-program survey are included in this report.

Student Assessment Tools

First Grade Student Pre- and Post-Program Surveys:

Each student in first grade was given a unique student identification number which was used to identify each students' surveys. We then compiled the pre-program and post-program surveys for each student using their identification numbers and discarded any surveys that did not have both a pre- and a post-match. The pre-surveys were graded and the results for each question were recorded in an Excel spreadsheet. Similarly, the post-surveys were graded and the results were entered into the same Excel spreadsheet.

Due to the relatively small sample size ($N = 29$), we did not statistically analyze the evaluation data. Instead, pre- and post- survey results were compared by question for the entire sample population and any changes from the pre- and post- survey (increase, decrease, or no change of point score) were recorded. Results from these surveys are displayed in Table 3 (p.12).

Fifth Grade Student Pre- and Post-Program Surveys:

Each student in fifth grade was given a unique student identification number which was used to identify each students' surveys. We then compiled the pre-program and post-program surveys for each student using their identification numbers and discarded any surveys that did not have both a pre- and a post-match. The pre-surveys were graded and the results for each question were recorded in an Excel spreadsheet. Similarly, the post-surveys were graded and the results were entered into the same Excel spreadsheet.

Due to the relatively small sample size ($N = 40$), we did not statistically analyze the evaluation data. Instead, pre- and post- survey results were compared by question for the entire sample population and any changes from the pre- and post- survey (increase, decrease, or no change of point score) were recorded. Results from these surveys are displayed in Table 4 (pp.12-13).

Results

Teacher Pre- and Post-Program Survey Results

Table 1. Pre- and Post-Program Survey Results N = 9

Statement	Change (increase or decrease) in Response from Pre- to Post-Program Survey		
	Decreased	No Change	Increased
1. I feel confident <u>using the local watershed environment as a learning resource.</u>	2 (22%)	2 (22%)	5 (56%)
2. I feel confident <u>leading hands-on environmental science lessons.</u>	2 (22%)	3 (33%)	4 (44%)
3. I feel confident <u>leading an outdoor environmental field trip with my class.</u>	1 (11%)	4 (44%)	4 (44%)
4. I feel confident <u>facilitating an environmental action project with my class.</u>	2 (22%)	5 (56%)	2 (22%)
5. I feel confident <u>facilitating the process of scientific inquiry with my class.</u>	1 (11%)	6 (67%)	2 (22%)

Table 1. Pre-Post Program Survey Results Summary

The majority of teachers increased their confidence levels in using the local environment as a learning resource and leading hands-on environmental science lessons. Four teachers, or 44%, increased their confidence in leading an outdoor environmental field trip with their students. Four teachers had no change in confidence leading an outdoor field trip; all of these teachers marked either “Agree” or “Strongly Agree” on both their pre- and post- program surveys, showing an already high confidence level. Similarly, although the majority of teachers did not show a change in level of confidence in facilitating an environmental action project and facilitating the process of scientific inquiry with their students, all of these teachers expressed an already high level of confidence in these areas by marking either “Agree” or “Strongly Agree” on both their pre- and post-program surveys.

Table 2. Post-Program Survey Results N = 9

Statement	Post-Program Survey Response					
	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	No Answer
7. Participation in the School Wide Watershed Action Program has <u>increased my students' concern about the local environment.</u>			1 (11%)	4 (44%)	3 (33%)	1
8. Participation in the School Wide Watershed Action Program has <u>increased my students' interest in learning.</u>				5 (56%)	3 (33%)	1
9. The School Wide Watershed Action Program <u>helped me to teach required CA State Science Standards to my students.</u>			1 (11%)	4 (44%)	3 (33%)	1
10. The <u>curriculum guide</u> provided to me is helpful in teaching the School Wide Watershed Action Program myself.			2 (22%)	5 (56%)	1 (11%)	1
11. The <u>in-class modeling</u> of the lessons and activities increases my confidence in teaching the program myself.			1 (11%)	3 (33%)	5 (56%)	
12. I feel prepared to <u>teach the SW WAP [grade-level] unit</u> to my class next year, with support from KftB.				5 (56%)	3 (33%)	1

Table 2. Post-Program Survey Results Summary

The majority of teachers marked “Agree” to all but one question in the post-program survey. The majority of teachers marked “Strongly Agree” for the remaining question, which asked teachers to share if the in-class modeling of the program increased their confidence in teaching the program themselves. All teachers “Agreed” or “Strongly Agreed” that the SW WAP increased their students’ interest in learning. All teachers also “Agreed” or “Strongly Agreed” that they feel prepared to teach the SW WAP to their students the following school year. The results from all of the post-program survey questions reflect a high level of satisfaction for and impact from the SW WAP.

