Final Evaluation Report
California Environmental Education Foundation

Best Practices of Environmental Education and Stewardship 2011
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Methods and Sample</td>
<td>5</td>
</tr>
<tr>
<td>Areas of Inquiry</td>
<td>5</td>
</tr>
<tr>
<td>Data Collection</td>
<td>6</td>
</tr>
<tr>
<td>Data Analysis and Reporting</td>
<td>6</td>
</tr>
<tr>
<td>Sample</td>
<td>6</td>
</tr>
<tr>
<td>Findings</td>
<td>7</td>
</tr>
<tr>
<td>Institute One</td>
<td>7</td>
</tr>
<tr>
<td>Current Practices and Attitudes</td>
<td>7</td>
</tr>
<tr>
<td>Ecological Content Knowledge</td>
<td>10</td>
</tr>
<tr>
<td>Institute One Experience</td>
<td>12</td>
</tr>
<tr>
<td>Institute One Follow-up</td>
<td>14</td>
</tr>
<tr>
<td>Institute Two</td>
<td>16</td>
</tr>
<tr>
<td>Ecological Content Knowledge</td>
<td>16</td>
</tr>
<tr>
<td>Institute Two Experience</td>
<td>19</td>
</tr>
<tr>
<td>Institute Three</td>
<td>20</td>
</tr>
<tr>
<td>Institute Three Experience</td>
<td>20</td>
</tr>
<tr>
<td>Classroom Experience</td>
<td>21</td>
</tr>
<tr>
<td>Stewardship Projects</td>
<td>21</td>
</tr>
<tr>
<td>Environmental Education Activities</td>
<td>22</td>
</tr>
<tr>
<td>Classroom Impact</td>
<td>23</td>
</tr>
<tr>
<td>Highlights and Recommendations</td>
<td>24</td>
</tr>
<tr>
<td>Continuing Best Practices</td>
<td>25</td>
</tr>
<tr>
<td>Summary and Recommendations</td>
<td>26</td>
</tr>
<tr>
<td>About ETI</td>
<td>28</td>
</tr>
<tr>
<td>Appendices</td>
<td>29</td>
</tr>
</tbody>
</table>
Executive Summary

Introduction

The California Environmental Education Foundation (CEEF), in partnership with the Yolo County Office of Education (Yolo COE), sponsored a three-day Teacher Institute designed for elementary and secondary teachers. The Institute utilized an Action Research Model to maximize collaborative learning in environmental education and place-based stewardship. The program was designed to achieve the following goals:

- Provide three days of high quality professional development on best practices of environmental education (EE) and stewardship with eight hours of individualized follow-up consultation with a CREEC network Regional Coordinator.
- Provide hands-on experience with research-based EE activities, and give sample curricula from Project Learning Tree, Project Wild Aquatic, and Project WET.
- Enable participants to gain ecological knowledge, enhanced pedagogic skills, and renewed passion for environmental stewardship.

Methods and Sample

In alignment with the goals of the program, data collection efforts were focused on the following areas:

- Ecological Understanding (content)
- Stewardship of the Environment (attitude)
- Environment-Based Practices (behavior)

Surveys were administered during the Institute trainings through Zoomerang, an online survey software system. Institute participants completed pre- and post-surveys for Institutes One and Two and post-surveys only for Institute Three. For the final report, we analyzed all content, attitudinal, and behavior data collected over the course of the three Institutes. Quantitative data were aggregated and analyzed using descriptive analyses (frequencies). Qualitative survey data were analyzed for salient themes and presented thematically. In addition, we reviewed teacher participant Power Point presentations, self-reflection notes, and California Regional Environmental Education Community (CREEC) interview transcripts provided by CEEF.

Findings

The following points below highlight key findings detailed in the report:

Institute One

- Teachers who attended the CEEF Institute One attributed their participation to one of three main reasons: to facilitate professional growth or development; to foster student growth or development; and to heighten environmental awareness and stimulate a sense of environmental stewardship among students.
- Teachers were overwhelmingly supportive of the idea of using environment-based activities to teach state standards and many teachers noted that environment-based concepts could be taught in science and many other disciplines.
• Many teachers were of the opinion that the student interest and engagement elicited through environment-based activities promoted an overall readiness to learn that extended to other disciplines. Some teachers felt this was due to the hands-on nature of the environment-based activities as well as their relevance to real life.

• Two-thirds of the teachers who participated in Institute One said the Institute was very useful in providing information to aid them in incorporating environment-based activities in the classroom. The remaining third felt the Institute was moderately useful in this regard.

• Nearly three-quarters of teachers said the information they learned during Institute One inspired a sense of stewardship toward the environment either very much so or moderately.

• All but two teachers said they would definitely implement what they learned during Institute One directly with students in the classroom. The remaining two teachers said they would “probably” do so.

Institute Two

• Roughly three-quarters of all teachers said they increased content knowledge either “moderately” or “a lot” in two of four content areas in Institute Two: watershed management and renewable energy technology.

• Nearly all teachers said they increased content knowledge “moderately” or “a lot” in regards to renewable energy resources, while nine out of sixteen indicated similar knowledge gains in regards to weathering and erosion.

Institute Three and Follow-Up

• In Institute Three, all teachers rated stewardship project presentations from other teachers as “moderately” or “very” useful; all but one teacher said the presentations gave them ideas for implementing ecological concepts or activities into their own classrooms; and all said the presentations gave them a chance to exchange ideas with other educators.

• All teachers strongly agreed that Institute Three was inspirational for them, and all agreed that Institute Three was informative.

• Half of participating teachers said the stewardship projects were very effective in increasing their ecological concept knowledge while the remainder said they were moderately effective in doing so.

• Nearly all teachers reported that the stewardship projects were very effective in increasing students' ecological knowledge as well as increasing their sense of environmental stewardship for themselves and students alike.

• Many teachers reported that since participating in the Institute they had begun to use their immediate outdoor surroundings as a platform for teaching environmental concepts. In addition, some teachers reported that bringing relevant environmental issues into their lessons had deepened the classroom experience for them as well as their students.

• All teachers either agreed or strongly agreed that they were more likely to include an ecological component as a result of participating in the three-day Institute.

• In describing next steps, many teachers reported that they would continue and/or expand their current stewardship projects into the next school year. A few teachers also expressed enthusiasm about the prospect of getting involved with community and other organizations to secure funding for stewardship projects and environmental education at their schools.
Introduction

The California Environmental Education Foundation (CEEF) is committed to providing professional development opportunities for teachers that promote ecological understanding, stewardship of the environment, and environment-based practices in the classroom and beyond. For 2011, in partnership with the Yolo County Office of Education (Yolo COE), the CEEF sponsored a three-day Teacher Institute designed for elementary and secondary teachers. The Institute utilized an Action Research Model to maximize collaborative learning in environmental education and place-based stewardship.

The Evaluation and Training Institute (ETI) is a non-profit research and consulting organization based in Los Angeles and specializing in educational program evaluation. ETI worked with CEEF to evaluate the Best Practices of Environmental Education and Stewardship 2011 Institute. The purpose of the evaluation was to measure the extent to which the program was successful in meeting the following three goals:

• Provide three days of high quality professional development on best practices of environmental education (EE) and stewardship with eight hours of individualized follow-up consultation with a CREEC network Regional Coordinator.
• Provide hands-on experience with research-based EE activities, and give sample curricula from Project Learning Tree, Project Wild Aquatic, and Project WET.
• Enable participants to gain ecological knowledge, enhanced pedagogic skills, and renewed passion for environmental stewardship.

The findings from this evaluation follow in the report below.

Methods and Sample

Areas of Inquiry

In alignment with the goals of the program, data collection efforts were focused on the following areas:

• Ecological Understanding (content)
• Stewardship of the Environment (attitude)
• Environment-Based Practices (behavior)

Ecological Understanding. In order to gauge the extent to which teachers had gained in specific content knowledge presented in Institutes One and Two, teachers completed content questions in a pre- and post-survey format. Pre-surveys containing multiple-choice content items were administered prior to the start of Institutes One and Two, and the same items were included in a post-survey completed after the close of each Institute. In addition, teachers were asked to rate the extent to which they felt they had increased their ecological content knowledge in specific areas.

Stewardship of the Environment. In order to mitigate a potential “ceiling effect” (initial positive responses leave little room for growth or change) that is likely to occur when respondents are asked about the concept of environmental stewardship, we used a
post-only approach to surveying teacher attitudes. We included both quantitative and qualitative items for teachers to report their attitudes toward stewardship of the environment in the interest of collecting robust and meaningful data. These types of items were included on post-surveys for all three Institutes and were designed to directly address the impact of the program on participants’ attitudes.

Environment-Based Practices. For this third area of focus, we assessed how teachers’ classroom practices were influenced by the Institute trainings. The term classroom practices includes teaching strategies and lesson content as well as any environment-based practices that evolved as a result of the program. We collected these data through pre- and post-survey items across all three Institutes in order to gain an in-depth understanding of any changes in behavior or classroom highlights.

Data Collection

All surveys can be found in Appendices A – E. Surveys were administered during the Institute trainings through Zoomerang, an online survey software system. ETI worked with the Yolo COE to house the survey link on a CEEF-related website. All survey responses were received electronically via Zoomerang. All participants were asked to complete pre- and post-surveys; we received close to a 100 percent response rate.

