

# 922603

September 5, 2002

Deb Scrivens  
Metro Regional Parks and Greenspaces  
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Portland, Oregon 97232-2736



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Dear Deb,

Thank you for supporting the transportation and substitute teachers essential for hundreds of students to participate in Wolfree programs over the past 18 months. Please see the attached Final Report for the Metro Regional Parks and Greenspaces Education Grant and Wolfree's final invoice for 574.69.

If you have any questions about the report, please contact me.

Sincerely,  
for   
Jennifer Carlson  
Program Manager

ATTAINMENT REPORT  
for  
WOLFTREE'S WATERSHED ECOLOGY PROGRAM  
SERVING PORTLAND AND VANCOUVER AREA SCHOOLS  
from  
DECEMBER 1, 2000- JUNE 1, 2002

Prepared for  
METRO REGIONAL PARKS AND GREENSPACES

by  
WOLFTREE, INC.



September 4, 2002

## SUMMARY

3,484 students from 131 Oregon and Washington classes were served through Wolfree's award-winning *Watershed Ecology* program between December 1, 2000 and June 1, 2002. Metro's \$8,000 contribution transported students from their urban schools in the Portland and Vancouver areas to wild ecosystems for a day of in-depth ecological studies. These young scientists spent their field days actively participating in an exploration of various parts of a watershed in order to gain an understanding of complex forest and river ecosystems. Local mentors, whose in-kind contribution of volunteer hours matched Metro's donation, guided the students as they made discoveries about ecology and the natural world. Wolfree mentors included scientists, natural resource specialists, and educators representing a wide diversity of professional and academic backgrounds. By the end of each field day, participating students had demonstrated an understanding of watersheds and heightened observation and awareness skills.

## ORGANIZATION DESCRIPTION

### Corporate Background

Wolfree, Inc. is a 501(c) 3 charitable non-profit corporation that was established in 1994<sup>1</sup>. Our mission is to serve people, their communities, and the Earth through innovative science education, ecological research, and ecosystem restoration. Wolfree's administrative office is located in Portland, Oregon from which we serve many communities across Oregon and southwest Washington. Our Portland office supports ten field sites, including our acclaimed *Cascade Streamwatch* education facility located on the Salmon River near the base of Mt. Hood. Wolfree currently has five full-time and two part-time staff members. The Executive Director supervises and evaluates the staff and is in turn evaluated by the Board of Directors. There are currently 11 members on the Board of Directors. Some of the board members serve on committees alongside other volunteers. The Wolfree staff and Board of Directors are supported by four committees: Executive; Development \ Finance; Education; and Advisory Committees. Wolfree is guided by a five year Strategic Plan that is reviewed, updated, and approved annually.

### Core Program Areas

Wolfree provides services to our customers through three main program areas that are identified directly in our mission statement. They are as follows: Science Education (*Watershed Ecology*); Ecological Research (regional and international studies), and Ecosystem Restoration (local community projects)<sup>2</sup>.

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<sup>1</sup> Registered Legal Agent: Sussman, Shank, Wapnick, Caplan & Stiles. Certified Public Accountant is Mel Ussing. Audits are performed by Certified Public Accountants: Bottaini, Gallucci, and O'Hanlon, P.C.

<sup>2</sup> Our research and restoration programs provide opportunities for the staff, the Board of Directors, mentors, teachers, and community members to participate in authentic scientific investigations and the application of ecological concepts on the ground through community based restoration projects. These programs directly help our partners and the communities we serve as well as enhancing our education programs by providing opportunities for our participants to engage in authentic, hands-on projects

### Wolfree's Watershed Ecology Program (Science Education)

The Watershed Ecology Program is an experiential, science education program that annually involves over 2,500 students, 100 teachers and nearly 200 scientists from 13 counties in Oregon and Southwest Washington. The award-winning program provides 5<sup>th</sup> - 12<sup>th</sup> grade teachers opportunities to deepen and enliven their science offerings with cutting edge classroom curriculum and rigorous, hands-on outdoor field studies.

**The goals for the program are twofold:** (1) enhance young people's awareness and appreciation of Pacific Northwest forest and aquatic ecosystems, while cultivating skills in science, math, and problem-solving, and (2) develop and maintain ecosystem monitoring programs aimed at restoring fish and wildlife habitats in the Pacific Northwest. Program goals are accomplished by engaging Portland area students in "hands-on" field studies with professional scientists.

