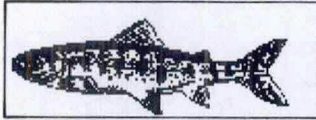


Markham Elementary School and Friends of Arnold Creek



Family Geography Watershed Project 1995-7

1. Written summary of grant activities that include progressive steps on how actual activity/project was completed.

SUMMARY

By both subjective and objective criteria, this project was a huge success. We had fun. Adults and children learned about neighborhood stewardship of water quality and habitat areas, and many changed their behavior as a result. Families were able to participate as a group; individuals from the wider community were attracted to the project. We have a functional native plant garden at Markham to teach and study in. We have learned how to use both high and low-tech equipment to perform water quality monitoring and instruct students, and have successfully completed an academic year of field study. We recorded data in two watersheds consistently for nine months, and analyzed the results. We have a plan for ongoing monitoring and stewardship. We identified immediate and ongoing watershed improvement needs in our neighborhoods and for our school, and took effective action on some of them.

Many parts of the grant project exceeded expectations. Professional assistance, both paid and donated, was superb. Jennifer Devlin, Kim Wilson, and LuAnn Bye of Audubon, Ivy Frances, Patrice Mango, Lynn Vanderkamp, Michael Carlson, and Rob Annear of BES, and Emily Roth, at the time working for the Natural Resources Conservation Service, were critical to the success of the project. Emily alone devoted more than fifty hours to the planning and implementation of the courtyard garden. These leaders kept both children and adults interested and enthusiastic. We are very glad we did the planting project, as it is a visible, ongoing reminder of the grant-funded project and of what we learned in it. The Bull Run field trip was the experience of a lifetime.

I feel the time I have donated as project manager and parent coordinator of field study activities has been extremely worthwhile, and that it has produced tangible, lasting results. Markham School, the Adventure School at Markham, and Friends of Arnold Creek thank you for the opportunities and successes this grant has facilitated.

Amanda Fritz, project manager

Progressive steps on how actual activity/project was completed:

Year 1:

- taught principles of watershed management to 116 volunteer participants plus 70 in-school 5th graders with the assistance of 30 professional staff/skilled members of non-profit organizations.
- 79 people attended the first workshop on watershed basics, water quality monitoring techniques, native plant identification, and microscopic macroinvertebrates.
- 65 people learned neighborhood influences on water quality, and tracking techniques in the second workshop.
- 55 people participated in a four-hour field trip to the headwaters of Arnold Creek and Woods Creek combined with a class on birdsong identification held in donated space at PCC Sylvania.
- 32 hard workers donated a total of 148 volunteer hours to prepare a planting area at Markham School, and 46 parents, teachers, children, and interested neighbors put in an additional 124 volunteer hours to install the native plants and build the water quality swale from a downspout disconnect (construction of the disconnection system to be completed this summer with the assistance of BES and NRCS staff).
- 17 adults enjoyed a 4-hour Naturescaping for Clean Rivers workshop sponsored as a bonus item in the project.
- 43 lucky participants went on field trips to the Bull Run Watershed. 18 parents and staff attended a class to learn how to use monitoring equipment purchased with the grant.
- The incoming 6th grade class and teacher went on a Headwaters to Ocean (H2O) trip on the Willamette River, which helped recruitment and orientation to the program.
- 8 parents and staff created a plan for ongoing monitoring and field experiences for Adventure School students in 1996-7. 71 parents signed up to assist with these field trips
- Two teachers and one parent attended the three-day 1996 Monitoring Conference sponsored by BES, and began to learn water quality monitoring skills.
- A short guide to planning and implementing a stewardship/education grant project was developed.
- The project was featured in two articles in *The Oregonian*, and was publicized in the *SWNI Newsletter*, the *Multnomah Village Post*, and the *Markham/Adventure Newsflash*.
- **Total number of participants : 140 (116 students/teachers/parents/neighbors, 24 project staff)**
- **Total volunteer/cash match 1995-6 :**
 - 1,505 volunteer hours worth \$18,187 (including professional volunteers and teacher time)
 - \$802.51 for supplies donated by individuals and businesses
 - \$4,000 grant from Portland Bureau of Environmental Services

TOTAL MATCH YEAR 1 = \$22,989.51

Year 2:

- 90 students (31 fourth graders, 32 fifth graders and 27 sixth graders) participated in field study at The Adventure School in 1996-7, monitoring Arnold and Woods Creek almost every week and Tryon Creek at least once each month
 - Over 70 field monitoring experiences were completed and recorded - 27 on Arnold Creek, 28 on Woods Creek, and 16 on Tryon Creek. In addition, stream water quality was measured using grant-funded equipment during the year-end Capstone experiences on Johnson Creek, Trapper Creek in the state of Washington, and on the Oregon coast.
 - 49 parents assisted with field study (20 in 4th grade, 17 in 5th grade, 12 in 6th grade)
 - 2,144 hours were donated by parents for field study experiences. Several parents donated over 200 hours each on field study-related activities. The parent volunteer match for field study time is worth \$11,256 at the allowed rate of \$5.25/h
 - Students piloted 4th, 5th, and 6th grade curriculum on watershed geography, and a series of simple one-page instructions on water quality assessment methodology has been developed.
 - 36 parents participated in the mid-year 1996-7 review of field study protocol and experiences. 33 families returned end-of-year evaluation forms (14 fourth, 18 fifth and 1 sixth graders).
 - 16 fifth graders participated in the Green City Data Project, surveying a site on Woods Creek and supplementing the standard GCDP curriculum with frequent water quality monitoring. Parents, who are obviously unbiased, objective evaluators, unanimously agreed that the group's presentation at the GCDP Conference was outstanding.
 - The Envirocorps team donated another afternoon working to tidy the Courtyard Garden before school started in September 1996
 - 30 fourth graders and 4 parents donated 80 hours volunteer labor to refresh the Courtyard Garden with weedstop fabric and cedar chips in Spring 1997
 - Students from PSU donated approximately 400 hours assisting with three Capstone Experiences - fourth grade two day trips to the Johnson Creek watershed, fifth grade an overnight camping trip to Trapper Creek in the National Forest at the foothills of Mt St Helens, sixth grade three days staying in yurts at the coast. Parents donated over 900 hours of volunteer time on these experiences. Stream monitoring using grant-funded equipment, with comparison to the "home" watershed, was an integral part of the Capstone studies.
 - 32 families returned evaluations of the field study component of the Adventure School. 21 (66%) rated field study "Very valuable", and another 8 (25%) rated the experiences "somewhat valuable". Only 3 (9%) were unsure if field study is valuable, and nobody gave it a negative rating. Of families with parents participating in field study, 75% stated the experiences were "very valuable"
 - Total number of participants, Year 2 : over 200
 - Total volunteer/cash match 1996-7 : 7,544 volunteer hours worth \$46,494
\$3,270 for supplies donated by individuals and businesses
- TOTAL MATCH YEAR 2 = \$49,764**

Ongoing activities

As planned, this project has set the stage for ongoing, in-depth water quality monitoring programs and resource enhancement projects at the Adventure School at Markham. Teachers and parents are prepared to assist students with stream assessments, and riparian habitat enhancement strategies have been defined, with a plan for implementation of a major restoration project at the headwaters of Arnold Creek. This fall, students will measure the area of the forest infested with ivy, calculate human and material resources needed to remove it and replant with native vegetation, assist with the writing of a grant to fund such a restoration project, and begin to propagate some of the native plants for eventual transplanting. Rainwater will be collected to water these seedlings, with students measuring amounts, predicting long-term needs, etc. Curriculum development to promote optimal stewardship of the natural areas in our neighborhood continues, with second year modules for Adventure School field trips to be completed before September.

2. Written evaluation and comments by grantee and/or others involved in the activity/project. This should include what worked/what did not work/helpful hints for future project managers.

What worked:

- ✓ Field experiences at Arnold Creek, Woods Creek, Tryon Creek, the Bull Run Watershed, Johnson Creek, Trapper Creek, and the Oregon coast, were an outstanding success, as measured by participant enjoyment and information learned.
- ✓ A native plant garden has replaced a 7,000 square foot lawn in a popular courtyard at Markham School. Birds have returned to the area in increased numbers and species, which has been noticed by teachers and children. A hawk was observed resting on the nurse stump which we planted in the garden. A water quality swale using the approved Hobbs and Hopkins Native Bioswale seed mix has provided valuable insights into the specialized technique needed for success of such facilities in Portland's environmental zones.
- ✓ Four (one more than planned) community/school workshops were held to teach water sample testing, macroinvertebrate observation, and neighborhood influences on stormwater quality.
- ✓ An additional Naturescaping class was held in conjunction with the grant project.
- ✓ Having consistent chaperones was good for both students and parents in the 4th grade. Other grades did not necessarily match the same students with consistent parents.
- ✓ Having a different parent coordinating parent help than coordinating field study activities worked well, partly because the grade-level volunteer coordinators were so efficient and dependable

What didn't work:

- Use of the equipment was initially more difficult to master than we had anticipated, although we believe we made the right choices for long-term success. 4th grade parents only used the equipment once every six weeks, and many did not achieve the necessary comfort level with this amount of experience. This resulted in "rescuing" by the Project Manager, which was not necessarily beneficial in the long run. On the other hand, having one person responsible for overseeing the 4th grade monitoring program resulted in more consistent QA/QC. The 5th and 6th grade teachers and parents, while more independent, made mistakes in setting up and using the equipment, e.g. failing to calibrate the DO machine correctly which leaves open the validity of the readings, and leaving the membrane on the probe at the end of the experience which necessitated purchase of tarnish-removal pads. The plan for next year should include a core group in each class, including the teacher and/or assistant, all of whom are proficient and comfortable with using the meters.
- Macroinvertebrate assessment was covered briefly but needs more expert instruction, and in our limited experience not many macroinvertebrates were observed in the water at the sites. This presents an opportunity for further study and investigation.
- Microbiology equipment demonstrated to sixth graders, but seems more age-appropriate for older students. We plan to use the equipment to expand learning experiences for 7th and 8th graders in the next two years.
- In some ways, the proposal was too ambitious. The many elements of the project made sure there was "something for everyone", and allowed community participants to attend only those programs they were most interested in, but the planning and implementation of the components was almost overwhelming at times.
- We will never again schedule major field trips close to the end of the school year, or at Rose Festival time.
- An on-the-lawn carwash activity in April, planned as an outreach/education activity, had to be canceled due to persistent monsoons.
- The seed mix for the Courtyard Native Plant project was either contaminated or not able to out-compete non-native invasive species, as the swale is heavily dominated by white clover. There was no clover in the lawn prior to the project.
- The timeline of the BES grant component of the project was too short - Metro's two year timeframe is better. A longer timeframe allows planting projects to be installed in the fall, reducing the need for summer watering (which was very time-consuming). *Don't let future grantees plan spring plantings unless they include an automatic watering system - and even then, this timing is not sound as it does not conserve water.*

- Increased integration of field study data and activities into classroom curriculum was the most common issue identified as a need at the end of the project, by 15 of the 27 parents submitting suggestions for improvement. Comments included
 - * *more tie-in with classroom work*
 - * *more data management utilizing classroom computers*
 - * *clearer purpose to the kids - why are we doing this?*
 - * *more analysis and manipulation of the data throughout the year. Use it to compare and contrast over time by charting and graphing - not just at the end.*
 - * *the kids need more background info in order to appreciate their field experiences*
 - * *have some parallel classroom studies that make their field studies more relevant - compare to larger rivers? River pollution and salmon recovery? Drinking water issues? Understanding streams in their larger context - how do they fit into our watery world*
 - * *Studies need to be related to some overall problem to be solved - animal habitat issues*
 - * *have more chances for students to share what they learned in the community*
 - * *have them study uses of plants, human and animal impacts on the environment, pop quizzes, discuss how they can make a difference*
 - * *discuss data collected to show relevance, and relate to larger environment - how does the field study site compare with other sites?*
 - * *emphasize advantages of metric measures for data manipulation and analysis*
 - * *use microscopes to study microscopic water animals more*
 - * *have more follow-up and follow-through. Exchange data between the classrooms on the Internet etc. Required writing projects about results and observations*

- We had been hoping for more repeated participation by non-parents in the community, as a way of increasing neighborhood cohesiveness and investment in the school. A handful of non-parents did attend more than one event and appear interested in ongoing involvement, but most did not. It must be noted that child behavior in the workshops, plantings and field trips far exceeded my expectations. The skill of the leaders, plus the obvious relevance of the material presented, apparently captivated the students and minimized aberrant rowdiness.

- We learned that the budget is one of the most critical elements of the proposal, and regretted not having had the knowledge and experience to plan the budget more carefully. Allowing some flexibility in reallocating funds during implementation of the project increased the project's ability to meet all its goals. We sincerely appreciated Metro's willingness to accommodate our changing needs. Most of the financial glitches could not have been anticipated without doing the project and discovering what worked and what more had to be done. The necessity to split the Bull Run trips

because of the 1996 March for Schools added cost, but proved to be an advantage as smaller groups were better for the watershed and for companionable interaction.

- We did not ask for enough money for curriculum development, since we did not realize how specialized this component of the Adventure School needs to be. Curriculum piloting was an area cut because of reduction in the budget from that requested in the proposal. We need to do an entire project focusing on this area. Some "standard" curriculum, such as the Streamwalk program facilitated by Lynn Vanderkamp, was enjoyable and useful. The SPLASH curriculum from Eugene was too specialized to adapt to our needs, but modeled the type of modules needed by the Adventure School program. The main conclusion drawn from this section of the project is that we need specialized curriculum to be developed for our particular sites. We need professional and technical assistance to coordinate some of the curriculum development - some will be solicited from agencies participating in this project, some may need to be purchased with a future grant. The naturalist hired for this project, Jennifer Devlin (Audubon's Education Director), has agreed to assist with this major task.
- Managing the grant with the Portland Public School District administering it was challenging. Miscommunication between the City and District delayed the start of the project. Metro's management, with frequent reminders about due dates for required paperwork and reports, has been exemplary. There is a quandary between the intent of the grant donor to fund specific equipment, and the requirement of the District that purchases must be made per their specifications and procedures. Some equipment which had been budgeted for purchase direct from the company, was instead bought from a local distributor, with additional shipping costs. Conversely, some items ordered directly from the company cost less than the list price, yet the project manager was not informed of this adjustment. In the future, we will assign a different parent to oversee the grant accounting, allowing the project manager more time to implement and evaluate the program components. We also recommend that Metro consider direct-buying expensive, technical equipment (such as meters) on behalf of grant recipients, instead of allocating money to be spent through the District purchasing department.