<table>
<thead>
<tr>
<th>Institute One</th>
<th>Institute Two</th>
<th>Institute Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre- n=16</td>
<td>Post- n=15</td>
<td>--</td>
</tr>
<tr>
<td>Pre- n=16</td>
<td>Post- n=16</td>
<td>Post- n=16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-- n=14</td>
</tr>
</tbody>
</table>

Data Analysis and Reporting

For the final report, we analyzed all content, attitudinal, and behavior data collected over the course of the three Institutes. Quantitative data were aggregated and analyzed using descriptive analyses (frequencies). Percentages were not included due to the small number of survey respondents (n=14-16). Qualitative survey data were analyzed for salient themes and presented thematically. In addition, we reviewed teacher participant Power Point presentations, self-reflection notes, and California Regional Environmental Education Community (CREEC) interview transcripts provided by CEEF in order to provide contextual quotes and enrich the findings from the survey data.

Sample

On the Institute One pre-survey, teachers were asked to provide demographic information including the grade level and subjects they teach. Of the 16 participants who completed the survey, grade levels ranged between Grade 2 and Grade 12 (see Table 2 on the following page). Due to the fact that several teachers reported teaching more than one grade level, the number of grade levels is greater than the number of teachers who completed the question (n=16). As depicted in Table 2 on the following page, the largest number of teachers reported teaching Grade 6 (n=9) and Grade 5 (n=5).
Table 2
Grade levels taught by participants

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 2</td>
<td>n=1</td>
</tr>
<tr>
<td>Grade 3</td>
<td>n=1</td>
</tr>
<tr>
<td>Grade 4</td>
<td>n=3</td>
</tr>
<tr>
<td>Grade 5</td>
<td>n=5</td>
</tr>
<tr>
<td>Grade 6</td>
<td>n=9</td>
</tr>
<tr>
<td>Grade 7</td>
<td>n=2</td>
</tr>
<tr>
<td>Grade 8</td>
<td>n=3</td>
</tr>
<tr>
<td>Grade 9-12</td>
<td>n=3</td>
</tr>
<tr>
<td>(high school)</td>
<td></td>
</tr>
</tbody>
</table>

The range of subjects taught by participants varied widely from language and reading to science to core curriculum (Table 3). The highest number of teachers reported teaching multiple or all subjects.

Table 3
Subjects taught by participants

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple/All</td>
<td>n=9</td>
</tr>
<tr>
<td>Language/Reading/Communication</td>
<td>n=2</td>
</tr>
<tr>
<td>Science/Biology/Environmental Science</td>
<td>n=2</td>
</tr>
<tr>
<td>World History/Global Studies/Social Studies</td>
<td>n=2</td>
</tr>
<tr>
<td>Core Curriculum (Special Education)</td>
<td>n=1</td>
</tr>
<tr>
<td>Industrial Technology</td>
<td>n=1</td>
</tr>
<tr>
<td>Math</td>
<td>n=1</td>
</tr>
<tr>
<td>Study Skills</td>
<td>n=1</td>
</tr>
<tr>
<td>Speech</td>
<td>n=1</td>
</tr>
</tbody>
</table>

Findings

Institute One

Current Practices and Attitudes

Prior to beginning participation in Institute One, teachers were asked to describe both why they had decided to participate in the Institute and what they hoped to gain from the experience. In their open-ended remarks, teachers who attended CEEF Institute One attributed their participation to one of three main reasons, namely: to facilitate professional growth or development; to foster student growth or development; and to heighten environmental awareness and stimulate a sense of environmental stewardship among students. For example, in one response that highlights professional growth and development, a teacher said, “I am working on my MA in Interdisciplinary Education-Environmental Education, and the institute’s objectives support my research on using cooperative/inquiry methods and direct service to teach.”

Another teacher put it this way regarding the potential for student growth, “I was interested in the subject and [am] always looking for new ways to develop self-monitoring learners and critical thinkers.” A third teacher commented, “I would love to
encourage my students to take an active interest in the world around them. We have spent a week at Outdoor Ed and I would like the students to give back to the environment. For some students the outdoors is not something they think about or experience; it is my obligation to at least expose these students to the opportunities and experiences that are available to them.”

When asked what they hoped to gain from Institute participation, teachers spoke about the desire to gain, as one teacher noted, “insight into how I can make my students more responsible in their relationship to the environment.” In addition, teachers cited the desire to develop additional resources to support environmental stewardship education and projects and to learn new ideas and curriculum that they can implement with students in the classroom. For example, one teacher reported the desire to acquire “More knowledge for me and a more enriching curriculum for my students.” Another sought “to gain support in environmental stewardship, ensuring that the science component is effective, accurate and relevant to my students’ lives.”

Prior to participating in the CEEF Institute, most teachers said they incorporated environment-based activities into the classroom at least on occasion. Four teachers reported utilizing environment-based activities frequently. A couple of teachers also reported discussing environmental topics in the classroom but said they did not currently include any related activities in the classroom setting.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Current Classroom Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please choose the statement that best reflects the extent to which you currently incorporate environment-based activities into your classroom practice.</td>
<td>n=16</td>
</tr>
<tr>
<td>• Currently I don’t include these types of activities.</td>
<td>--</td>
</tr>
<tr>
<td>• We talk about the environment in my classroom, but we don’t conduct activities.</td>
<td>2</td>
</tr>
<tr>
<td>• I incorporate these types of activities occasionally.</td>
<td>7</td>
</tr>
<tr>
<td>• I incorporate these types of activities frequently.</td>
<td>4</td>
</tr>
<tr>
<td>• Other, please specify</td>
<td>3</td>
</tr>
</tbody>
</table>

As noted in Table 5 below, about a third (5 out of 16) of teachers reported having little confidence incorporating environmentally related activities in the classroom at the onset of the Institute. The remainder (11 out of 16) was “moderately” or “very” confident.

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Classroom Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate your current level of confidence toward incorporating environment-based activities into your classroom practice.</td>
<td>n=16</td>
</tr>
<tr>
<td>• Not at all confident</td>
<td>--</td>
</tr>
<tr>
<td>• A little confident</td>
<td>5</td>
</tr>
<tr>
<td>• Moderately confident</td>
<td>8</td>
</tr>
<tr>
<td>• Very confident</td>
<td>3</td>
</tr>
</tbody>
</table>

Teachers’ comments provided at the start of the Institute indicate that teachers saw the potential for environment-based activities to enrich the classroom. In their comments, teachers were of the opinion that students benefit from environment based activities in the classroom in a number of ways. For one thing, teachers felt that all students are able to relate to the topic of the environment. As such, environment-based activities offer “students the opportunity to make this connection” and can empower students to
“become actively involved in their community and realize their impact is meaningful.” Another teacher added, “It allows students to realize the impact they all have upon our planet and that their actions can make a difference.” Another teacher added, “Most kids do not realize that their actions are felt not only locally but also globally. I love to empower them to make a difference.”

Next, teachers expressed the opinion that by teaching environmental topics they could enable students to relate to the subject matter, thereby fostering deeper learning. As one teacher said, “If I can create some sort of connection between what I am teaching and the student, I feel the student has a better chance to retain the information. It is my hope that environment-based activities will maintain my students’ interest for a longer period of time thereby making the experience as a whole more valuable.”

Finally, teachers said activities, in general, are more engaging for students. As the teacher put it, “Students naturally get more from doing activities…They will remember it more…than simply reading from a book.”

Data collected through CREEC coordinator interviews further emphasizes teachers’ support for incorporating environment-based activities to enrich the classroom. Specifically, teachers were overwhelmingly supportive of the idea of using environment-based activities to teach state standards and many teachers noted that environment-based concepts could be taught in science and many other disciplines. In addition, many teachers were of the opinion that the type of student interest and engagement elicited through environment-based activities promoted an overall readiness to learn that extended to other disciplines. In other words, if students became engaged through these types of activities they were more likely to be receptive to other learning and concepts. Many teachers pointed out that this was due to the hands-on nature of the environment-based activities as well as their relevance to real life. The comments below highlight some prevalent points of view:

• “I am a huge advocate of [using environment-based activities to teach state content standards]. I would stress that the standards to be taught exceed the limitations of environmental sciences. Student engagement in environment-based activities can serve as the conduit for relevant engagement in a wide range of disciplines—math, science, language arts, social studies.”

• Environmental education (EE) offers the potential for students to engage in the world immediately around them. EE can serve as the platform for making school relevant and meaningful to a large population of students who often see limited connection between school and the real world.”

• “I think it is a fantastic idea because it makes content applicable to students’ everyday lives and makes them more responsible citizens at the same time.”

As for themselves, teachers noted a number of potential benefits to incorporating environment-based activities into the classroom. Teachers’ feedback spanned a number of themes: enhancing their own knowledge and passion for the environment; developing their sense of environmental stewardship; empowering students/passing the torch/paying it forward regarding care and concern for the environment; making a lasting impact in students’ lives; enhancing teaching skills; and increasing students skills. The following comments highlight these themes:
• “I want to feel more comfortable teaching environment education to my students and become an environmental steward, not just a mildly interested participant.”

• “Including environment-based activities in my teaching helps remind me why I became a teacher, it allows me to make a difference in my student’s lives, and ultimately my hope is that they will “pay it forward” some day.”