Student Pre- and Post-Program Survey Results

Table 3. First Grade Students Pre- and Post-Program Survey Results N = 29

Question	Pre-Program Point Score Actual Score/ Possible Score (Percentage)	Post-Program Point Score Actual Score/ Possible Score (Percentage)	Change
Is “Fresh Water”, “Salt Water”, or both “Fresh and Salt Water” found in:			
1) Pacific Ocean (Answer: Salt Water)	16/29 (55%)	20/29 (69%)	4 Point Increase (14% Increase)
2) San Francisco Bay (Answer: Fresh and Salt Water)	8/29 (28%)	19/29 (66%)	11 Point Increase (38% Increase)
3) Sacramento/ San Joaquin Rivers (Answer: Fresh Water)	21/29 (72%)	23/29 (79%)	2 Point Increase (7% Increase)
4) Circle the body of water that is an estuary. (Answer: San Francisco Bay)	11/29 (38%)	24/29 (83%)	13 Point Increase (45% Increase)

Table 3. First Grade Students Pre- and Post-Program Survey Results

The first grade student population increased their total point score on each of the four questions, indicating an increase in knowledge of concepts taught in the SW WAP. The highest point increases occurred in Questions 2 and 4. Both questions focused on the San Francisco Bay, which was the grade-level habitat for the first grade classes.

Table 4. Fifth Grade Students Pre- and Post-Program Survey Results N = 40

Question	Pre-Program Point Score Actual Score/ Possible Score (Percentage)	Post-Program Point Score Actual Score/ Possible Score (Percentage)	Change
1) Circle the correct names of the three National Marine Sanctuaries that are near the San Francisco Bay from the list below. (Answer: Cordell Bank, Gulf of the Farallones, Monterey Bay)	72/150 (48%)	99/150 (66%)	27 Point Increase (18% Increase)
2) Write the letter of each of the three marine sanctuaries where it is located on the map below. (Answer from top to bottom: D, Cordell Bank; A, Gulf of the Farallones; E, Monterey Bay)	26/150 (17%)	41/150 (27%)	15 Point Increase 10% Increase
3) Why are the National	60/100	70/100	10 Point Increase

Marine Sanctuaries important? (Answer: C, both A and B)	(60%)	(70%)	10% Increase
4) Which of the following actions can you do to protect the National Marine Sanctuaries? (Answer: C, both A and B)	68/100 (68%)	71/100 (71%)	3 Point Increase 3% Increase

Table 4. Fifth Grade Students Pre- and Post-Program Survey Results

The fifth grade student population increased their total point score on each of the four questions, indicating an increase in knowledge of concepts taught in the SW WAP. The most significant point increase occurred in Questions 1, which asked students to choose the three National Marine Sanctuaries (NMS) closest to the San Francisco Bay out of a list of six choices. A noteworthy increase in knowledge also occurred in Question 2, which asked students to place the three NMS’ in their correct locations on a map, and Question 3, which asked why the NMS are important.

Discussion and Conclusions

Results from the 2010-11 school year evaluation process point towards the goals of the SW WAP and those of the NOAA B-WET Program being achieved. The SW WAP provided meaningful watershed education experiences for elementary school students, and also provided professional development to classroom teachers in watershed and environmental education. The feedback and evaluation data that we received from teacher participants were extremely positive in all areas. We can conclude that these teachers felt that the program was enjoyable, valuable, and beneficial to both the teachers and the students. The evaluation results from first and fifth grade students were equally positive. Evaluation results showed a strong increase in knowledge for the concepts taught in the SW WAP.

KftB arrived at the following conclusions based on the collected and analyzed evaluation data:

Program Impact on Teachers

- The majority of teachers increased their confidence levels in using the local environment as a learning resource and leading hands-on environmental science lessons. Most teachers either already had a high level of confidence or increased their confidence in leading an outdoor environmental field trip with their students.
- The majority of teachers either already had a high level of confidence or increased their confidence in facilitating an environmental action project and facilitating the process of scientific inquiry with their students.
- All teachers felt prepared to teach the SW WAP in their classrooms the following school year, reflecting a positive response to KftB’s Teacher Training Model, which included modeling of all lessons and activities, detailed grade-level curriculum given to each teacher, and on-going one-on-one support in teachers’ classrooms and in the field.