The program seeks to accommodate the full range of learning abilities, cultures, and ages through a flexible science program that actively engages participants in the science inquiry process. We challenge students to use their creative and critical higher-order thinking skills, cultivate their interest and skills in science and math, and inspire them to be life-long learners.

To date, Wolfree has served over 20,000 students representing more than 135 Pacific Northwest schools. People of all economic backgrounds need opportunities to succeed in science and math. Since 1999, with strong support from a host of local foundations, organizations and corporations, Wolfree has been engaged in an *Underserved Communities Initiative*. The long-term goal of this Initiative is that by the year 2005, 80% of our participants will come from targeted underserved communities<sup>3</sup>-- primarily low income, inner city, and rural populations that have little or no access to high quality science or outdoor programs. An important part of the Initiative is to increase the number of ethnic minorities and female youth who want to pursue careers in science.

### THE PROCESS

Wolfree's work in the Portland and Vancouver area schools was completed through the dedication of 50 teachers, 148 science mentors, and the enthusiasm of thousands of students (Table 1. lists the all the schools and community organizations served by Wolfree during this period). Listed below are the four steps that were taken to achieve our two program goals:

1) **TRAINING:** 61 Volunteer scientist mentors and 12 new teachers were prepared to participate in Wolfree Watershed Ecology Programs during formal trainings throughout the past 18 months. Training was supplemented with teacher meetings and opportunities for new volunteer mentors to "shadow" Wolfree staff or seasoned mentors.

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<sup>3</sup> Schools must meet three of the following seven criteria to be classified as underserved: (1) Considered distressed under the Distressed Areas Index published by the Oregon and Washington Departments of Commerce. (2) Must score below satisfactory on the overall rating of the School Report Card published by the Department of Education. (3) The schools minority number must be greater than the state average. (4) The schools spending per student must be less than the state average. (5) The student:teacher ratio must be greater than the state average. (6) There is a specific documented reason or need for the school to be served. This can come from a parent, teacher, administrator, or public citizen. (7) The school has no other educational services available to them.

**TABLE 1. SCHOOLS WOLFTREE SERVED IN 2000 - 2002. NEW SCHOOLS FOR 2001 ARE IN RED. ALL UNDER-SERVED SCHOOLS ARE IN **BOLD**. The (#) INDICATES THE NUMBER OF CLASSES IF MORE THAN 1.**

PORTLAND METRO AREA

- 
- Buckman ES ESL
  - Buckingham ES
  - Byrom ES (2)
  - Cedar Mill ES
  - **Creative Science ES (3)**
  - **Chief Joseph ES (4)**
  - **Faubion ES (3)**
  - **Kelly ES (4)**
  - Lynchview ES
  - Madeleine ES
  - Phonics Phactory ES
  - Portland Jewish Academy(3) ES
  - **Sitton ES (3)**
  - Edwards ES
  - Concord Elementary School
  - **Binnsmead MS (5)**
  - Beaumont MS (3)
  - Catlin Gable MS
  - **Centennial Learning Center**
  - Fernwood MS (2)
  - Five Oaks MS (2)
  - Gardiner MS
  - **George MS (4)**
  - Highland Park MS
  - **Inner City Youth Institute MS**
  - **Kellogg MS (2)**
  - **Lane MS (2)**
  - **Ockley Green MS (4)**
  - **Mt. Scott ES**
  - **Mt. Tabor Hearing impaired MS (2)**
  - **Portsmouth MS (2)**
  - Sunnyside MS
  - Sherwood MS
  - Welches MS (4)
- 
- **Alpha Alternative HS**
  - Clackamas HS
  - Cleveland HS (2)
  - David Douglas HS (3)
  - Franklin HS (2)
  - Grant HS (4)
  - **Helensview AHS**
  - **Jefferson HS (5)**
  - **Marshall HS (8)**
  - Madison HS (4)
  - **Miller Alternative HS**
  - Reynolds HS (4)
  - Scappoose HS (2)
  - West Linn HS (2)
  - **Westside HS**
  - Westview HS
  - Wilson HS
  - Multnomah Learning Center
  - Gregory Heights MS