• “I think including these activities will help me by broadening my educational base for educating students and make teaching more fun for me as it makes it more fun for the students.”

• “I really enjoy the environment and have been interested since I was younger in the environment. I would like to see my students have some of that awareness and love for the environment.”

• “I want to make relevant real life connections for my students. I want them to see that they can have an impact on their environment.”

Ecological Content Knowledge

Before participating in Institute One, teachers were surveyed to determine their prior knowledge of content taught in the Institute. Specifically, participants were asked questions based on the curricula that was used to demonstrate environmental content and activities during the Institute: “Project WILD: Where Have All the Salmon Gone?” and “Project Learning Tree: Living With Fire.” At the conclusion of Institute One, teachers were again surveyed to measure any changes in prior content knowledge. Results of the pre- and post- Institute One surveys are found in Tables 6 and 7 on the following page. As depicted in the tables, outcomes for Institute One participants are mixed.

Outcomes for “Project WILD: Where Have all the Salmon Gone” suggest that revisions to the content and/or instructional methods may be warranted or possibly that the content items included in the survey did not receive enough focus during the training. For two of the three content questions respondents showed no gains in content knowledge. For the third content question, post- Institute surveys were negative for Institute attendees.
Table 6  
Ecological Knowledge from Project Wild: Where Have All the Salmon Gone?  
n=16

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-survey</th>
<th>Post-survey</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose the statement that is the least accurate regarding research data gathered about wildlife (fish) populations in a similar manner over a period of time:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unless the data is consistent and proven to be accurate, decisions should not be based on it.</td>
<td>5</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td>Choose the most accurate statement describing the decline of salmon in California:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• With 85% of the state’s developed water required for crop irrigation, the salmon population has suffered by having their natural spawning grounds disrupted.</td>
<td>11</td>
<td>8</td>
<td>-3</td>
</tr>
<tr>
<td>Choose the statement that most accurately completes the following statement: The State Board of Fish Commissioners established salmon hatcheries...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• As a means to stabilize fish populations.</td>
<td>15</td>
<td>15</td>
<td>--</td>
</tr>
</tbody>
</table>

Outcomes for “Project Learning Tree: Living With Fire” are somewhat more positive though results remained mixed. Two of the four content questions (The “fire triangle” consists of three elements which are necessary to start and maintain a fire. The three elements are...and Please choose the most accurate statement below regarding forest fires...) garnered a very high pre- Institute score from Institute participants. Even so, three participating teachers acquired additional knowledge in one area while one teacher scored lower in the second domain following the workshops.

When looking at the two other test questions in this content area (In the United States there is an increased likelihood that wildfires will threaten both structures and people because...and When forest fuels (trees) are consumed by fire, it is most accurate to say...), modest pre- Institute results experienced small gains from one and two teachers, respectively at the conclusion of the workshops.

Table 7  
Ecological Knowledge from Project Learning Tree: Living With Fire  
n=16

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-survey</th>
<th>Post-survey</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The “fire triangle” consists of three elements which are necessary to start and maintain a fire. The three elements are:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Heat, fuel, and oxygen.</td>
<td>12</td>
<td>15</td>
<td>+3</td>
</tr>
<tr>
<td>Please choose the most accurate statement below regarding forest fires.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Both the first and second bullets.</td>
<td>15</td>
<td>14</td>
<td>-1</td>
</tr>
<tr>
<td>In the United States there is an increased likelihood that wildfires will threaten both structures and people because:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• There has been a movement of the population away from urban areas, into outlying rural and wildland areas, increasing the size of the wildland-urban interface.</td>
<td>9</td>
<td>10</td>
<td>+1</td>
</tr>
<tr>
<td>When forest fuels (trees) are consumed by fire, it is most accurate to say:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Most of the energy released becomes heat energy.</td>
<td>7</td>
<td>9</td>
<td>+2</td>
</tr>
</tbody>
</table>
Because the items above were designed to measure very narrow content items, teachers were also asked to rate the extent to which Institute participation increased their content knowledge in the content areas surveyed in pre- and post- participation surveys (see Table 8 below). In this way it was possible to gain a fuller picture of the content gains teachers achieved. About half of Institute One teachers said they experienced moderate content knowledge gains across all content areas. About a quarter of participating teachers said they experienced little gains in content knowledge. A small remainder said they learned a lot across all content areas as a direct result of attending the workshops. For the most part, however, pre- and post- Institute content items reflect more modest knowledge gains than teachers’ ratings attribute directly to their workshop participation. When taken together, just two or three teachers made content knowledge gains in any of the content areas included in the survey. In contrast, approximately two-thirds of participating teachers said they increased their content knowledge “moderately” or “a lot” across content areas as a result of attending the Institute (Table 8).

### Table 8
Content Knowledge Gains
n=15

<table>
<thead>
<tr>
<th>To what extent did the Institute increase your ecological content knowledge in . . .</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Interpreting fluctuations in fish populations through data?</td>
<td>--</td>
<td>4</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>• Understanding the effects of humans and habitat changes on fish populations?</td>
<td>--</td>
<td>4</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>• Understanding elements of the fire triangle and the prevention and control of fire?</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>• Understanding ways to reduce the risk of wildland fire to homes?</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

### Institute One Experience

Perhaps teachers’ overall positive perceptions of their own content knowledge gains were influenced in part by their positive evaluations of the Institute overall and by their assessment of the likelihood of implementing what they learned in the classroom. After all, two-thirds of the teachers who participated in the Institute said the Institute was very useful in providing information to aid them in incorporating environment-based activities in the classroom. The remaining third felt the Institute was moderately useful in this regard. Nearly three-quarters of teachers said the information they learned during the Institute inspired a sense of stewardship toward the environment either very much so or moderately (see Table 9).

In addition, as depicted in Table 10, all but two teachers said they would definitely implement what they learned during the Institute directly with students in the classroom. The remaining two teachers said they would “probably” do so.
When asked to describe Institute highlights, participating teachers mentioned the speakers, resources, and contacts; interactions and opportunities to share with colleagues; hands-on experiences; and support and inspiration gained from the workshops. Typical teachers’ comments included the following:

- “I thought every speaker was knowledgeable and personable. I feel that I can contact any of people involved and have support from them.”

- “I especially enjoyed the guest speakers and their explanations of the multitude of resources they offer to support environmental education in the classroom. I enjoyed the interactive nature of the institute, and being able to talk to my colleagues about what they do in their practice.”

- “The breakout session for participants to discuss the preconceptions about wildfire and finding ways of making our students’ learning experience more meaningful.”

- “There was a wealth of information shared and great ideas that I can take and easily adapt for my classroom.”

- “The highlights for me were the hands on activities, the pacing was good, and I appreciate all the hand outs and take home supplies.”

When asked for recommendations to improve the Institute, teachers’ comments indicated that they had few suggestions for improvement. By way of example, two teachers noted that “Everything was quite good” and “Great job, loved it all.” Those teachers who requested improvements asked for more time to collaborate with colleagues, additional time to process information presented by speakers, and additional resources to enable participants to organize the information presented. Sample comments from participating teachers included:
• “The time allotted for the various components were not enough for in depth presentation and discussion.”
• As much hands on as possible. Maybe more time to collaborate with others on project ideas.”
• “I think offering an explanation before presentations of expected outcomes would be helpful. I would have liked more time to talk to others about stewardship project ideas.”
• “No work during breaks—a lot of information needs to be processed.”
• “Provide some paper for notes/reflection/questions interspersed in notebook.”

Institute One Follow-up

Approximately two months after Institute One, at the beginning of the Institute Two training, teachers were asked to reflect back on how Institute One had impacted their classroom experience. Most teachers felt that including ecological activities in the classroom enriched their experience. Fourteen out of sixteen teachers said it did so either “moderately” or “a lot” in their post-survey responses (see Table 11 below.)

<table>
<thead>
<tr>
<th>To what extent did including ecological activities into your classroom practice enrich the teaching experience for you?</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
<th>N/A Did not include any activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=16</td>
<td></td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>--</td>
</tr>
</tbody>
</table>

In open-ended feedback teachers elaborated on their experience, and all but one teacher reported utilizing pedagogical strategies, worksheets, and/or implementing an environment-based project with their students subsequent to attending Institute One. One teacher reported, “We have started a recycling program on campus, which has sparked many discussions on the environmental impact it has on our school” while another explained “My sixth grade students researched Biomes. They then created Biomes projects that represented their research.” A third teacher commented, “Yesterday my class planted Willows and Cottonwoods along Putah Creek. We are learning about the Putah Creek watershed and how watersheds in general effect cultures.”

Other teacher remarks included:

• “We tried the oxygen flame project. We have started studying birds. We used some Project WILD activities.”

• “We are developing a project involving planting, maintaining and protecting trees – focus on urban forestry.”
• “Fire ecology, where have the salmon gone? These fit in so well with my class discussions. The salmon activity was especially effective.”

• “I worked on understanding the resources within the environment, bring articles on how to take care of the environment and make it a better place for all.”

• “I took my students outside to observe the local ecology and make note of anything they felt, saw, or heard. They then came inside to discuss what they had seen and select the thing they all experienced that interested them the most. They picked birds. We have since been learning about birds, migration, and trying to figure out which birds are present in our yard.”