Program Impact on Students

- Results from the first grade students’ pre- and post-program surveys were very positive. The results indicate that the students gained specific knowledge relating to the concepts and

information taught in the SW WAP. The grade-level objectives listed in the “Evaluation Goals” section of this evaluation report have been met.

- Results from the fifth grade students’ pre- and post-program survey were similarly positive. The results indicate that the students gained knowledge about the National Marine Sanctuaries. The grade-level objectives listed in the “Evaluation Goals” section of this report have been met.
- Teachers strongly expressed that the SW WAP increased their students’ concern about the local environment. This sentiment is supported by the written feedback received from many classroom teachers, displayed below.
- All teachers felt that participation in the SW WAP increased their students’ interest in learning, which indicates a high level of enjoyment and engagement from the students.

Teacher and Principal Written Feedback Supports Evaluation Results

Classroom teachers were also asked to complete an evaluation form in spring 2011 to collect written feedback and elicit more information from open-ended questions. Although the written evaluation data was not formally analyzed, this information fully supports the survey results and conclusions within this report. The following are a few excerpts from teachers’ written evaluation forms:

“I feel like I have been given a great, diverse, comprehensive unit to help my students better appreciate the unique environment around them.”

“[My students] became passionate about the Bay and ecology after their experiences. They also have a great command of scientific vocabulary such as fry, eggs, spawn, scat, etc.”

“Continue the funding of this special opportunity for all schools to participate!”

“Working with the SW WAP has been a powerful opportunity for me to grow as a teacher. While I have always known that real life experiences better student understanding, I have had a difficult time wanting to do the prep work involved with these lessons. Watching student engagement and understanding grow through these real life exercises encourages me to continue with them in future years. In addition, I plan to integrate similar strategies to math and social science lessons.”

“SW WAP taught me so much about the local watershed! It also provided me with meaningful classroom lessons to teach each year!”

“I’ve definitely noticed a positive impact on my class. They are so much more aware of their local environment! They’ve become much more conscientious about litter and disposing of it properly.”

“The entire John Muir community (and families of) have learned a great deal about our local watershed and environment, and how to protect it!”

“The field trip to the ocean/tide pools was crucial for the students to understand—see/hear/smell/touch the ocean. A picture cannot convey this! I could not have afforded to take my class to the ocean and some students had never been to the ocean before our field trip.”

“I believe my students will want to visit the ocean again and will feel confident in doing so. Students who had never been to the ocean will feel more confident in taking their children when they are parents.”

“I loved working with KIDS for the BAY. The lessons that [KIDS for the BAY Instructor Deborah Zierten] taught the students were connected to the standards, and thoughtfully implemented. The lessons involved wonderful teaching practices—reaching all kinds of kids.”

John Muir School Principal was also asked to complete a written evaluation form and survey in spring 2011. The feedback and responses received from Principal Mendieta not only support the evaluation data and results from teachers and students, but also confirm a high level of satisfaction and value for the SW WAP at John Muir School.

When asked “*What impact has the SW WAP had on the classroom teachers at your school?*”, Principal Mendieta wrote “[The SW WAP] has encouraged more interest in science curriculum throughout the school.” In his survey, Principal Mendieta marked the following responses in regards to the impact of the SW WAP and his level of support for the program:

- ◆ “Strongly Agreed” that participation in the SW WAP increased his school’s awareness about the local environment.
- ◆ “Strongly Agreed” that participation in the SW WAP increased his school’s concern about the local environment.
- ◆ “Strongly Agreed” that participation in the SW WAP increased the students’ interest in learning.
- ◆ “Strongly Agreed” that the SW WAP helped the school teach required CA State Science Standards.
- ◆ “Strongly Agreed” that he felt prepared to support the continuation of the SW WAP at his school.

Recommendations

Overall, we received encouraging results as to the impact of the SW WAP on teachers and students from the 2010-11 evaluation process.