WILLAMETTE VALLEY, SALEM AREA, AND THE COASTAL REGIONS

- Chapman Hill ES
  - **Grand Ronde ES**
  - **Independence ES**
  - **Willamina ES/MS**
  - St. Paul Parochial School
- 
- Cascade MS
  - **Dayton MS**
  - Grant MS
  - **Gardiner MS (2)**
  - Judson JHS
  - Leslie MS (3)
  - **Mark Twain MS (2)**
  - **Molalla River MS (2)**
  - Patton MS
  - **Richmond MS**
  - **Waldo ESL MS(2)**
  - **Waldo Jane Goodall Instit. MS (3)**
  - Whiteaker MS
- 
- **Barbara Roberts HS (4)**
  - Canby HS (2)
  - Cascade HS (2)
  - Dallas High School
  - **Estacada HS (2)**
  - McKay HS (4)
  - **McMinnville HS**
  - **Molalla HS (3)**
  - **Sheridan HS**
  - Silverton HS (2)
  - South Salem HS (2)
  - **Willamina HS**
  - **Woodburn HS (3)**

BEND/SISTERS AREA

- Buckingham ES (2)
  - **John Tuck ES (2)**
  - **Madras ES (3)**
  - **Terrebonne ES (2)**
- 
- High Desert MS (6)
  - Westside Village Magnet School (2)
- 
- Bend HS (2)
  - **Madras HS**
  - **Marshall HS**
  - Sisters HS (2)
  - Summit HS
  - **Crook County HS**

ES = elementary school  
 MS = middle school  
 HS = high school  
 ESL = english is the 2nd language  
 AHS = alternative high school

SOUTHWEST WASHINGTON AND THE COLUMBIA RIVER GORGE

- Cape Horn ES
  - **Cascade Locks ES-HS**
  - Cascadia Montessori
  - Helen Boller ES
  - **Mill A School ES-HS**
  - **Westside ES**
- 
- **Hood River MS (4)**
  - McLoughlin MS (2)
  - Lewisville MS (2)
  - **Pacific Jr. High School**
  - St. Mary's MS (2)
  - **The Dalles MS**
  - **Wind River MS**
- 
- **Camas HS**
  - Corbett HS
  - **Columbia HS (2)**
  - Fort Vancouver HS (2)
  - **Glenwood HS (2)**
  - **Heritage HS (7)**
  - **Hudson's Bay HS**
  - **Lewis and Clark AHS (2)**
  - **Lyle HS (2)**
  - Pacific JR HS
  - Skyview HS
  - **Stevenson HS (2)**
  - **The Dalles HS (2)**
  - Trout Lake ES-HS (3)
  - VSAA HS
  - **Wahtonka HS (4)**
  - **Washougal HS (3)**
- 

SPECIAL GROUPS AND SUMMER SESSIONS

- Environmental Middle School
- **Inner City Youth Institute**
- **Nanitch Sahallie Reservation Treatment Center**
- **Portland Opportunity Industrial Center**
- **The Urban Youth Camp out**
- **The Summerbridge Portland Program**
- **The Friends of Trees Youth Tree Corp**
- **Westside Youth and Family (3)**
- **The Edgefield Children's Center**
- **Portland Boys and Girls Club**
- **Friends of the Children**
- **OR City 21st Century Program**
- **Mill City 21st Century Program**
- **Touchstone School**
- **Molalla OYCC**

2) CLASSROOM PREPARATION: Teachers prepared students with Wolfree's comprehensive curriculum, the Ecology Field Guide, and a new preparation video (created by Wolfree staff.) Concepts in ecology, the science inquiry process, and observation skills were covered in this preparation.

3) A FIELD STUDY: In-class preparation was followed by a day at one of Wolfree's field sites. Teams of five students spent the day studying one of the following disciplines: forest ecology, plants, wildlife, lichens, terrestrial invertebrates, aquatic invertebrates, streamflow or water chemistry. As students explored their outdoor classroom, they honed their observation skills and developed a question that interested the team. Teams researched their question by collecting data with scientific tools. Students then organized, summarized, and made sense of ecological data in order to answer their question and effectively communicate their observations and conclusions to classmates. The result was a deepened understanding of connections and interactions within the watershed.