Following completion of Institute One, teachers were also asked to rate the success of Institute One in terms of increasing students’ ecological knowledge, increasing students’ sense of ecological stewardship, and in increasing their own sense of ecological stewardship. As evidenced in Table 12 on Page 16, all but one teacher reported that the Institute was “somewhat” or “very” successful on all three measures; the number of teachers who said the Institute was “somewhat” successful was roughly equal to the number who said it was “very” successful on the three measures. Teachers also shared comments that added detail to their overall ratings on these measures. On the positive side, teachers spoke about high levels of student engagement, hands on activities that engaged students allowing them to access deeper learning, and the ease of implementing projects in the classroom. In their comments, they said:

• “Kids are engaged in the project, eager to learn more and to educate others.”

• “Students were very engaged with the material, and wanted to know more about the concepts because of that engagement.”

• “The kids are always motivated and excited to do things that are hands on.”

• “This project did not require an excessive amount of time or energy, yet the change in my students and myself has been tremendous.”

• “The project allowed the students to look beyond their classroom and neighborhood to understand little better their ‘place’ in the global ecological world.”

• “The salmon activity fit in with our discussion/learning about water and human’s impact on the earth. Students really saw how human population growth impacts eco-systems. They loved trying to figure out a mystery!”

• “I think it was just the first steps in their journey of stewardship. It started the knowledge base about the global climates, and ecological importance of each biome.”

• “When they understand more about the relationship between humans and the environment, they want to be better stewards of the earth. So, the activities not
only helped them understand concepts but fostered environmental literacy and ethics.”

Some teachers also provided feedback about constraints or challenges in adapting Institute One activities in the classroom. Some teachers noted the following: “I’m having trouble linking this to developing a deep understanding of topics in the standards” and “It was successful as far as what I scheduled for us to do; as always, I have time constraints which kept me from doing more.”

As depicted in Table 13 below, 10 out of 15 teachers also reported that including ecological activities into classroom practice enriched the teaching experience “a lot” for them. The remainder noted that including ecological activities enhanced their teaching experience “somewhat.” By way of explanation, one teacher commented, “It is always a rewarding experience to share with the students ecology and science…they are naturally drawn to those subjects.” Another explained, “I get so focused on standards and testing and pressure that I ‘forget’ that teaching is so much more than those areas. Working with kids on ecological activities brings the fun back into the job.”

<table>
<thead>
<tr>
<th>Table 12</th>
<th>Success of Institute One</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=16</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How successful were these activities for . . .</th>
<th>Not at all successful</th>
<th>Somewhat successful</th>
<th>Very successful</th>
<th>N/A Did not include any activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increasing your students’ ecological knowledge?</td>
<td>--</td>
<td>7</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>• Increasing your students’ sense of ecological stewardship (extent to which they feel responsible for the environment)?</td>
<td>--</td>
<td>9</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>• Increasing your sense of ecological stewardship (extent to which you feel responsible for the environment)?</td>
<td>--</td>
<td>6</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 13</th>
<th>Enrichment of Classroom Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=16</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To what extent did including ecological activities into your classroom practice enrich the teaching experience for you?</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
<th>N/A Did not include any activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>5</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

**Institute Two**

**Ecological Content Knowledge**

In keeping with the protocol for Institute One, teachers who took part in Institute Two were surveyed prior and subsequent to Institute participation to ascertain prior content knowledge and to assess content knowledge gains resulting from their workshop participation. Participating teachers answered several questions pertaining to the
curricula “Project Wet” and “Energy for Keeps.” Their responses are provided in Table 14 and Table 15.

Also in keeping with patterns seen in Institute One pre- and post- survey responses, teachers’ content knowledge gains varied greatly by individual question. For example, while three teachers demonstrated content knowledge gains for the first question (Best Management Practices used by watershed managers to prevent soil erosion…) in the survey, three teachers also demonstrated negative content knowledge gains for the second survey question (More mercury was used and lost with this type of gold mining…).

Furthermore, post-Institute surveys for the two remaining questions (The weathering of rock and soil and the transportation and deposition of sediment is directly tied to the environmental fate of mercury in all except…” and “Mercury methylation is controlled in waterways by which of the following…”) indicated that teachers experienced little knowledge gains on either question after attending the workshops.

Table 14
Ecological Knowledge from Project WET
n=16

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-survey</th>
<th>Post-survey</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Management Practices used by watershed managers to prevent soil erosion include all of the following except:</td>
<td>12</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>• Increasing the slope of the land to shed water more efficiently.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More mercury was used and lost with this type of gold mining than with any other types of mining:</td>
<td>13</td>
<td>10</td>
<td>-3</td>
</tr>
<tr>
<td>• Hydraulic.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The weathering of rock and soil and the transportation and deposition of sediment is directly tied to the environmental fate of mercury in all except:</td>
<td>7</td>
<td>7</td>
<td>--</td>
</tr>
<tr>
<td>• Bioaccumulation and biomagnifications in the food web.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury methylation is controlled in waterways by which of the following:</td>
<td>5</td>
<td>6</td>
<td>+1</td>
</tr>
<tr>
<td>• Sulfate reducing bacteria and microbes that thrive in low dissolved oxygen conditions.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In looking at pre- and post- survey responses for “Energy for Keeps” content knowledge, it is evident that teachers’ prior content knowledge on all but one survey question (“What are some renewable energy resources that California has in abundance?”) was quite low. Only between four and six teachers of the 16 teachers responded correctly to the following pre- survey questions as part of “Energy for Keeps”: Which of the following choices of renewable energy technologies has the potential to be a baseload resource, and could run around the clock all year long?, What is currently the most cost-effective renewable technology for areas with a consistent supply of this resource? and What renewable technology takes the most land to make a given amount of electric power?.

For the remaining question regarding California’s abundant renewable energy resources, 12 out of 16 participating teachers answered correctly on the pre-survey.
As depicted in Table 15 on the following page, teachers experienced strong content knowledge gains in response to two “Energy for Keeps” post-survey questions. An additional seven teachers also correctly answered “Which of the following choices of renewable energy technologies has the potential to be a baseload resource…” and “What is currently the most cost-effective renewable technology…” after taking part in the workshops. As in Institute One, however, content knowledge gains were not experienced across all questions. The remaining two questions included in the surveys for “Energy for Keeps” demonstrated little to no gains in teacher content knowledge at the conclusion of Institute Two.

Table 15
Ecological Knowledge from Energy for Keeps
n=16

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-survey</th>
<th>Post-survey</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which of the following choices of renewable energy technologies has the potential to be a baseload resource, and could run around the clock all year long?</td>
<td>6</td>
<td>13</td>
<td>+7</td>
</tr>
<tr>
<td>• Geothermal and biomass.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is currently the most cost-effective renewable technology for areas with a consistent supply of this resource?</td>
<td>4</td>
<td>11</td>
<td>+7</td>
</tr>
<tr>
<td>• Wind turbines.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What renewable technology takes the most land to make a given amount of electric power?</td>
<td>5</td>
<td>6</td>
<td>+1</td>
</tr>
<tr>
<td>• Solar -- photovoltaic.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What are some renewable energy resources that California has in abundance?</td>
<td>12</td>
<td>11</td>
<td>-1</td>
</tr>
<tr>
<td>• Solar, Geothermal, Wind.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When asked about the extent to which teachers felt Institute Two increased their knowledge across the content areas presented in the workshops, teachers’ perceptions were more positive than their pre- and post-survey responses indicated. Roughly three-quarters of all teachers said they increased content knowledge either “moderately” or “a lot” in two of four content areas: watershed management and renewable energy technology. Nearly all teachers said they increased content knowledge “moderately” or “a lot” in regards to renewable energy resources, while just nine out of sixteen indicated similar knowledge gains in regards to weathering and erosion. See Table 16 below.

Table 16
Content Knowledge Gains
n=16

<table>
<thead>
<tr>
<th>To what extent did the Institute increase your ecological content knowledge of . . .</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Watershed management?</td>
<td>--</td>
<td>4</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>• Weathering and erosion?</td>
<td>--</td>
<td>7</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>• Renewable energy resources?</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>• Renewable energy technology?</td>
<td>1</td>
<td>3</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>
**Institute Two Experience**

Following Institute Two, teachers were asked to reflect on their experience through a post-Institute survey. As depicted in Table 17 below, half of all teachers said they would definitely implement what they learned in Institute Two in the classroom while another six said they would probably do so.

<table>
<thead>
<tr>
<th>Likelihood of Practical Application in Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=16</td>
</tr>
<tr>
<td><strong>What is the likelihood that you will use what you learned today in your classroom?</strong></td>
</tr>
<tr>
<td>Not at all likely</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>--</td>
</tr>
</tbody>
</table>

Teachers were also asked to report on the highlights of Institute Two. According to teachers’ feedback these included: the content experts, the activities they can immediately implement in their classrooms, and the opportunity to interact and collaborate with fellow teachers. One teacher summed up these sentiments, saying “I really enjoyed the opportunities to engage with cohort teachers and discuss ideas/strategies with curricular experts. I also really liked the pedagogical discussion and activities, which were engaging and seemed easy to adapt.”