We recommend that KIDS for the BAY continues to provide classroom teachers high-quality professional development opportunities in environmental education through our SW WAP. The Teacher Training Model should continue to include in-class training and direct modeling of the program; resources such as a comprehensive curriculum guide and program equipment; and support so teachers feel confident teaching environmental science and the program activities and lessons.

We also recommend that KIDS for the BAY continues to provide hands-on, engaging environmental science lessons to elementary school students, both in the classroom and in the field, through our SW WAP. Continue to provide meaningful and relevant learning experiences, and opportunities for students to be engaged in learning about and caring for their local watershed environment and the local National Marine Sanctuaries. Additionally, opportunities for students to have up-close experiences in our local watersheds through field trips should continue.

Finally, it is recommended that the SW WAP be implemented in other public elementary schools. As KIDS for the BAY phases out working directly at John Muir School and the schools’ faculty, students,

and students' families take over the program in the coming years, KIDS for the BAY should start a new SW WAP and a new three-year partnership with a local elementary school that would greatly benefit from the high-quality professional development in environmental science education for teachers and engaging, hands-on environmental education experiences for students.

Appendix A. Teacher Pre-Program Survey

School-Wide Watershed Action Pre-Program Survey

Name _____ Grade Level _____ Date _____

Respond to each statement by checking the response that best reflects your feelings:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel confident <u>using the local watershed environment as a learning resource.</u>					
I feel confident <u>leading hands-on environmental science lessons.</u>					
I feel confident <u>leading an outdoor environmental field trip with my class.</u>					
I feel confident <u>facilitating an environmental action project with my class.</u>					
I feel confident <u>facilitating the process of scientific inquiry with my class.</u>					
I feel confident <u>using the [grade-level habitat: <i>local creek watershed, San Francisco Bay, or Pacific Ocean</i>] as a learning resource.</u>					

1) Do you currently teach science? If so, what curriculum, activities, and/or programs do you use?

2) What support do you feel you need to incorporate science in your school-year curriculum?

3) Any other comments?

Thank you for your commitment to environmental science education!

Appendix B. Teacher Post-Program Survey

School Wide Watershed Action Post-Program Survey

Name _____ Grade Level _____ Date _____

Respond to each statement by checking the response that best reflects your feelings:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel confident <u>using the local watershed environment as a learning resource.</u>					
I feel confident <u>leading hands-on environmental science lessons.</u>					
I feel confident <u>leading an outdoor environmental field trip with my class.</u>					
I feel confident <u>facilitating an environmental action project with my class.</u>					
I feel confident <u>facilitating the process of scientific inquiry with my class.</u>					
I feel confident <u>using the [grade-level habitat: <i>local creek watershed, San Francisco Bay, or Pacific Ocean</i>] as a learning resource.</u>					

Participation in the School Wide Watershed Action Program has <u>increased my students' concern about the local environment.</u>					
Participation in the School Wide Watershed Action Program has <u>increased my students' interest in learning.</u>					

The School Wide Watershed Action Program <u>helped me to teach required CA State Science Standards to my students.</u>					
The <u>curriculum guide</u> provided to me is helpful in teaching the School Wide Watershed Action Program myself.					

The <u>in-class modeling</u> of the lessons and activities increases my confidence in teaching the program myself.					
12. I feel prepared to <u>teach the SW WAP [grade-level] unit</u> to my class next year, with support from KftB.					

Thank you for your commitment to environmental science education!