4) FOLLOW-UP ACTIVITIES: Teachers and students returned to the classroom after the field day to apply new concepts and data collection processes at a local site, when available. Wolfree staff and volunteers were frequently used as a resource for this follow-up work which included monitoring and restoration projects.

## EVALUATIONS

In 2000, many of our teachers, students, and mentors completed an evaluation of our watershed ecology programs. Although the programs were praised overall for their innovation and effectiveness, the evaluation revealed four areas in need of improvement: (1) more activities involving math; (2) more preparation — 25% of our mentors requested more training before the field day; (3) additional opportunities to formulate student questions and hypotheses during their field studies, and (4) enhanced program content so that the students can form connections between themselves and the ecosystem they study. The following outline briefly describes some of the ways we improved our program content in 2001 based on the evaluations:

### (1) More activities involving math:

- Calculation sheets for each field module were developed and implemented. These sheets gave students the ability to organize and analyze their data using charts and graphs;
- All data sheets, required students to use measuring devices to sketch specimens to scale;
- A large data display was created so that students could input their measurements such as temperature, dissolved oxygen, and pH. The historical data encouraged students to compare and contrast the different ecological systems and track changes over time.

(2) Better teacher and mentor training:

- Training sessions were simplified and refined, understanding that less is more. We emphasized the art and methodology of science inquiry;
- Video, visual displays, slides, maps and charts were used to enhance the effectiveness of the training;
- Several training sessions were designed to meet the needs of specialized groups, thus focusing on their knowledge base, and
- Program managers met with interested mentors before field days to review methods, strategies, procedures and equipment.

(3-4) More opportunities for students to formulate questions in the field; new program content to enhance the opportunity for students to form connections between themselves and the ecosystem they study.

In addition to changes to the curriculum, a video was produced for the classroom that reviewed the following:

- important ecological concepts;
- What to bring and how to dress for the outdoors. Participants were ready to do science when they arrived in the field;
- An overview of science inquiry process (how to ask a test-able question), and
- An introduction to observation and awareness skills to effectively prepare and excite students about the field day experience.

Table 2. shows the compiled data for program evaluations for the fall of 2001 and spring of 2002. 54 teachers, 140 mentors, and 89 students participated in the survey. The comprehensive evaluations indicated that scores were significantly higher in three out of the four key areas targeted for improvement. Despite a considerable investment in new field activities and training for our mentors, the application of math in the field still remains a weak component in Wolfree's Watershed Ecology Program. Another round of enhancements to the curriculum and several new field activities will be added for the fall of 2002 (See the attached Attainment Report for more information).

Through the past three seasons, Wolfree has been adapting our Watershed Ecology programs to the needs of our teachers. As state and national standards increase the requirements for inquiry-based learning, we have enhanced and increased the emphasis on science inquiry in our programs. Wolfree will be offering in-class science inquiry activities that require students to measure, collect and analyze data, and present results. We will also develop training modules for our mentors that will provide more opportunities for students to use mathematics and simple statistical applications during the field studies.

Table 2. Watershed Ecology Program Evaluations for Fall 2001 and Spring 2002.

<b>CLASSROOM PREP BY VIDEO OR STAFF</b>															
Level of agreement	<b>TEACHERS</b>					<b>MENTORS</b>					<b>STUDENTS</b>				
	Not At All	Not Really	Some-what	A lot	Very Much	Not at All	Not Really	Some-what	A lot	Very Much	Not At All	Not Really	Some-What	A lot	Very Much
1. Introduced students to goals and expectations of the field day.	0%	5%	4%	<b>54%</b>	37%	-	-	-	-	-	0%	1%	15%	38%	<b>46%</b>
2. Introduced students to ecology.	0%	2%	10%	41%	<b>47%</b>	-	-	-	-	-	1%	5%	29%	<b>37%</b>	28%
3. Students gained an understanding of data collection & questioning techniques.	0%	3%	9%	42%	<b>46%</b>	-	-	-	-	-	1%	1%	15%	36%	<b>47%</b>
4. Prepared students for field day.	0%	0%	13%	<b>52%</b>	35%	-	-	-	-	-	1%	4%	13%	25%	<b>58%</b>
5. Excited students about field day.	0%	2%	8%	27%	<b>63%</b>	-	-	-	-	-	1%	4%	15%	23%	<b>57%</b>

