922606

saturday ACADEMY

August 8, 2002

Metro Regional Parks and Greenspaces Department
ATTN: Deb Scrivens
600 NE Grand Avenue
Portland, OR 97232

Dear Ms. Scrivens and Ms. Thompson:

Thank you for supporting Saturday Academy's Student Watershed Research Project (SWRP).

The $8,000 Metro Greenspaces Grant helped SWRP to maintain our long-term monitoring and watershed education operations in the Portland metropolitan area. Requested funds were used to cover the cost of field trips, classroom and field support and coordination of sampling and quality control, and a year-end scientific summit where students presented their findings.

Enclosed please find a copy of our final report and an invoice for payment of the $8,000 to Portland State University, our fiscal agent.

I can be reached at 503-748-1363 or renfro@pdx.edu if you have any questions.

Thank you again and I look forward to working with you in the future.

Sincerely,

Stacy Renfro
Program Director
Student Watershed Research Project
Saturday Academy

STUDENT WATERSHED RESEARCH PROJECT

20000 NW Walker Road, Beaverton, Oregon 97006
503/748-1190 FAX 503/748-1470
http://www.saturdayacademy.org

METROPOLITAN GREENSPACES EDUCATION GRANT #922606
FINAL REPORT – JULY 1, 2002

Project: Student Watershed Research Project (SWRP) Contact: Stacy Renfro

Phone: 503-748-1363 Fax: 503-748-1388 Email: renfro@pdx.edu

SYNOPSIS

The Student Watershed Research Project (SWRP) is a long-term monitoring program started in 1991 with funds from the National Science Foundation. SWRP coordinates cooperation among teachers, 8-12th grade students, scientists, businesses, governmental agencies, and community groups to couple watershed education with the collection of high quality data. **SWRP conducts stream sampling at multiple watershed sites in the Portland/Vancouver Metropolitan area. SWRP's monitoring protocols provide a complete baseline set of data including physical, chemical, and biological parameters**, which, by reflecting changes over time, provide information for both baseline and project effectiveness monitoring.

ACCOMPLISHMENTS

Metropolitan Greenspaces Environmental Education Grant funds have enabled the SWRP program to coordinate the monitoring efforts of students and teachers from 23 schools. The following table identifies program participants during the 2000-2001 and 2001-2002 school years.

School	Teacher	2001 Students	2002 Students	Total participation
Aloha High School	Kathleen Sprague	195	83	278
Alpha High School	Stefan Aumack	0	20	20
Capital Center High School	Debbie Cooper	9	36	45
Cascade Education Corps - NWRESD	Rachel Lippert	12	18	30
The Catlin Gabel School	Lynda Jones	15	14	29
Columbia River High School	Pam Lehrman	118	122	240
Evergreen High School	John Akers	90	0	150
	Kristy Harger	60	0	
Glencoe High School	Linda Wolf	30	27	57
Grant High School	Walt Hollands	40	60	203
	Brick Street	40	63	
Gresham High School	Kathy Childress	0	28	131
	Paul Slichter	63	40	
Hillsboro	Wayne Turner	30	0	30
Lake Oswego High School	Jeff Goodrich	35	62	97
Levi Anderson School	Paul Ferris	10	7	17
Madison High School	Tom Hinton	0	17	131
	Will Mitman	29	42	
	Winnie Yan	25	18	
Reynolds Natural Resources Academy	Larry Callister	60	67	175
	Dawn Gilkison	20	28	
Sandy High School	Alan L'Hommedieu	0	30	30
Sherwood High School	April Dewees	30	24	54
St. John Fisher School	Leonard Lippi	29	0	29
Sunset High School	Kirk Soule'	48	0	48
Tualatin High School	Dede Moore	0	15	15
West Linn High School	Paul Sherman	29	24	53
Westview High School	Debbie Cooper	29	0	29
Wilsonville High School	Jim O'Connell	15	7	22
23 Schools	**29 Teachers**	**1883 Students**		

Each of these 1883 students has effectively gained an understanding of environmental science and watershed issues. With the SWRP program as part of their science class students went through the following steps:

1. **Students learn what a watershed is.** Students explored the definition of a watershed and the various factors that contribute the quantity and quality of surface water.