Please see attached sheet for feedback on the project/field study program from the Principal and a teacher.

Feedback from students and parents:

Issues which received both positive and negative feedback:

- Dislike for field study on cold, wet days was reported by about half the students responding to the evaluation (having to wear long pants, long-sleeved shirts, and helmets on hot days was also mentioned by several students), and six parents thought

the site visits should be less frequent during the winter months. One student wrote “*I learned that there’s nothing worse than being wet, muddy, tired, and homesick.*” (Travis, 4th grade). However nine parents identified monitoring the same site consistently and frequently as a positive feature of the program, and one parent, who participated in field study, stated “*Arnold Creek is affected more by changes in the weather and human activities than I would have thought. The kids need to learn this too, even if it takes years!*” Another student wrote “*I have found walking down to the creek in pouring rain or squelching heat quite miserable but I am proud of what I have learned and accomplished this year*” (Dylan, 4th grade)

- ❑ Walking to the site for 4th grade study was identified as a problem on the year-end evaluation by one student and two parents (although 3 students said walking there was one of the things they especially liked, and several parents identified walking to the site as one of the positive aspects of the program). During the actual walks, some students complained it was tiring, but when asked why we were walking not driving, the students were able to state reasons appropriately and did not complain further. Parents were concerned about extra time away from the classroom, and about safety on busy streets. However, there were several “teachable moments” which occurred during the walks to the site, e.g. a crew in the street flushing a water main (*we stopped and they explained to the students what they were doing, and why*); muddy runoff from a construction project (*we took a sample, tested its turbidity, and reported the violation to the city*); a resident emptying his car’s radiator fluid into the storm drain (*we asked him not to, and explained why*); unexplained water on a sidewalk (*we had the students figure out where the drainage was coming from, and why*); hydroseeding of a construction project (*we showed the students the method used and explained why it helps protect water quality*); and weekly stops at the divide between the watersheds (*which it took an entire year before a majority of the students remembered the word “divide” and were able to identify the relevant watersheds!*) A compromise plan scheduling transportation November-February while walking the rest of the year seems appropriate.
- ❑ Parent opinions were divided on the value of repetitious and technical monitoring of physical characteristics of the sites and water quality, but the student evaluations were heavily in favor of the testing - 28 students mentioned water quality testing as what they liked about field study, vs. 4 who picked it as what they didn’t like and “boring”. Many students did not like recording the data, and cited “paperwork is boring”. Forms and recording methods were updated several times and will continue to be the focus of ongoing improvements. Parent comments indicate more use of the data in class might improve student interest in recording it.
- ❑ Students expressed readiness to move to a new site by the end of the year, but also showed significant bonding with “our site”. One parent indicated interest in continuing to study the same site for two years, but most want new experiences and sites next year. Occasional visits to sites studied in previous years will be incorporated into the program.

- ❑ The single topic most students wish they had learned more about was animal identification and tracking. The 5th grade Green City Data Project group did one plaster-casting exercise which was a great success - we should definitely do this activity at least twice a year at Woods Creek and Tryon Creek. The Arnold Creek site had very few tracks except for dogs, so this might be an activity best saved for later years.
- ❑ The single topic parents identified as a learning need, apart from increased integration into classroom curriculum, was plant identification. This topic is best suited to the first few weeks of the school year, when berries are fruiting, so we should emphasize this at the beginning of each session rather than deferring it until after students become more skilled with water quality testing, as we did this year. Now that we have the photographic plant ID books, this should be easier for parent-helpers to learn along with the students, but we should also contract with professional botanists (Naturescaping for Clean Rivers etc.) to give us additional help in September and October of each year.
- ❑ Timing of field study was an issue for students, parents, and teachers, all of whom expressed frustration that the students on field study missed instruction and/or study time in the classroom. Although having all students at one site simultaneously creates too much impact, needs many parents, and results in either large groups for water quality testing or waiting long periods for smaller groups to each take a turn with the equipment, there are several possible solutions for this:
 - * *Have all students go on field study at the same time, either divided into groups working in different areas in a large site like Woods Park or Tryon Creek, or studying different parts of the watershed (one parent suggested having three groups monitoring the headwaters, mainstem, and outflow of Arnold Creek)*
 - * *Have one half studying the site(s), the other students working on a community service/restoration project (e.g. ivy pulling, courtyard garden maintenance), and rotate*
 - * *Have the students who remain work ONLY on field study-related activities - data manipulation and analysis, further research on related issues etc. Then switch the following week, so that neither group is ahead or behind in "the rest" of the curriculum activities.*

In any of these scenarios, it is ESSENTIAL that instruction is structured so that the primary teacher goes on field study at least half the visits. By doing so the teacher observes the teaching needs of students and parents, relates to the site, and incorporates field experiences and data into classroom curriculum more consistently.