<b>STUDENT PREPARATION</b>															
Level of agreement	<b>TEACHERS</b>					<b>MENTORS</b>					<b>STUDENTS</b>				
	Not At All	Not Really	Some-what	A lot	Very Much	Not at All	Not Really	Some-what	A lot	Very Much	Not At All	Not Really	Some-What	A lot	Very Much
6. Students came with an understanding of goals and expectations.	-	-	-	-	-	0%	4%	29%	<b>48%</b>	19%	-	-	-	-	-
7. Students had a basic understanding of ecology.	-	-	-	-	-	0%	6%	<b>42%</b>	39%	13%	-	-	-	-	-
8. Students had a basic understanding of data collection techniques.	-	-	-	-	-	2%	16%	<b>36%</b>	31%	15%	-	-	-	-	-
9. Students were academically prepared for the field experience.	-	-	-	-	-	0%	6%	23%	<b>47%</b>	24%	-	-	-	-	-
10. Students were excited about learning science in the outdoors.	-	-	-	-	-	0%	1%	14%	<b>47%</b>	38%	-	-	-	-	-

Table 2 . (continued)

<b>ECOLOGY FIELD GUIDE</b>															
Level of agreement	<b>TEACHERS</b>					<b>MENTORS</b>					<b>STUDENTS</b>				
	Not At All	Not Really	Some-what	A lot	Very Much	Not at All	Not Really	Some-what	A lot	Very Much	Not At All	Not Really	Some-What	A lot	Very Much
11. Easy to read and understand.	0%	2%	3%	<b>49%</b>	46%	0%	2%	3%	26%	<b>69%</b>	1%	1%	24%	<b>39%</b>	35%
12. Provides a good introduction to ecology.	0%	0%	6%	42%	<b>52%</b>	0%	0%	3%	26%	<b>71%</b>	2%	5%	25%	<b>37%</b>	31%
13. Provides useful background information and procedures.	0%	0%	0%	37%	<b>65%</b>	0%	0%	9%	19%	<b>72%</b>	2%	8%	19%	<b>36%</b>	35%
14. Helps prepare students for the field.	0%	0%	2%	<b>50%</b>	48%	0%	0%	16%	25%	<b>59%</b>	6%	8%	21%	<b>34%</b>	31%
15. Enhances the field experience.	0%	0%	7%	40%	<b>53%</b>	2%	0%	11%	46%	41%	2%	14%	19%	32%	<b>34%</b>

<b>THE FIELD DAY</b>															
Level of agreement	<b>TEACHERS</b>					<b>MENTORS</b>					<b>STUDENTS</b>				
	Not At All	Not Really	Some-what	A lot	Very Much	Not at All	Not Really	Some-what	A lot	Very Much	Not At All	Not Really	Some-What	A lot	Very Much
16. Day went smoothly.	0%	0%	1%	19%	<b>80%</b>	0%	2%	8%	46%	44%	2%	2%	11%	28%	<b>57%</b>
17. Mentors were prepared/effective.	0%	0%	3%	23%	<b>74%</b>	1%	1%	13%	50%	35%	1%	2%	9%	21%	<b>67%</b>
18. Students were engaged.	0%	0%	2%	27%	71%	0%	1%	22%	44%	33%	1%	1%	11%	34%	<b>53%</b>
19. Small teams were conducive to learning.	0%	0%	0%	15%	<b>85%</b>	0%	3%	3%	36%	<b>58%</b>	1%	1%	13%	27%	<b>59%</b>
20. Ecological concepts were integrated.	0%	0%	1%	33%	<b>66%</b>	0%	3%	23%	44%	31%	5%	8%	15%	<b>38%</b>	34%
21. Wolfree staff were effective facilitators.	0%	0%	0%	16%	<b>82%</b>	0%	0%	2%	21%	<b>78%</b>	0%	0%	6%	22%	<b>71%</b>
22. Safety was emphasized.	0%	1%	1%	18%	<b>80%</b>	0%	0%	3%	23%	<b>74%</b>	1%	2%	8%	24%	<b>65%</b>
23. Site as an effective outdoor classroom.	0%	1%	0%	10%	<b>89%</b>	0%	1%	5%	15%	<b>79%</b>	1%	2%	9%	24%	<b>65%</b>
24. There was enough time for field work.	0%	0%	2%	22%	77%	3%	8%	9%	20%	<b>61%</b>	1%	4%	12%	24%	<b>59%</b>
25. There was enough time to organize and make sense of the data.	0%	0%	11%	28%	<b>63%</b>	1%	9%	14%	26%	<b>49%</b>	1%	4%	11%	29%	<b>54%</b>