In additional remarks, teachers shared the following:

- “*In depth presentations by [the presenters]. At the middle school level… I need the details [they] provided to back up our somewhat vague curriculum standards.*”

- “*The Project WET activity and presentation were very helpful. Short, interactive presentation followed by active lesson.*”

- “*The ‘pass it through’ activity was engaging and I will use with my students. The clean energy book is very informative and provides a good resource for my unit on alternative resources.*”

- “*I am glad we have time to work with our peers to discuss our projects and give and take advice.*”

- “*The activities and time to share ideas about our projects. The handouts and books are great too.*”

In their recommendations for Institute Two, those teachers who provided suggestions focused on two themes: less time spent lecturing (more time interacting with colleagues and in hands-on activities) and presentation of information that is appropriate to be shared directly with students. “*Model good practice! Make sure lecture is minimized so we had more time to do the activities and discuss how to effectively integrate into classes*” and “*I appreciate the content experts very much, but I am not proficient in their subject areas so it will make it hard for me to use their information at a level that my students can grasp,*” typified their suggestions.
Institute Three

Institute Three Experience

At the conclusion of Institute Three, teachers were surveyed to ascertain their opinions about the Institute Three as well as to gain feedback about their overall experience. Regarding Institute Three participants were asked to consider the extent to which they found stewardship project presentations from colleagues helpful, felt the presentations provided ideas for implementing activities in the classroom, and were provided with an opportunity to exchange ideas with other educators. Feedback from teachers was quite positive on all three measures. All teachers rated stewardship project presentations from other teachers as “moderately” or “very” useful; all but one teacher said the presentations gave them ideas for implementing ecological concepts or activities into their own classrooms; and all said the presentations gave them a chance to exchange ideas with other educators. (See Table 18 and Table 19, below, for more detail.)

Table 18
Usefulness of Colleague Presentations
n=14

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate the extent to which you found the stewardship project presentations from other teachers useful.</td>
<td>--</td>
<td>--</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 19
Stewardship Project Presentations
n=14

<table>
<thead>
<tr>
<th>Please rate the extent to which you agree with the statement: The stewardship project presentations gave me . . .</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideas for implementing ecological concepts/activities into my own classroom.</td>
<td>1</td>
<td>--</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>A chance to exchange ideas with other educators.</td>
<td>--</td>
<td>--</td>
<td>11</td>
<td>3</td>
</tr>
</tbody>
</table>

Teachers who participated in Institute Three were also asked about the usefulness of the keynote speaker address on “The Real Dirt of Environmental Education” and the panel presentation and discussion on “Funding Environmental Stewardship Projects.” All teachers said both were useful to them as depicted in Table 20 below.

Table 20
Institute Three Presentations
n=14

<table>
<thead>
<tr>
<th>Please rate the extent to which you found . . .</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>The keynote speaker address on the topic: “The Real Dirt of Environmental Education” useful.</td>
<td>--</td>
<td>--</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>The panel presentation and discussion on the topic “Funding Environmental Stewardship Projects” useful.</td>
<td>--</td>
<td>--</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>
Teachers were asked to rate the extent to which they felt Institute Three was both informative and inspirational with highly positive results. All teachers who responded to the survey question strongly agreed that Institute Three was inspirational for them. All also agreed Institute Three was informative.

<table>
<thead>
<tr>
<th>Please rate the extent to which you agree that</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute Three was . . .</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Informative.</td>
<td>--</td>
<td>--</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>• Inspirational.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>14</td>
</tr>
</tbody>
</table>

**Classroom Experience**

**Stewardship Projects**

As part of the overall Institute experience, teachers developed stewardship projects in the classroom, which they then presented to other teachers during Institute Three. The exercise was designed to have teachers apply concepts they had learned in the Institute while promoting environmental stewardship, a main tenet of the trainings. In order to ensure the success and completion of the project as well as provide valuable mentorship to teachers during the process, they were partnered with California Regional Environmental Education Community (CREEC) coordinators. The coordinators worked with participating teachers collaboratively to assist with resources and feedback for the project.

In developing stewardship projects, teachers reported that they and their students used a variety of resources that included activities, worksheets, and content provided in Institute workshops; online resources from CREEC; consultations with the CREEC coordinator; and local sources including parents, teachers, and environmental organizations. One teacher commented on the need for more time to work with these resources, explaining, “I have not had the time to explore resources fully. This is information I plan to explore. I also plan to involve more school staff and community members and now I have some ideas on how to start and where to go for answers.”

Teachers who participated in Institute Three were asked to respond to survey questions rating the extent to which they felt the stewardship project effectively increased their knowledge of ecological concepts, increased students’ knowledge of ecological concepts, increased their sense of environmental stewardship, and increased their students’ sense of environmental stewardship. The results for all measures were highly positive for Institute Three. Half of participating teachers said the stewardship projects were very effective in increasing their ecological concept knowledge while the remainder said they were moderately effective in doing so. Nearly all teachers (See Table 22 on the following page) reported that the stewardship projects were very effective in increasing students’ ecological knowledge as well as increasing their sense of environmental stewardship for themselves and students alike.

In open-ended responses, teachers verified that they had gained in knowledge, both knowledge of concepts and knowledge of teaching resources. For example, one teacher
explained, “I had never been involved in composting before and at the beginning I did not know how it would go. As the project progressed I became more aware of the whole process and how I can start one in my house.” Reflecting several teacher comments, another teacher said, “I have a better idea of what resources are out there and how to access them.”

When asked to rate how helpful the CREEC coordinator was in aiding in the development of their stewardship projects, most teachers (11 out of 14) said the coordinator was helpful (see Table 23 below). The remaining three teachers said the coordinator was “a little” helpful in this capacity. While open-ended responses indicate that teachers worked with the CREEC coordinator in various capacities, one teacher reflected other positive feedback, commenting, “She helped make local connections, was a very responsive sound board, gave me ideas about organizing my Power Point, proofed it for me and gave me feedback. She is wonderful, reliable, motivated, motivating.”

<table>
<thead>
<tr>
<th>Table 22</th>
<th>Stewardship Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=14</td>
<td></td>
</tr>
<tr>
<td>Please rate the extent to which the stewardship project was effective for . . .</td>
<td>Not at all</td>
</tr>
<tr>
<td>• Increasing your knowledge of ecological concepts.</td>
<td>--</td>
</tr>
<tr>
<td>• Increasing your students’ knowledge of ecological concepts.</td>
<td>--</td>
</tr>
<tr>
<td>• Augmenting your sense of stewardship for the environment.</td>
<td>--</td>
</tr>
<tr>
<td>• Augmenting your students’ sense of stewardship for the environment.</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 23</th>
<th>Stewardship Project Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=14</td>
<td></td>
</tr>
<tr>
<td>Please rate the extent to which the CREEC coordinator was helpful in developing your stewardship projects.</td>
<td>Not at all</td>
</tr>
<tr>
<td>--</td>
<td>3</td>
</tr>
</tbody>
</table>

Environmental Education Activities

In addition to providing feedback about the stewardship projects, teachers were asked to comment generally about the value of the environmental education activities for them as well as their students. As depicted in Table 24 on the following page, teachers overwhelmingly found the experience to be valuable for themselves and their students. In open-ended comments, teachers said that they appreciated the sense of focus, motivation, and inspiration for teaching environmental education. Teachers indicated that the value for their students lay in their increased ability to be engaged in and make larger connections to the world around them.
Table 24
Environmental Education Activities
n=14

<table>
<thead>
<tr>
<th>Please rate the extent to which you feel that . . .</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Developing and implementing the environmental education activity was a valuable experience for you as an educator.</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>• The environmental education activity was a valuable experience for your students.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>14</td>
</tr>
</tbody>
</table>

Teachers also described any changes in implementation of environment-based activities or concepts they had made since participating in the Institute. Many teachers reported that they had begun to use their immediate outdoor surroundings as a platform for teaching environmental concepts. In addition, some teachers reported that bringing relevant environmental issues into their lessons had deepened the experience for them as well as their students. Teachers provided the following representative comments:

- “I felt much more confident after hearing ideas from the Institute. I realized others are doing these things. I can too. It was new to figure out how to tie things into urban forestry. I really had to venture out and connect with other groups as I had never done before.”
- “The project that I recently have been working on focuses on renewable energy connected to water conservation. As a result of the workshop I was able to approach this project with a much better understanding of the issues. The hands-on activity in the CEEF teacher institute deepened my understanding of the water ecosystem.”
- “I believe that my thinking about environmental education has to some extent gotten clearer only in the sense that I better appreciate the fact that environmental education is one of the most pressing issues in today’s society. Because environmental education cuts across so many subject areas I’m probably more convinced of the need to pursue opportunities to create team taught courses.”

Classroom Impact

Most teachers were of the opinion that students’ sense of environmental stewardship and learning had increased since participating in the Institute, an opinion they shared during interviews with CREEC coordinators. Many teachers explained that they had engaged students in environmental stewardship and learning beginning locally. For example, many teachers described field trips into the backyard of the school to observe the ecosystem there. Teachers largely described this technique as effective for engaging students and making them excited about their surroundings with one teacher commenting about students, “They are learning more because they are making the connections and are engaged.” Teachers described the stewardship behaviors accompanying these excursions including students’ exhibiting increased care toward the plants and animals in their vicinity, picking up trash, recycling, and talking about environmental topics. Several teachers also explained that they had engaged their students in stewardship projects including recycling, e-waste recycling, restoration projects, and community education projects.
The survey data supports this view of an overall classroom that has an increased culture of environmental knowledge and stewardship (see Table 25 below). In addition, as evidenced by Table 25, teachers also responded positively to items about their ability to teach ecological concepts/activities, and confidence in teaching ecological concepts/activities.