- ❑ Only two sixth grade families returned the field study evaluation form. The teacher did not hand out the survey until reminded to, twice, on the last day of school. Both families reported that field study experiences went well. Anecdotal reports were not as favorable. Sixth grade parents took charge of the field study experiences at the beginning of the year, but quickly reported there were not enough activities at their

5. The grant included a restoration/enhancement portion - outline of the maintenance plan and follow up activities that will ensure success of the project:

Frequent watering ensured the survival of about 90% of the plants in the Courtyard Garden the first summer. Continued monitoring and occasional watering will be maintained this summer, then replacements for the plants that died, plus additional shrubs and groundcover plants, will be planted in the fall. Ongoing maintenance will be provided by Adventure School students and families. The Courtyard is in a highly visible location at Markham so future students, staff, and parents at the school will be motivated to continue to maintain and improve it.

6. Actual product of the grant such as curriculum, video, guide, brochure, etc. that the grant money funded.

See attached:

- ✓ Data sheets and monitoring protocol
- ✓ Results of field studies
- ✓ Guide to writing an Education/Stewardship grant application

Financial Report:

In-kind/matching donations, Year 1

<u>Item</u>	<u>Donor</u>	<u>Amount/value</u>
Microbiology filter holder	Millipore Company	\$51
Reference books (Terrene)	Friends of Arnold Creek	\$117.99
Snacks for workshops	PTA	\$52.35
Snacks for planting project	Parent	\$25.70
Weedshield for courtyard	"	\$38.97
Barkdust for courtyard	Portland Parks and Recreation	\$50
Plant markers, hoses	Parent	\$36.50
Sprinklers	"	\$30
Tip to Bull Run bus driver	"	\$10
Donations for swale consultation	Parents, McDonald's	\$200
Donations for reference books	Parents	\$75
Printing	Portland Public Schools	\$30
Paper for fliers	Parent	\$15
Photography film and printing	Parents	\$30
Slide preparation for Metro report	Parent	\$40

TOTAL : \$802.51

Receipts for matching donations are available on request.

Teacher/professional staff volunteer hours, Year 1 - June 1996

Total project planning time from mid-project report : 120 hours, \$4,025
Saturday local field trip and bird call ID : JP, PH 2 hrs each; PW 4 hrs; LuAnn Bye 4 hrs
Planting project : Emily Roth, NRCS, 50 hours; PW 2 hrs, JP, MM 1 hr each
Downspout disconnection : Rudy from NRCS, 2hrs; Henry from BES, 2 hrs
Naturescaping workshop : Linda Robinson + assistant, 6 hrs each
Bull Run field trip : 3 staff from Water Bureau, Ivy Frances, PW 8 hours each
Streamwalk with 5th grade : Lynn Vanderkamp 8 hrs
Field trip/monitoring planning : Rob Annear, 8 hours; PW, MM, GP, 5 hrs each
Total professional hours donated in second half of first year : 153
Teacher time = 32 hrs @ \$25 = \$800 Principal = 3 hrs @ \$50 = \$150
Agency staff = 106 hours @ \$50 = \$5,300 Skilled volunteers = 12 hrs @ \$25 = \$300
Total value of professional/skilled volunteer time, second half of first year = \$6,550

Total : 273 hours, \$10,575

Volunteer hours, Year 1 - June 1996

March field trip	212 +
Courtyard planting	124 + 148 +
Naturescaping workshop	60 +
Bull Run trip	312 +
Monitoring program planning	40 +
Watering courtyard to 6/30	60 +
Grants accounting/evaluation	40
	= 996 hours @ \$4.75 = \$4,731
Volunteer hours from first half of project	= 236 @ \$4.75 = \$1,121
Total volunteer hours	= 1,232 @ \$ 4.75 = \$5,852

Match from work by LOHS Green City Data Project team : 160 volunteer hours plus 40 professional hours = \$1,760

Total value of volunteer hours, Year 1 = \$18,187
Total value of in-kind match, Year 1 = \$802.51
Total value of matching funds, Year 1 = \$4,000 (BES Stewardship grant)

Total match, Year 1 = \$22,990

Year 2

Professional hours donated, Year 2:

Note : It is not possible to estimate the number of volunteer hours donated by teaching and administrative staff at the Adventure School in 1996-7, because the grant-funded field study program is an integral part of the regular curriculum, and teachers donated hundreds of hours over the contracted workweek in order to ensure success of the program. Teacher hours are counted as donated only for the Capstone Experiences, which any reasonable person would consider above and beyond the call of duty in a regular classroom.