**Teacher Comments Submitted with the Evaluations** (a random selection from all of the evaluations is shown below with suggestions for improvement or negative comments highlighted in bold):

1. Absolutely fantastic program!
2. The Wolfree experience was wonderful for our students. Thank you for all the time and effort you put into making this a success.
3. Great program – well presented and organized.
4. This is an excellent program.
5. Everything went exceptionally well and most all of my students really enjoyed the day while increasing their appreciation and knowledge of field ecology.
6. I'd love to be able to offer this field trip to all freshman science students at The Dalles High School.
7. Overall the experience was great! Our population is harder to motivate towards the outdoors – so I commend the entire Wolfree staff on their efforts. **A few students said their leaders weren't effective teachers – and so had a harder time being engaged the whole day.**
8. Thank you for a wonderful day and for such good curriculum. We all really appreciate all of your good work.
9. I love your program! My class loves the experience every year! Your team are fabulous, as well as the mentors. The program dovetails perfectly with my science unit in the fall. I would love to get another spot so that the other 6<sup>th</sup> grade could go too! Thanks!
10. Great! Great! Great! Wolfree staff was super. Our high school students were very excited about working with the Wolfree staff and mentors. If Wolfree continues to conduct classes east of the mountains, think of developing specific curricula for eastern, high desert ecosystems. Thanks to you all. We had a great experience.
11. **We LOVED OUR FIELD TRIP TO LARCH MT!!!** Thank you so much for such a rich educational experience! I'd love to do this again next year.
12. **The weakest part for me was the ability of my students to ask questions and formulate hypotheses. It's been a struggle in class as well. Perhaps some examples would help.**
13. This is a terrific program. It was very organized this year. The small groups and working lunch went well. Thanks for your dedication!
14. I've been a teacher of Biology for 36 years. **These trips have been the best field experiences that I've had with my students. THANKS.**
15. I liked the change to staying in small groups to eat and prepare presentations. They worked harder and stayed more settled rather than trying to hang with friends. **Awesome program!**
16. CL – Thank you again for your efforts!

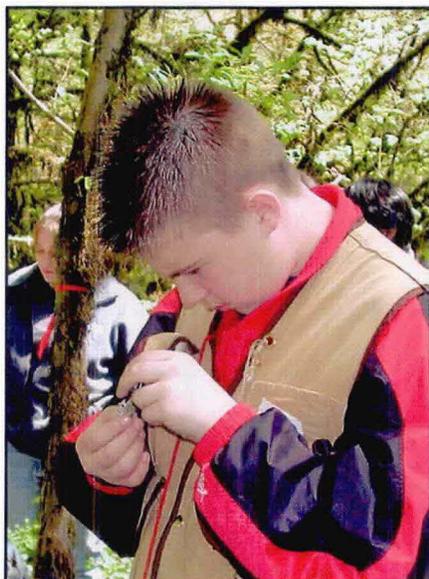
#### **Mentor Comments from the Evaluations:**

1. A great program! Student to mentor ratio is excellent and the key to success of the program. Small group presentations at the end worked better I believe, then a whole group being together at the end. Students asked more questions and were more involved than when the whole group met together in my last session.
2. Emphasize that students should wear warm boots and gloves, etc.
3. The group size of five was perfect. **There should be more simple goals for kids younger than high school age.**
4. Great students, great site. Directions should have mileage for significant turns. **Emphasize a timely arrival of the students to the site - less rushing, more in depth experience will result from more time.**