<table>
<thead>
<tr>
<th>Table 25</th>
<th>Classroom Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=14</td>
<td></td>
</tr>
</tbody>
</table>

Please rate your level of agreement to the following statement: Since participating in/As a result of participating in the CEEF Institutes…

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>• I have seen student evidence of increased ecological content knowledge (e.g. through tests, classroom discussions, reports, etc.).</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>• Interest in environmental topics in my classroom has increased.</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>• The sense of environmental stewardship in my classroom has increased.</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>• My ability to teach ecological concepts/activities has increased.</td>
<td>--</td>
<td>--</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>• My confidence in teaching ecological concepts/activities has increased.</td>
<td>--</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

Highlights and Recommendations

Teachers mentioned several aspects of the Institute in response to being asked to share the highlights of the Institute. Specifically, respondents mentioned the opportunity for teacher sharing/collaboration; the presenters; the positive and inspiring atmosphere, and the successful format of the Institute. The comments below illustrate the range of feedback:

• “The positivity of [the Institute staff] was inspiring and it helped me remember why I love teaching.”
• “The Institute was very well organized. I appreciated all the support.”
• “Great information, very impressive speakers, wonderful opportunity to share ideas with colleagues.”
• “The presentations were a highlight, but I also appreciated all of the speakers.”

Teachers also provided some recommendations for the Institute overall, although not all participants had recommendations and there was no strong theme among the recommendations that were presented. The recommendations included the following:

• “Before doing the activities, perhaps explain what the objective is beforehand so we can be more reflective as we’re doing them.”
• “A few more participants in the secondary level would be great.”
• “Have the grant information at the start and take time to work on the plans first.”
• “Take a field trip to a school doing something awesome!”
• “The day before Mother’s Day or any big holiday is not a good choice for an Institute Day.”
• “If the coordinators that contact you in between the Institutes could be more timely with the information we need to complete it’d be helpful.”
• “The interview questions seemed to be a bit repetitive and felt like busywork.”
• “Give Power Point tips and clear guidelines for the final project at the close of the first session.”

Continuing Best Practices

At the end of the CEEF Institute, teachers were asked to think about how their experience with the Institute trainings might continue to influence their professional practice. Of the items below in Table 26, teachers’ responses were most positive when responding to the item “Participating in the CEEF Institute gave me new ideas for classroom lessons/activities.” All Institute participants strongly agreed with this statement. All teachers either agreed (n=13) or strongly agreed (n=1) that they were more likely to include an ecological component as a result of participating in the three-day Institute. Finally, while all participants indicated that the pedagogical presentations and activities were useful to their instructional practice to some degree, more than half (n=8) indicated that this was “moderately” so. In open-ended responses several teachers pointed out that, while the presentations were helpful, they mainly functioned to reinforce information they already had.

Table 26
Continuing Best Practices
n=14

<table>
<thead>
<tr>
<th>Please rate your level of agreement to the following statement:</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Participating in the CEEF Institute gave me new ideas for classroom lessons/activities.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>14</td>
</tr>
<tr>
<td>• As a result of participating in the three-day Institute, I am more likely to include an ecological component into my classroom curriculum.</td>
<td>--</td>
<td>--</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>

| | Not at all | A little | Moderately | Very much so |
|---------------------------------------------------------------|---------|-----------|-------------|
| • Please rate the extent to which you feel that the pedagogical presentations and activities were useful to your instructional practice. | -- | 1 | 8 | 5 |

Teachers were also asked to provide a description of any next steps they would take with regard to environmental education and stewardship. Many teachers reported that they would continue and/or expand their current stewardship projects into the next school year. In addition, several teachers described specific activities or programs they wanted to continue or incorporate at their school sites including planting trees, composting, building a sustainable garden, and recycling. Several teachers also commented that they wanted to expand the environmental curriculum either in their classroom or at their schools. A few teachers also expressed enthusiasm about the
prospect of getting involved with community and other organizations to secure funding for stewardship projects and environmental education at their schools.

Summary and Recommendations

When teachers who participated in the CEEF Institute trainings were first asked to describe their reasons for participation, their comments indicated that they were interested in facilitating professional growth or development; fostering student growth or development; heightening their own sense of environmental awareness, and stimulating a sense of environmental stewardship among students. It is clear from feedback provided by participants that these goals were achieved. Following Institute One, for example, teachers’ survey responses clearly indicated that they found the information they had learned to be useful for incorporating environment-based activities and inspirational for inspiring a sense of environmental stewardship. Furthermore, teachers were positive about the likelihood that they would use what they had learned in the classroom. Beyond teachers’ immediate opinions about the experience, however, the Institute design (three Institute dates occurring across four months) allowed for the opportunity to follow up with teachers to see how this positive experience took shape in their professional practice. At the beginning of Institute Two, for example, teachers were asked to reflect back on their classroom experience since Institute One. In open-ended feedback all but one teacher reported utilizing pedagogical strategies, worksheets, and/or implementing an environment-based project with their students subsequent to attending Institute One. Most teachers felt that including ecological activities in the classroom enriched their experience. Upon looking back at the experience, almost all teachers rated Institute One either “somewhat” or “very” successful in terms of increasing students’ ecological knowledge, increasing students’ sense of ecological stewardship, and in increasing their own sense of ecological stewardship.

Even more concrete evidence of professional impact occurred, however, during Institute Three when teachers brought evidence of stewardship projects in the form of PowerPoint presentations to share with their Institute colleagues. In their feedback regarding the stewardship projects nearly all teachers reported that they were effective for increasing their students knowledge of ecological concepts as well as augmenting their own and their students’ sense of stewardship for the environment. Teachers were largely of the opinion that their students’ sense of environmental stewardship and learning had increased since participating in the Institutes and reported evidence including observations of students’ increased care toward plants and animals in their vicinity, picking up trash, recycling, and talking about environmental topics.

While teachers’ experience and feedback were clearly positive, it was also important to ascertain whether or not teachers were interested in continuing to incorporate these ideas into their practice. In describing their next steps, many teachers reported that they would continue and/or expand their current stewardship projects into the next school year. In addition, several teachers described specific activities or programs they wanted to continue or incorporate at their school sites including planting trees, composting, building a sustainable garden, and recycling. Several teachers also commented that they wanted to expand the environmental curriculum either in their classroom or at their schools.
The largest aspect of the evaluation was dedicated to assessing the extent to which the CEEF Institute met its goals. While this is clearly the case, a less extensive part of the evaluation was dedicated to providing formative feedback for program improvement. Teacher participants were invited to share any recommendations they had for the program overall. These included suggestions to provide objectives prior to Institute activities; take a field trip to observe good environmental education practices in place, and improve logistics with CREEC coordinators. In all, however, the recommendations provided by teachers did not consistently point to any conspicuous areas for improvement (see Highlights and Recommendations section) above.
About ETI

Evaluation and Training Institute (ETI) is a non-profit 501 (c) 3 organization based in Los Angeles. We are dedicated to conducting high quality, customized evaluations for public agencies, private foundations, community-based organizations, schools, post secondary institutions, and professional organizations. With over 35 years of experience, ETI has extensive experience designing and conducting all types of evaluations—including needs assessments, cost-benefit analyses, and formative, process, and outcome evaluations. We use a wide range of evaluation research methods—including survey research, secondary data analysis, structured and unstructured interviews and focus groups, observations, and statistical analyses of quantitative data. We have directed studies at local, state, and national levels. Collectively and individually, ETI senior staff have participated in hundreds of studies and evaluation projects covering organizational, educational and social policy issues in a variety of areas. We also have significant experience working with school districts and other educational organizations to evaluate professional development programs including science and environment-based programs.

In recent evaluations relevant to our work with CEEF, we evaluated a pre-K Hands-on Science Learning program designed to give teachers the training, curriculum, and materials needed to help pre-kindergarten students develop science skills and attitudes. Evaluation results were used to revise the professional development curricula, as well as to highlight notable teacher and student outcomes, such as improved science instruction skills, knowledge and motivation. In another project, we evaluated the effectiveness of six distinct water education programs including a cost-benefit analysis of each program. ETI also conducted a regional review of similar educational programs in order to help our client identify opportunities for inter-agency collaboration. ETI utilized program observations, telephone interviews, and surveys to capture data from stakeholders. In addition, ETI studied aspects of program implementation in order to support program improvement. The evaluation findings and recommendations helped to inform the organization’s 5-year education planning process.
Appendices

Appendix A: Institute One Pre-survey
Appendix B: Institute One Post-survey
Appendix C: Institute Two Pre-survey
Appendix D: Institute Two Post-survey
Appendix E: Institute Three Post-survey
Appendix A: Institute One Pre-survey

Welcome to the Best Practices of Environmental Education and Stewardship evaluation! Your responses are very important for understanding how successful the Institutes are for your classroom practice. All responses are confidential. Please take a few minutes to complete the questions below.

**Educator Background**

1) What grade level do you teach?

2) What subject(s) do you teach?

3) Why did you decide to participate in the Institute?

4) What do you hope to gain from the Institute?