Lynn Vanderkamp, BES Education Specialist - 8 hours, @ \$50 = \$400
Kim Wilson, Green City Data Project Naturalist - 20 hours, @ \$25 = \$500
Patt Opdyke, Naturescaping for Clean Rivers - 4 hours, @ \$50 = \$200
Bob Febus, Woods Memorial Park Ranger - 2 hours, @ \$25 = \$50
Patty Nelson, BES Engineer - 2 hours, @ \$50 = \$100
Korin Henderson, USA Water quality scientist - 4 hours, @ \$50 = \$200
Colleen Culberton, PPS Technology Specialist - 4 hours, @ \$25 = \$100
Rob Annear, BES Intern/Monitoring planning & support - 6 hours, @ \$25 = \$150
Hach Company, technical support division - 1 hour, @ \$25 = \$25
Teacher time on capstone experiences - 25 + 50 + 75 = 150 hours, @ \$25 = \$3,750
Student teachers on capstone experiences - 50 + 75 = 125 hours, @ \$25 = \$3,125

Total professional hours donated, Year 2 = 326 hours = \$8,600

Volunteer hours, Year 2

Parent volunteer hours : 2,144 @ \$5.25/h = \$11,256
Student participation in field study : 4,810 hours = \$25,252.50
Envirocorps Courtyard Cleanup - 6 workers, 4 hours each @ \$5.25/h = \$126
Portland State University interns on Capstone Field Studies : 180 hours @ \$5.25 = \$945
4th grade Courtyard Cleanup - 30 students, 2 hours each @ \$5.25 = \$315

It is interesting to note that the ratio of parent volunteer hours to student hours is only a little over 2:1, despite the fact that the ratio on field study was usually 4:1. This discrepancy shows that nearly as much time was donated planning and doing follow-up for field experiences as was spent in the field.

Parent hours include planning during the summer of 1996 prior to the opening of the Adventure School, and watering the courtyard garden during that time. Individuals kept personal records of volunteer hours on separate sheets at the school - these logs are available on request.

Total unskilled volunteer hours donated = 7,218 @ \$5.25 = \$37,894.50

In-kind donations, Year 2:

Metro - two "fruit loops" regional watershed maps = \$60
Parent - 4 replacement thermometers and pH test strips = \$67.80
Parent - replacement DO membranes = \$108
Parents - mileage for field experiences : 432 miles on weekly experiences plus
500 miles for 4th grade, 2800 for 5th grade, and 2000 for 6th grade Capstones,
= 5,732 miles @ 32 cents = \$1,834.24
KOIN-TV - 100 hard hats with Adventure School logo @ \$10 = \$1,000
Multnomah County - 20 hard hats @ \$10 = \$200

Total in-kind donations, Year 2 = \$3,270

**Total match, Year 2 = \$49,764.50 (match not including students participating in field study
= \$24,512)**

TOTAL MATCH : Year 1 + Year 2 = \$22,990 + \$49,765 = \$72,755

Ratio of Metro Education Funds to match : 1 to 23

In addition, the success of the planning and implementation of the first year of the Adventure School, including its innovative neighborhood geography/field study component, helped us to win a \$35,000 grant from the Oregon State Department of Education.

Addendum

Benefits resulting from the project

1. Parents, teachers, children and neighbors LEARNED! We're excited! We're pumped and ready to continue to monitor and enhance those watersheds!

Beneficiaries : 348 direct participants, plus their families, friends, and neighbors.

2. Behaviors have changed. The day after the installation of the native plant garden, I returned to Markham to water the plants. Another parent was there, sweeping the soil off the asphalt path so it would not be washed into the stormdrain. Participants in the courtyard garden and the Naturescaping for Clean Rivers workshop plan to re-landscape their yards with native plants. Some have already started. Other participants have switched from gas mowers to push mowers.

3. Sixth grade student participants have started an "Environmental Club". They plan to use babysitting money to buy native plants to restore a riparian area in the leader's backyard.

Beneficiaries : 10

4. The Adventure School neighborhood geography component will continue in September. This grant project was invaluable in helping to set up our monitoring program.

Beneficiaries : up to 150 students per year, ongoing

5. Although collection of water quality data is only just beginning, the extensive troubleshooting for the monitoring program which has occurred through this grant will facilitate future success.

6. The courtyard garden is beautiful. The area has not been mowed for over a year, providing direct air and water quality improvements. Wildlife is returning to the area. Shrubs, trees and highgrowing groundcover has reduced runoff compared with the pre-existing lawn. The observations regarding the water quality swale grasses from seed provide important information for the City and developers needing to establish native grass swales in environmental zones. *Beneficiaries : 500 Markham students, staff and family members; owners of the 15% of Portland land in environmental zones.*

7. Community awareness of watershed issues, student participation in environmental education, and neighborhood stewardship of streams and natural areas has increased by articles in local and regional publications.