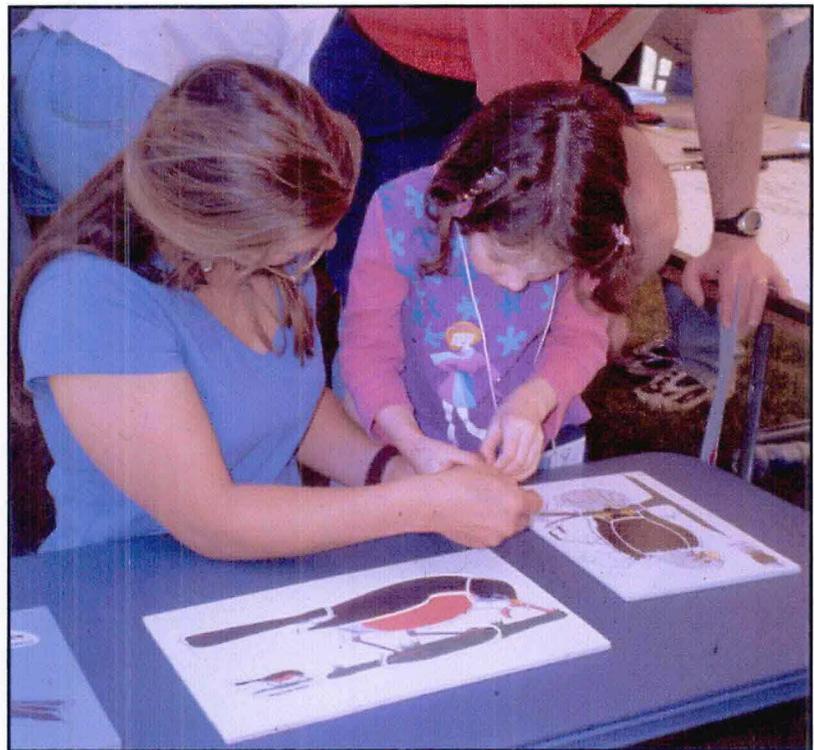
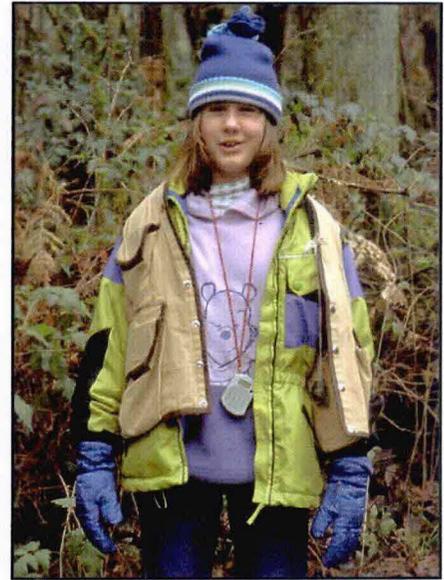
5. I was very impressed with the youth I worked with and their responsiveness to learning about NW ecosystems. The tools tied to their curriculum worked very well. They took great pride in learning how to work with their tools and developing accurate results.
6. **It would help to have more training in how to engage and involve those quiet students who wouldn't talk or participate.** What are some tools for mentors to motivate students? Huge positive was that some students really did shine, especially when giving the presentations. **I think all students should have the chance to speak, instead of one spokesperson. This was a mistake we made in not pushing the quiet ones to speak up.** How do you do this constructively? Thanks to all the fun, motivated staff of Wolfree. You are doing great work!!
7. Greatly enjoyed the younger class. What they lacked in structure, they definitely made up for with enthusiasm and curiosity.
8. Wolfree staff, mentors and interns were great! I just think that the students were not totally prepared with background ecology info prior to the field day! Also I need to integrate the day's activities more into their daily lives – things that I need to do. I am happy to be helping out again!
9. **Tailor the curriculum to the site a little more. I could have done a little more to make the learning more applicable to the site.**
10. This group did not seem too responsive to the idea of making careful measurements and meticulous notes. So we left the forms in the tatum and did the whole thing verbally and somewhat extemporaneously (except we did take two soil samples and tested them). By not being constrained by methodology, we were able to visit, observe and learn about plants and their interaction in three different areas. At the presentation, the group did as well as any group I've mentored. Perhaps even were the best. Whether that is because of methodology or the group, I can't say.
11. I like to do quiet time with the kids – helps stimulate other senses.
12. Amazed at knowledge that they had – the wonder, curiosity, and openness of these children were inspiring! They were respectful and aware of both others and their environment. The students usually reflect their teacher, and I think this was another great example of that today.
13. **Do some of the preparation for presentation groups outside the shelter. All groups in the shelter is cacophonous!**
14. The soil pH test is a good improvement over the previous. Introducing geology where it is prominent was an opportunity. It was fun.
15. 1. **Need more time preparing presentation than we took.** 2. Small groups great!! 3. Teachers of class should be mentors. 4. Try to tie issues into collection = status, health of stream/forest (at the high school level).
16. Parent help essential for small kids. Encourage parents to split off from their child. Encourage parents to not give answers.
17. Keep up the good work. I enjoy working with everyone at Wolfree. I think you're doing a wonderful job of introducing young minds to the world around them.
18. **Either get rid of the plant transect sheet or the plant data collection sheet. There is no space to write a focus on one sheet or get a clipboard so students could record on each sheet. Thus student doing transect sheet or one student doing plant data sheet as others are collecting, IDing plants. Could also use plastic bags for mushrooms. Maybe work up a mushroom ID and data sheet for next year. The students really seem interested in mushrooms.**
19. I thought it was a great field day. The students were excellent and I think we both learned a lot. I thought the student to mentor ratio was real nice and if you can get it to three to one it makes a huge difference.
20. Just a cold and rainy day – always tough to keep the kids motivated when it's soooo cold. But sweet kids and wanted to learn.