5) Please choose the statement that best reflects the extent to which you currently incorporate environment-based activities into your classroom practice.

   - Currently I don’t include these types of activities
   - We talk about the environment in my classroom, but we don’t conduct activities
   - I incorporate these types of activities occasionally
   - I incorporate these types of activities frequently
   - Other (please specify)

6) Please rate your current level of confidence toward incorporating environment-based activities into your classroom practice.

   - Not at all confident
   - A little confident
   - Moderately confident
   - Very confident

7) How do you think including environment-based activities into your classroom can enrich the classroom experience for students?

8) How do you think including environment-based activities into your classroom can enrich the classroom experience for you?

**Ecological Knowledge**

*From Project WILD: Where Have All the Salmon Gone?*

9) Choose the statement that is the **least accurate** regarding research data gathered about a wildlife (fish) population in a similar manner over a period of time.

   - The data may be analyzed in a variety of ways.
   - Because a fish population is influenced by many factors, it may be difficult to measure the effect of a single factor.
• Unless the data is consistent and proven to be accurate, decisions should not be based on it
• Usually, only a sample of the population can be obtained, and inferences about the total population must be made from this sample.

10) Choose the **most accurate** statement describing the decline of salmon in California:

• The number of salmon in California has steadily declined since 1954
• **With 85% of the state’s developed water being required for crop irrigation, the salmon population has suffered by having their natural spawning grounds disrupted**
• Public concern over the decline of salmon has been a relatively recent development, beginning in the 1990s
• Although sediment from gold mines had nearly destroyed spawning grounds by 1852, historic spawning grounds were rejuvenated through the State Board of Fish Commissioners

11) Choose statement that **most accurately** completes the following statement: The State Board of Fish Commissioners established salmon hatcheries . . .

  • In order to meet the growing demands for salmon.
  • **As a means to stabilize fish populations.**
  • To develop new breeds of salmon.
  • To give a boost to the commercial fishing industry.

*From Project Learning Tree: Living with Fire*

12) The “fire triangle” consists of three elements which are necessary to start and maintain a fire. The three elements are:

• **Heat, fuel, and oxygen**
• Favorable weather conditions, dense vegetation, high structure ratio
• Heat, time, and oxygen
• Lightning, dry trees, air

13) Please choose the **most accurate** statement below regarding forest fires.

• Fire is a natural event in most ecosystems
• Fire is an essential component in the life-cycle of several tree species
• While fire may provide benefits to the ecosystem such as recycling nutrients back into the soil, fire is mostly “bad” from an ecological standpoint
• **Both the first and second choices**

14) In the United States there is an increased likelihood that wildfires will threaten both structures and people because:

• Major industry in combination with a growing population has increased the likelihood of human-incited fires
• There has been a movement of the population into urban areas, increasing the fire-urban interface
• There has been a movement of the population away from urban areas into outlying rural and wildland areas and increasing the size of the wildland-urban interface
• None of the Above

15) When forest fuels (trees) are consumed by fire, it is most accurate to say:
• Most of the energy released becomes heat energy
• New trees will grow from the burned roots
• Forest fires consume carbon dioxide and produce nutrient-rich ash
• The energy released is transferred to other living things

Thank you!
Appendix B: Institute One Post-survey

Now that you’ve participated in Institute Day #1, we would like to hear from you again! Please complete the questions below so that we can understand how successful the Institute was in conveying specific ecological concepts. In addition, we would like to hear about your overall experience. Please take a few minutes to complete the questions below.

Ecological Knowledge

From Project WILD: Where Have All the Salmon Gone?

16) Choose the statement that is the least accurate regarding research data gathered about a wildlife (fish) population in a similar manner over a period of time.

- The data may be analyzed in a variety of ways.
- Because a fish population is influenced by many factors, it may be difficult to measure the effect of a single factor.
- Unless the data is consistent and proven to be accurate, decisions should not be based on it
- Usually, only a sample of the population can be obtained, and inferences about the total population must be made from this sample.

17) Choose the most accurate statement describing the decline of salmon in California:

- The number of salmon in California has steadily declined since 1954
- With 85% of the state’s developed water being required for crop irrigation, the salmon population has suffered by having their natural watershed disrupted
- Public concern over the decline of salmon has been a relatively recent development, beginning in the 1990s
- Although sediment from gold mines had nearly destroyed spawning grounds by 1852, historic spawning grounds were rejuvenated through the State Board of Fish Commissioners

18) Choose statement that most accurately completes the following statement: The State Board of Fish Commissioners established salmon hatcheries . . .

- In order to meet the growing demands for salmon.
- As a means to stabilize fish populations.
- To develop new breeds of salmon.
- To give a boost to the commercial fishing industry.

From Project Learning Tree: Living with Fire

19) The “fire triangle” consists of three elements which are necessary to start and maintain a fire. The three elements are:

- Heat, fuel, and oxygen
- Favorable weather conditions, dense vegetation, high structure ratio
• Heat, time, and oxygen
• Lightning, dry trees, air

20) Please choose the most accurate statement below regarding forest fires.

• Fire is a natural event in most ecosystems
• Fire is an essential component in the life-cycle of several tree species
• While fire may provide benefits to the ecosystem such as recycling nutrients back into the soil, fire is mostly “bad” from an ecological standpoint
• Both the first and second choices

21) In the United States there is an increased likelihood that wildfires will threaten both structures and people because:

• Major industry in combination with a growing population has increased the likelihood of human incited fires
• There has been a movement of the population into urban areas, increasing the fire-urban interface
• There has been a movement of the population away from urban areas into outlying rural and wildland areas and increasing the size of the wildland-urban interface
• None of the Above

Institute Follow-Up Questions

22) To what extent did the Institute increase your ecological content knowledge in the following areas:

<table>
<thead>
<tr>
<th>Ecological Content Area</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpreting fluctuations in fish populations through data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effects of humans and habitat changes on fish population</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elements of the fire triangle and the prevention and control of fire</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ways to reduce the risk of wildland fire to homes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23) To what extent did you feel the information you learned today was useful for incorporating environment-based activities into your classroom?

• Not at all useful
• A Little Useful
• Moderately Useful
• Very Useful

Please explain.

24) Please rate the extent to which you feel that the information you learned today inspired a sense of stewardship toward the environment.
• Not at all
• A little bit
• Moderately
• Very much so

25) Please rate the likelihood that you will use what you learned today in your classroom.

• Not at all likely
• A little bit likely
• Probably
• Definitely

Please explain.

26) Please describe any highlights of the Institute today.

27) Please describe any recommendations you have for the Institute today.

Thank you!
Appendix C: Institute Two Pre-survey

Welcome to the Best Practices of Environmental Education and Stewardship evaluation! Your responses are very important for understanding how successful the Institutes are for your classroom practice. Please take a few minutes to complete the questions below.

Background

1) Please enter the first two letters of your first name and the first two letters of your last name. Example: Jane Smith would be JASM

2) Please enter your birth month and date using four digits. Example: October 8 would be 1008

Follow-Up from Institute 1

Please tell us about your experience in the classroom since participating in Institute 1.

3) Please describe any activities based on Institute 1 that you included in your classroom practice.

4) How successful were these activities for increasing your students’ ecological knowledge? Please choose one.
   • Not at all successful
   • Somewhat successful
   • Very successful
   • N/A Did not implement any activities

5) Please explain your response.

6) How successful were these activities for increasing your students’ sense of ecological stewardship (extent to which they feel responsible for the environment)? Please choose one.
   • Not at all successful
   • Somewhat successful
   • Very successful
   • N/A Did not include any activities

7) Please explain your response.

8) How successful were these activities for increasing your sense of ecological stewardship (extent to which you feel responsible for the environment)? Please choose one.
   • Not at all successful
   • Somewhat successful
   • Very successful
   • N/A Did not include any activities

9) Please explain your response.
10) To what extent did including ecological activities into your classroom practice enrich the teaching experience for you? Please choose one.
   • Not at all
   • A little
   • Moderately
   • A lot
   • N/A Did not include any activities

11) Please explain your response.

**Ecological Knowledge**

*From Project WET*

12) Best Management Practices used by watershed managers to prevent soil erosion include all of the following except: Please choose one.
   • Landscaping areas to promote plant cover
   • Replanting areas cleared by logging
   • **Increasing the slope of the land to shed water more efficiently**
   • Building terraces and catch basins to mitigate sediment transport

13) More mercury was used and lost with this type of gold mining than with any other types of mining: Please choose one.
   • Placer
   • Hard rock
   • **Hydraulic**
   • Dredging

14) The weathering of rock and soil and the transportation and deposition of sediment is directly tied to the environmental fate of mercury in all except: Please choose one.
   • Weathering (erosion) of mine ‘hot spots’
   • Transport of sediments to downstream areas
   • Deposition and accumulation of sediments
   • **Bioaccumulation and biomagnifications in the food web**

15) Mercury methylation is controlled in waterways by which of the following: Please choose one.
   • **Sulfate-reducing bacteria and microbes that thrive in low dissolved oxygen conditions**
   • The rapid growth of algal mats
   • Macroinvertebrates that thrive in high dissolved oxygen environments.
   • Fish ingesting macroinvertebrates
From Energy for Keeps

16) Which of the following choices of renewable energy technologies has the potential to be a baseload resource, and could run around the clock all year long? Please choose one.
   • Solar – photovoltaic
   • Wind turbines
   • Solar - thermal
   • **Geothermal and biomass**
   • Coal

17) What is currently the most cost-effective renewable technology for areas with a consistent supply of this resource? Please choose one.
   • Nuclear
   • **Wind turbines**
   • Coal
   • Space-based solar
   • Solar – photovoltaic

18) What renewable technology takes the most land to make a given amount of electric power? Please choose one.
   • Solar - thermal
   • **Solar – photovoltaic**
   • Geothermal
   • Coal
   • Tar sands

19) What are some renewable energy resources that California has in abundance? Please choose one.
   • Only Solar
   • Solar, Geothermal
   • **Solar, Geothermal, Wind**
   • Solar, Geothermal, Wind, heavy crude oil
   • Uranium

Thank you!
Appendix D: Institute Two Post-survey

Now that you’ve participated in Institute Day 2, we would like to hear from you again! Please complete the questions below so that we can understand how successful the Institute was in conveying specific ecological concepts. In addition, we would like to hear about your overall experience. Please take a few minutes to complete the questions below.