Distribution statistics : *The Oregonian* - Portland Metro area
SWNI newsletter - 8,000 SW households monthly; 26,000 in April
Multnomah Village Post - 8,000 households
Markham Newsflash - 380 families

8. Participant pre- and post-tests indicate that learning occurred during the workshop series. 11 families attending the first workshop handed in their pre-test, 12 returned a post-test after the Bull Run trip.

The following summarizes the results:

Question	# answering correctly pre-test	# answering correctly post-test
Which watershed is Markham in?	4/11 = 36%	10/12 = 83%
Name four watersheds in Portland.	3/11 = 27%	12/12 = 100%
Which rivers do Tryon/Fanno flow to?	9.5/11 = 86%	11.5/12 = 96%
Where are WPP/Woods Park?	2/11 = 18%	9/12 = 75%
Where do stormdrains lead?	7/11 = 63%	11/12 = 92%
Is Markham in the CSO area?	2/11 = 18%	3/12 = 25%
<i>(note - this topic was covered only briefly, during the first workshop)</i>		
Name 4 plants native to Portland	6/11 = 55%	11/12 = 92%
What is a benthic macroinvertebrate?	4/11 = 36%	12/12 = 100%
What is an indicator microorganism	2/11 = 18%	11/12 = 92%
What does DO stand for?	2/11 = 18%	11/12 = 92%
What activity do you do which has the greatest impact on water quality?	3/11 = 27%	9/12 = 75%
List as many ways <u>you</u> can improve water quality as possible	12 total responses	27 total responses (225% increase)

9. Participant evaluation forms on the Year 1 workshop series were returned by 12 families. Results were as follows:

(Scale was from "Very fun" to "Awful")

Workshop # 1 - Very fun 11/12 = 92%, a little fun 1/12 = 8%

Workshop # 2 - Very fun 10/12 = 83%, a little fun 2/12 = 17%

Local field trip - Very fun 10/10 = 100%

Planting project - Very fun 6/11 = 54%, a little fun = 5/11 = 46%

Note - several participants commented it was satisfying, but too much hard work to be "very fun"!

Bull Run field trip - Very fun 11/12 = 92%, a little fun 1/12 = 8%

All the respondents stated they had learned something from participating in the project. Items listed as "the most memorable thing we learned" included:

Bull Run trip (size, beauty, lack of filtration, lack of drainage from Mt Hood) - 4 mentions

"How to keep a healthy watershed"

"Bird calls" - 2 mentions

"That there's always more to learn about watersheds"

"Where Woods Park is"

"Native plants and their effect on water quality"

"We have leeches in our front yard"

10. 8 families volunteered to water the courtyard garden over the 1996 summer - a measure of their feeling of ownership and stewardship for the project. 49 parents assisted with field study activities at the Adventure School in 1996-7.

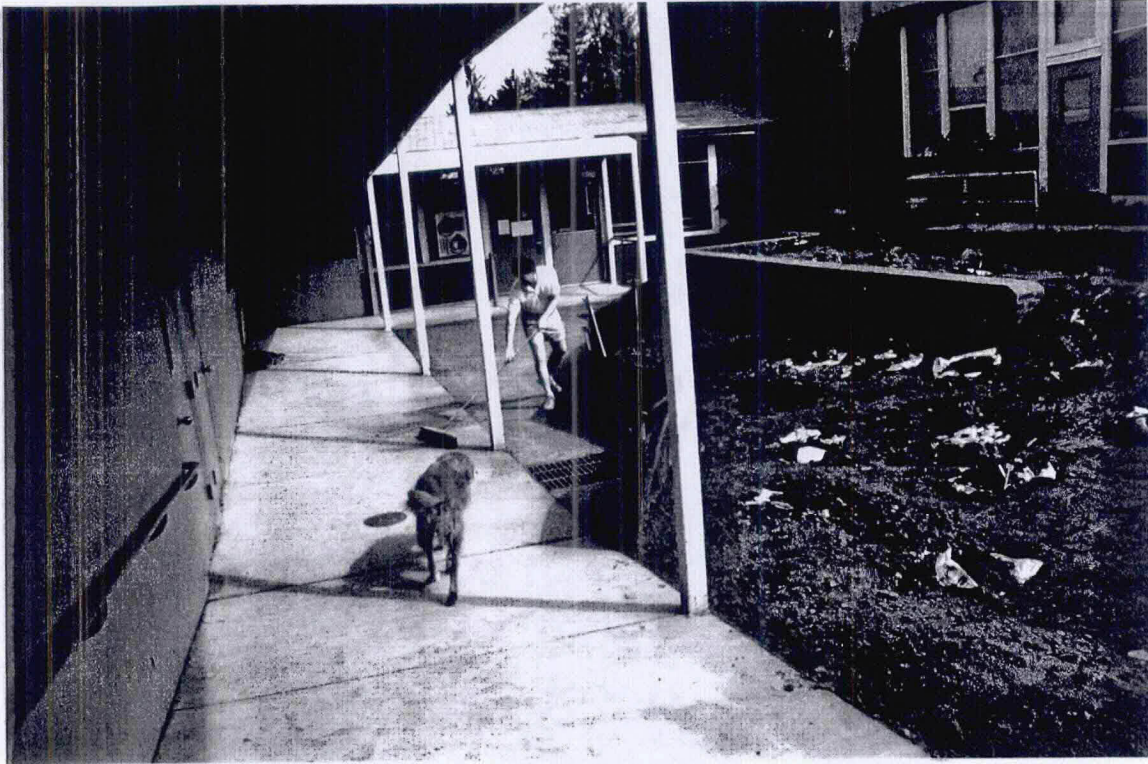
11. Criteria for community involvement in the Year 1 Workshop series:

<u>Category of participant</u>	<u># targeted in grant proposal</u>	<u># participated</u>
5th grade students	70	70
Markham families	20	24
Community residents	10	34
Teachers	3	8
<i>Total sign-ins for all extracurricular events</i>	165 (estimated)	361

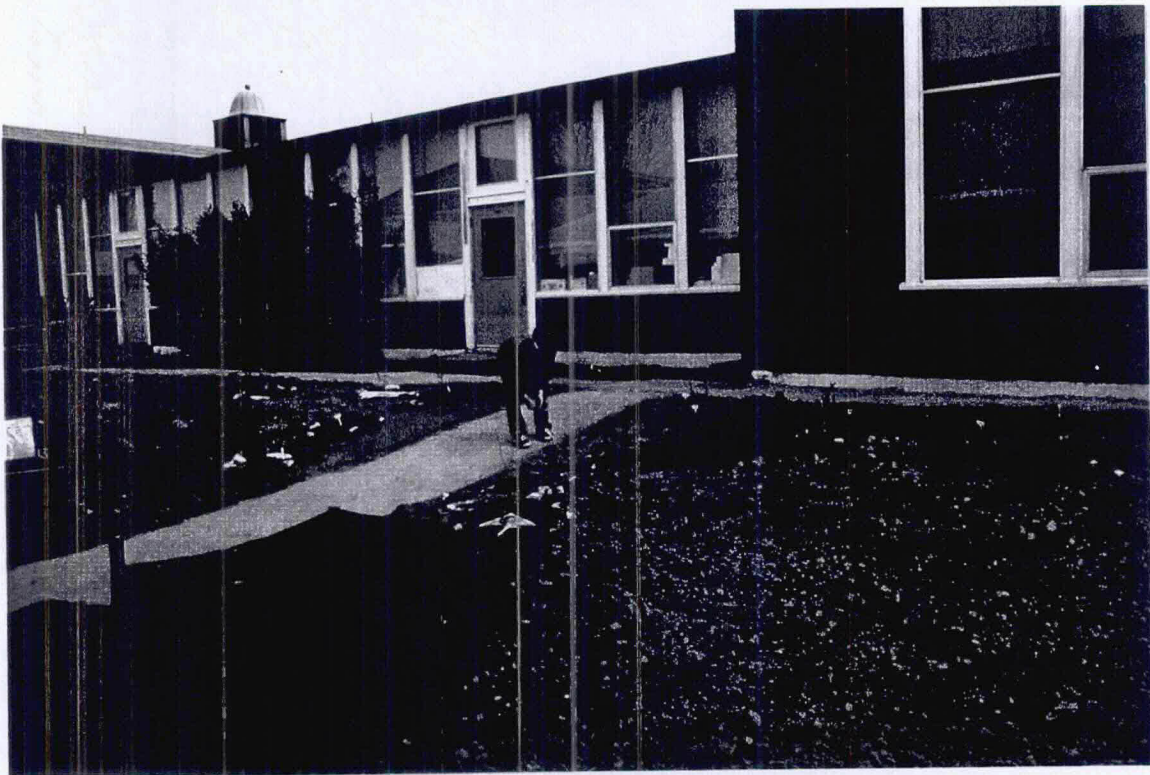
12. Final criterion for evaluating success of the project - I would do it again!

The MARKHAM/FRIENDS of ARNOLD CREEK
FAMILY GEOGRAPHY WATERSHED PROJECT

Two signs of success, the day after the planting project:



1) A dad sweeps off the dust to prevent it going down the stormdrain



2) Kid with basketball wanders in and looks at the plants and signs in the garden