21. Feet got soaked early on, perhaps suggest that they wear boots if they have them. Had to very creative to keep kids engaged. Wildlife has less props and focus than the others. If not a lot of wildlife appear, it's nice to have other interesting things to show and do. The plaster was great!
22. Perhaps provide a little more time for wrap-up, and limit each presentation, but to some extent that would depend on the group. The group today could have spent a lot more time at wrap up.
23. The equipment was very well organized and easy to use. It was good to be given the flexibility to teach at an appropriate level for these younger kids.
24. Great fun, great kids, great day.
25. I'd like to do streamflow again (and again). I'd like to have the students select their stream boots at the intro/welcome site. Then I'd like to have them begin with the blue viewers to experience flowing water, to establish group momentum. Then get into concepts of flow/precip/evaporation/surface/groundwater, then channel/floodplain morphology (drawing map of x-section), then measure channel features and flow. End with blue view to close. Very rewarding day.
26. More time to present and discuss results. Mixed M/F groups – just male groups are less effective in the learning experience.
27. I had three 8<sup>th</sup> grade boys – could have used a mixed gender group or an assistant. They got a little out of control at times. Sorry but I swore a couple of times never at them but....Oh well, they took it in fun. Great day! Thanks.
28. More time, especially to wrap up, discuss what learned, prepare presentation.
29. Smaller groups. Provide more time for exploration. We need a total of about three hours in the field.
30. The pH explanation was too advanced for 5<sup>th</sup> graders.
31. Great day/experience. Well planned.
32. I had a wonderful time and appreciated the cooperation from the class.
33. I liked the old macro data sheets that asked for #'s and helped organize data for % of each spp. Captured. Helps for the math part.
34. Always great when students have had some pre-background work on subject.
35. It would be good to explore new ways to communicate the concept of streamflow in volume/time and new ways to explore and understand the significance of water chemistry.
36. Need to fix turbidity meter. I needed more waders to fit the kids.
37. Great day. Students went from very serious faces to lots of smiling and laughing and getting involved. Always need more time – especially to make connections. Seems like enough time to collect some data and make observations, but harder to make sense of those things except in very general terms. But the experience itself is fantastic for them. Thanks!
38. It was fun! Great group of kids!
39. My staff person can gain in confidence, experience, and knowledge. Connectedness and observations were left out of closing circle, which was more chaotic than it needed to be.
40. Include a plant press with cardboard or something so the students can bring home specimens to key in half decent shape. More than one plant ID book would be good also, so more than one plant at a time can be identified. Excellent day!! Looking forward to helping again.
41. Emphasize our role in the ecosystem more!?!?
42. I think it is an excellent program.
43. Great working with Brian Lipinski – impressive teacher and naturalist.
44. Great program! Well prepared, well presented information. A joy to participate.
45. As always, I had fun! Thanks.

## Young Scientists at Work



## Small Groups of Students and Mentors Learn About Science in the Outdoors



## Students and Mentors Have Fun While They Learn