Background

20) Please enter the first two letters of your first name and the first two letters of your last name. Example: Jane Smith would be JASM

21) Please enter your birth month and date using four digits. Example: October 8 would be 1008

Ecological Knowledge

From Project WET

22) Best Management Practices used by watershed managers to prevent soil erosion include all of the following except: Please choose one.
   • Landscaping areas to promote plant cover
   • Replanting areas cleared by logging
   • Increasing the slope of the land to shed water more efficiently
   • Building terraces and catch basins to mitigate sediment transport

23) More mercury was used and lost with this type of gold mining than with any other types of mining: Please choose one.
   • Placer
   • Hard rock
   • Hydraulic
   • Dredging

24) The weathering of rock and soil and the transportation and deposition of sediment is directly tied to the environmental fate of mercury in all except: Please choose one.
   • Weathering (erosion) of mine ‘hot spots’
   • Transport of sediments to downstream areas
   • Deposition and accumulation of sediments
   • Bioaccumulation and biomagnifications in the food web

25) Mercury methylation is controlled in waterways by which of the following: Please choose one.
   • Sulfate-reducing bacteria and microbes that thrive in low dissolved oxygen conditions
   • The rapid growth of algal mats
   • Macroinvertebrates that thrive in high dissolved oxygen environments.
   • Fish ingesting macroinvertebrates

From Energy for Keeps
26) Which of the following choices of renewable energy technologies has the potential to be a baseload resource, and could run around the clock all year long? Please choose one.
   • Solar – photovoltaic
   • Wind turbines
   • Solar - thermal
   • Geothermal and biomass
   • Coal

27) What is currently the most cost-effective renewable technology for areas with a consistent supply of this resource? Please choose one.
   • Nuclear
   • Wind turbines
   • Coal
   • Space-based solar
   • Solar – photovoltaic

28) What renewable technology takes the most land to make a given amount of electric power? Please choose one.
   • Solar - thermal
   • Solar – photovoltaic
   • Geothermal
   • Coal
   • Tar sands

29) What are some renewable energy resources that California has in abundance? Please choose one.
   • Only Solar
   • Solar, Geothermal
   • Solar, Geothermal, Wind
   • Solar, Geothermal, Wind, heavy crude oil
   • Uranium

Institute 2 Follow-Up Questions

30) To what extent did the Institute increase your ecological content knowledge of watershed management? Please choose one.
   • Not at all
   • A little
   • Moderately
   • A lot

31) To what extent did the Institute increase your ecological content knowledge of weathering and erosion? Please choose one.
   • Not at all
   • A little
   • Moderately
• A lot

32) To what extent did the Institute increase your ecological content knowledge of renewable energy resources? Please choose one.
• Not at all
• A little
• Moderately
• A lot

33) To what extent did the Institute increase your ecological content knowledge of renewable energy technology? Please choose one.
• Not at all
• A little
• Moderately
• A lot

34) To what extent did the information you learned today inspire a sense of stewardship toward the environment? Please choose one.
• Not at all
• A little bit
• Moderately
• Very much so

35) What is the likelihood that you will use what you learning today in your classroom? Please choose one.
• Not at all likely
• A little bit likely
• Probably
• Definitely

36) Please describe any highlights of the Institute today.

37) Please describe any recommendations you have for the Institute today.

Thank you!
Appendix E: Institute Three Post-survey

Now that you’ve participated in Institute Day 3, we would like to hear from you! Please complete the questions below so that we can understand your experience in Institute #3, as well as your experience with the “Best Practices of Environmental Education and Stewardship” professional development program overall. Please take a few minutes to complete the questions below.

Background

38) Please enter the first two letters of your first name and the first two letters of your last name. Example: Jane Smith would be JASM

39) Please enter your birth month and date using four digits. Example: October 8 would be 1008

Your Experience Today

40) Please rate the extent to which you found the **stewardship project presentations** from other teachers useful.
   - Not at all
   - A little
   - Moderately
   - Very much so

   Please explain your response.

41) Please rate the extent to which you agree with the statement: The **stewardship project presentations** gave me ideas for implementing ecological concepts/activities into my own classroom:
   - Strongly disagree
   - Disagree
   - Agree
   - Strongly agree

42) Please rate the extent to which you agree with the statement: The **stewardship project presentations** gave me a chance to exchange ideas with other educators.
   - Strongly disagree
   - Disagree
   - Agree
   - Strongly agree

43) Please rate the extent to which you found the keynote speaker address on the topic: “The Real Dirt of Environmental Education” useful.
   - Not at all
44) Please rate the extent to which you found the panel presentation and discussion on the topic “Funding Environmental Stewardship Projects” useful.

- Not at all
- A little
- Moderately
- Very much so

Please explain your response.

45) Please rate the extent to which you agree that Institute #3 was informative.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

46) Please rate the extent to which you agree that Institute #3 was inspirational.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

**Stewardship Projects**

47) What resources did you and your students use to develop the stewardship projects (e.g., CREEC online resources, ideas from CEEF institutes)?

48) Please rate the extent to which the CREEC coordinator was helpful in developing your stewardship projects.
• Not at all
• A little
• Moderately
• Very much so

Please explain your response.

49) Please rate the extent to which the stewardship project was effective for increasing your knowledge of ecological concepts.

• Not at all
• A little
• Moderately
• Very much so

Please explain your response.

50) Please rate the extent to which the stewardship project was effective for increasing your students’ knowledge of ecological concepts.

• Not at all
• A little
• Moderately
• Very much so

Please explain your response.

51) Please rate the extent to which the stewardship project was effective for augmenting your sense of stewardship for the environment.

• Not at all
• A little
• Moderately
• Very much so

Please explain your response.
52) Please rate the extent to which the **stewardship project** was effective for augmenting your students’ sense of stewardship for the environment.
   - Not at all
   - A little
   - Moderately
   - Very much so

Please explain your response (optional).

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**Environmental Education Activities**

53) What resources did you use to develop your environmental education activity (e.g., CREEC online resources, ideas from CEEF institutes)?

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54) Please rate the extent to which you feel that developing and implementing the environmental education activity was a valuable experience for you as an educator.
   - Not at all
   - A little
   - Moderately
   - Very much so

Please explain your response.

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55) Please rate the extent to which you feel that the environmental education activity was a valuable experience for your students.
   - Not at all
   - A little
   - Moderately
   - Very much so
Overall Institute Experience

56) Please rate your level of agreement to the following statement: Participating in the CEEF institutes gave me new ideas for classroom lessons/activities.

- Strongly disagree
- Disagree
- Agree
- Strongly agree

57) As a result of participating in the three-day Institute, I am more likely to include an ecological component into my classroom curriculum:

- Strongly disagree
- Disagree
- Agree
- Strongly agree

Please explain your response.

58) Please rate the extent to which you feel that the pedagogical presentations and activities were useful to your instructional practice.

- Not at all
- A little
- Moderately
- Very much so

Please explain your response.

59) Please rate your level of agreement to the following statement: Since participating in the CEEF Institutes, I have seen student evidence of increased ecological content knowledge (e.g., through tests, classroom discussions, reports, etc.).

- Strongly disagree
• Disagree
• Agree
• Strongly agree

Please explain your response.

60) Please rate your level of agreement to the following statement: As a result of participating in the CEEF institutes interest in environmental topics in my classroom has increased.
   • Strongly disagree
   • Disagree
   • Agree
   • Strongly agree

61) Please rate your level of agreement to the following statement: As a result of participating in the CEEF institutes the sense of environmental stewardship in my classroom has increased.
   • Strongly disagree
   • Disagree
   • Agree
   • Strongly agree

62) Please rate your level of agreement to the following statement: As a result of participating in the CEEF institutes my ability to teach ecological concepts/activities has increased.
   • Strongly disagree
   • Disagree
   • Agree
   • Strongly agree

63) Please rate your level of agreement to the following statement: As a result of participating in the CEEF institutes my confidence in teaching ecological concepts/activities has increased.
   • Strongly disagree
   • Disagree
   • Agree
   • Strongly agree

64) Please describe any next steps you will take with regard to environmental education and stewardship.


65) Please describe any highlights of the Institute overall.

66) Please describe any recommendations you have for the Institute overall.

Thank you!