Appendix C. First Grade Student Pre- Post-Program Survey

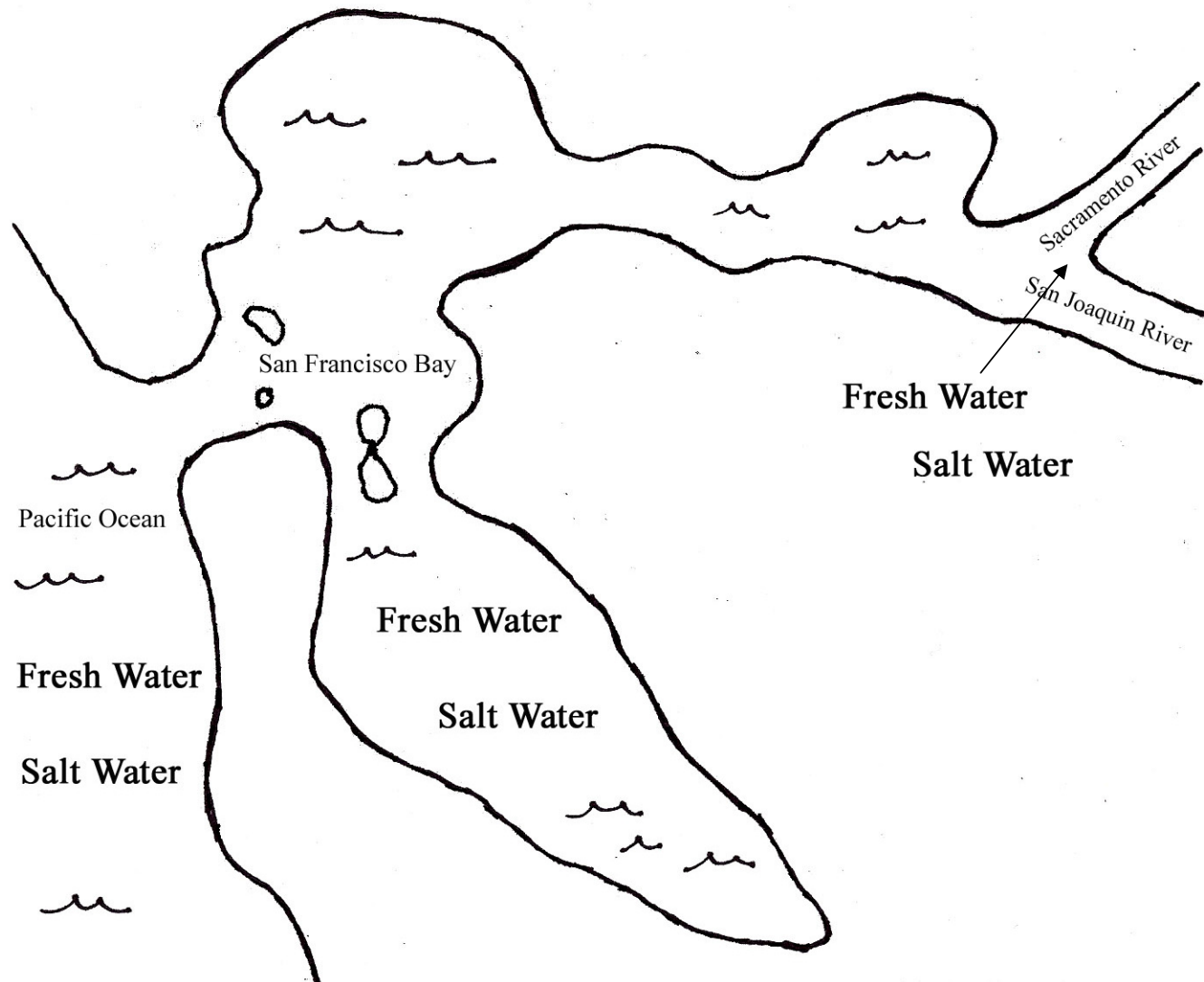
Student ID #: _____ Teacher: _____ Date: _____

KIDS for the BAY

School Wide Watershed Action Program First Grade Student Survey

1) Below is a drawing of the San Francisco Bay. Two types of water are found in the drawing below: **salt water** and **fresh water**. On the drawing below:

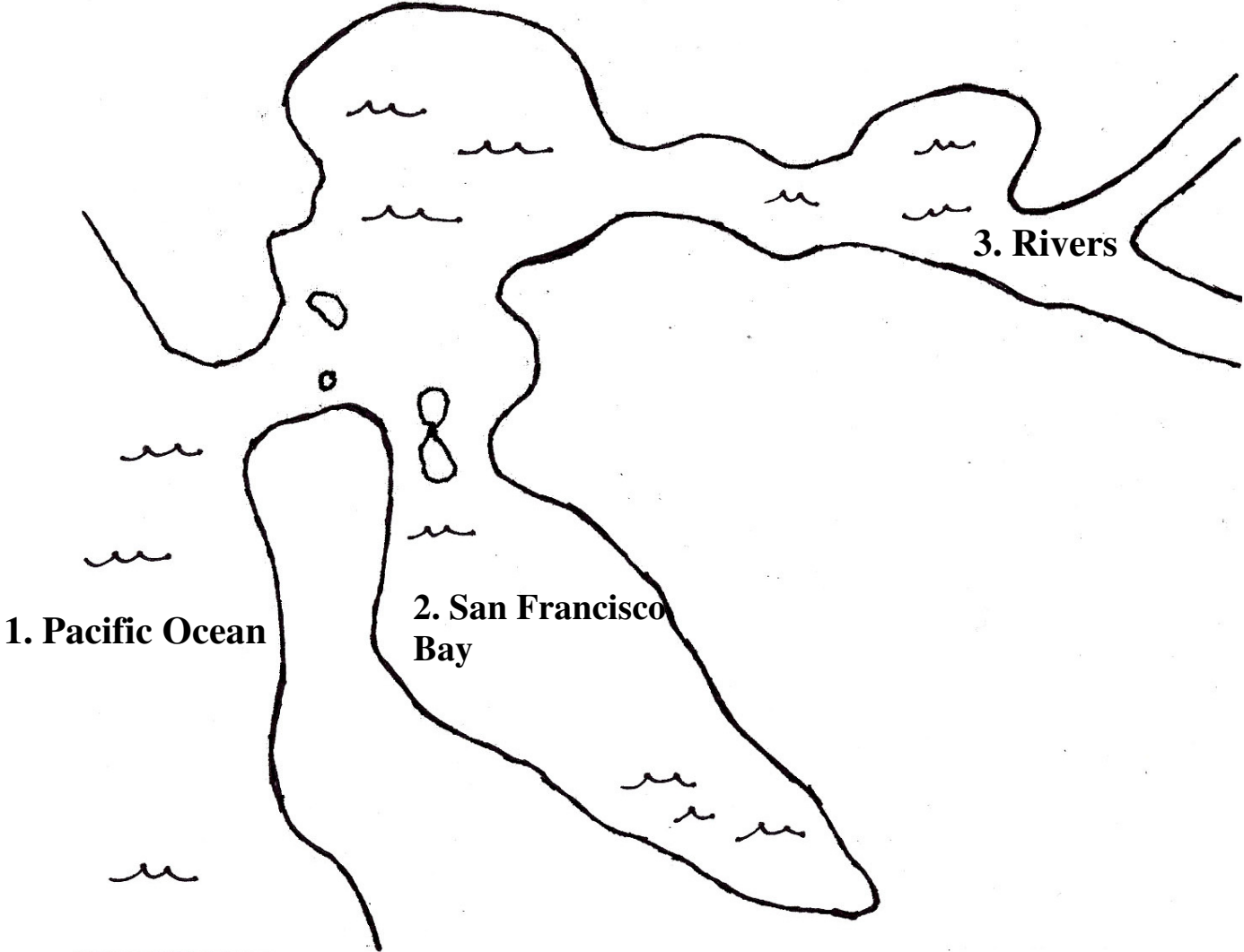
- A) Circle the words “**salt water**” where salt water is found.
- B) Circle the words “**fresh water**” where fresh water is found.



Appendix C. First Grade Student Pre- Post-Program Survey

Student ID #: _____ Teacher: _____ Date: _____

2) On the drawing below circle the name of the body of water that is an estuary.



Appendix D. Fifth Grade Student Pre- Post-Program Survey

Student ID #: _____

Teacher: _____

Date: _____

KIDS for the BAY

School Wide Watershed Action Program Fifth Grade Student Survey

1) Circle the correct names of the three National Marine Sanctuaries that are near the San Francisco Bay from the list below.

A) Gulf of the Farallones

D) Cordell Bank

B) Florida Keys

E) Monterey Bay

C) Channel Islands

F) Gray's Reef

2) Write the letter of each of the three marine sanctuaries where it is located on the map below.



Appendix D. Fifth Grade Student Pre- Post-Program Survey

Student ID #: _____ Teacher: _____ Date: _____

3) Why are the National Marine Sanctuaries important?

Circle one answer.

- a. They protect different types of habitats, such as beaches, kelp forests, and marshes
- b. They provide a safe home for many endangered plants and animals
- c. Both a and b
- d. I don't know

4) Which of the following actions can you do to protect the National Marine Sanctuaries?

Circle one answer.

- a. Keep trash, oil, and other pollutants out of the streets in your neighborhood
- b. Pick up garbage at your local creek or Bay shoreline
- c. Both a and b
- d. I don't know

5) Which pie chart shows the correct amount of fresh water and salt water on Earth?

Circle one answer.