2. **Students become familiar with the parameters to be studied.** SWRP provided classroom lectures, handouts, and web-based materials for students to learn the ecological importance of the chemical, biological and physical parameters measured. For example: Rather than focusing on the chemical formulations of pH, the SWRP program provided materials and insight for teachers and students to focus on the significance of pH, what it indicates about the health of a stream, and what factors may influence changes in the pH of a stream.
3. **Students learn and practice the measurement methodologies for the parameters to be studied.** SWRP supported instructors to teach proper field and lab techniques resulting in consistent methodology implementation by students. Students learned the need for statistical relevance, as a quality control mechanism for their own data; precision between practice replicates and accuracy of unknown sample analysis.
4. **Students prepared for field sampling** by reviewing historical data and compiling all needed materials including data sheets, reagents, boots/waders, etc.
5. **Students conduct field sampling.** At this point, students knew what they were doing. SWRP staff met students in the field to collect and transport duplicate samples to a professional lab, provide troubleshooting, and support. Students were encouraged to use any extra time to take note of field observations such as surrounding land use, potential problems, and significant flora and fauna, such as the presence or absence of wildlife, native or invasive species, etc.
6. **Students submitted their data to the SWRP database.** Labs reported duplicate sample data to SWRP. Student and lab data were audited by SWRP staff and returned to students and teachers with feedback on any successes or problems with the data.
7. **Students analyze their data.** SWRP provided classroom and web support for data analysis including use of spreadsheets, statistics, and graphing. Students identified problems or areas of interest in their data and formulated hypotheses.
8. **Students secured additional data and conduct additional research as necessary to investigate their hypotheses.** This involved internet, library, and community resources such as land owner interviews and contact with agency personnel.
9. **Students presented their findings.** Poster and oral presentations were given at SWRP's Annual Student Watershed Summit. Environmental science professionals evaluated student presentations. 250 students presented at the 10th Annual Student Watershed Summit, held at the University of Portland on May 17th, 2002.
10. All of SWRP's student-collected data is available on our web site – www.swrp.org.

Students also presented findings in their communities:

School	Problem and Community Presentation
Capital Center High School	Found that the local swimming pool was overflowing into a small perennial creek, raising the temperature and introducing chlorine. Students reported findings to the Tualatin Hills Park and Recreation District Board of Directors.
Grant High School	Students found extremely high *E. coli* levels in the North Fork of Dairy Creek. They called DEQ, went back for additional samples, and spoke with the property owner at their monitoring site. Students presented findings to the Executive Committee of the Clackamas River Basin Council. The poster display for this group and the students monitoring Clear Creek are on display at the Clackamas County Board of Commissioner's Office.
Reynolds Natural Resources Academy, Gresham High School, Alpha High School, and Madison High School	Students participated in a one year monthly monitoring project to establish a baseline for Fairview Creek as part of the TMDL (Total Maximum Daily Load) process. Student Posters are on display in Gresham's City Hall and will also be displayed at OMSI during the summer of 2002.
All Schools	Poster Displays developed and evaluated at the Annual Student Watershed Summit are displayed each summer in OMSI's Watershed Lab.

Project Timeline

Month(s)	Activities
January 2001	Teacher Training - *New Technologies in Data Management* – 1 session Online Data entry and retrieval – Review and troubleshooting
March 2001	Sampling preparation meeting – protocol and Quality Control review – Classroom presentations for sampling preparation and introduction to volunteer opportunities
April 2001	Classroom presentations and support for sampling preparation Spring Sampling – field support and quality control provided by SWRP staff Summit preparation – Students utilize web-based data and information shortcuts on SWRP web site, classroom assistance provided by SWRP staff Students report data online to SWRP's web site Data Auditing and feedback begins
May 2001	Summit preparation continues Ninth Annual STUDENT WATERSHED SUMMIT – May 18th Data Auditing and feedback continues
July/August 2002	Riparian and Aquatic Ecosystem Monitoring Workshop held at Pacific University Recruitment of new teachers
September 2002	Teacher Meeting to start the project year – equipment & supplies distribution, schedule, expectations, and new project offerings. Start preparation for fall Sampling Begin Fairview Creek monthly monitoring.
October 2002	Fall Sampling – Classroom Assistance, Field Assistance, Quality Control
November 2002	Web data entry training – Data Auditing
March 2002	Habitat Assessment Training Get ready for Spring
April 2002	Teacher Meeting supplies distribution, schedule, expectations, and new project offerings. Spring Sampling Classroom Assistance, Field Assistance, Quality Control Summit Preparation Data Analysis Training
May 2002	10th Annual Student Watershed Summit – May 17th – 250 students, over 320 people in attendance Final Fairview Creek Sampling

FUNDS

Metropolitan Greenspaces Environmental Education Grant funds were utilized as follows:

Category	Budgeted	Expended	In-Kind	Match - Cash
Personnel	$4,105 SWRP Staff	$4,796	$ 6,666 OGI	$ 9,425 CRW
Professional Services	$2,395 Transportation	$1,693	$20,826 CWS Lab Services	$0
Materials and Supplies	$1,500 Sampling Supplies	$1,511	$ 203 Hach $ 200 CWS	$0
Rental Fees	$0	$0	$ 1,170 PU	$ 21 CRW
Indirect Costs	$0	$0	$0	$42,982 PSU $ 754 CRW
Total	**$8,000**	**$8,000**	**$29,065**	**$42,982**

CRW = Clackamas River Water

CWS = Clean Water Services

PSU = Portland State University

PU = Pacific University

TOTAL MATCH $72,047

Match Ratio 9:1

Special Note for Final Report: This project did not involve the restoration or enhancement of a particular stream site. The major products of this program are student presentations, which were presented at the Student Watershed Summit and a database of quality assured student-collected data, which is accessible to the public at www.swrp.org. Therefore we have not included a final product other than the collection of student abstracts, pictures of field activities, and copies of the newsletters produced by SWRP for our student participants.

ATTACHMENTS

- 10th Annual Summit Program and Evaluation Results
- 9th Annual Summit Program and Evaluation Results
- Giant Stonefly, Spring 2001, Fall 2001 and Spring 2002 – SWRP's newsletter for participants
- Photo Gallery – This page provides some visual reference for the activities described in this report – additional photos and information are available on our web site: www.swrp.org digital copies can also be provided if needed – contact Stacy Renfro for more information.
- Invoice and Receipts for grant expenditures *(sent to Metro only)*

9th Annual Student Watershed Summit
May 18, 2001
Summary of Evaluation Comments

All indications are good to EXCELLENT! Summit evaluations have been reviewed and the event appears to have been a tremendous success. Nineteen school groups and over 170 students were involved in this year's event. Each year SWRP uses the feedback we receive from the Summit to evaluate the event success and to determine changes that can be made to enhance future events. The following is a brief summary of feedback received from this year's Summit attendees.

STUDENT feedback on the Summit was overwhelmingly positive. As usual, we received a number of requests for *more time,* and *more free stuff,* but most of the comments were geared to their appreciation for the opportunity to share their findings with their peers and interested adults.

"I was interested and challenged – it went really well, I am glad I came!"
– Clinton Downs, Grant High School

"The Summit is a great idea, it brings students together to share info with each other and to teach their peers." – Sasha Unkov, Grant High School

"I think that the best part of the Summit was being able to look at all the posters and being able to tell other people about what we have learned and show the data we have gathered."
– Tracy Muncy, Aloha High School

"After our presentation the judges came by our poster and talked to us one on one about our presentation and ideas." – Betsy Herb, Glencoe High School

"I enjoyed listening to the judges questions causing students to really think about the information that they found." – Christina Mackin- Reynolds HS

"I appreciated that the judges asked real questions and treated us as more than high school students." –Aaron Heine, Westview High School

"I liked the focused groups and the difference between sites. I liked the speaker also, being able to hear about hope for the future." –Lauren Ormerod, Grant High School

Kendra Smith's keynote address was listed by several as the best aspect of the Summit.

"Good speaker, good ideas, she was really trying to motivate us to actually do something to help solve the pollution problem rather than just take the water samples and watch the species become extinct." – Spencer Hardy, Grant High School

"I liked how she talked about the future and what we can do to help. She was quite modest yet had a lot of important information to share. Posed many good points and questions."
–Lauren Ormerod, Grant High School

JUDGES really enjoyed being able to see BOTH the oral and poster presentations. Last year the Summit format was changed so that judges evaluate both presentation formats. Prior to that, judges spent most of their time focusing on the poster presentations and determining awards. Based on comments from judges and teachers, it appears that the quality of student presentations is improving despite the lack of awards.

> *"I liked the fact the judges got to attend the[oral] presentations and posters."*

Judges really felt students knew what they were talking about.

> *"[The best part of the Summit was] how well the students understood their subjects. I was very impressed with the posters and oral presentations"* – Rusty Post, Washington Dept of Ecology
>
> *"The students keep getting smarter!"* – Bernie Bonn, US Geological Survey
>
> *"[The best part of the Summit was] all of the smart students presenting data."*

And it shouldn't come as any surprise that most scientists involved in the Summit think interacting with students is the best part of the event.

> *"[The best part of the Summit is] interacting with the students in the poster session! This event is inspiring!"*
>
> *"Inspiration from knowledgeable students"* – Jennifer Thompson, US Fish and Wildlife Service

Several student presentations were so good that it inspired the following comment from a judge:

> *"Follow-up community education and local business cooperation should be encouraged and supported."*

…and there were similar comments from guests. Hopefully several student groups will find other local audiences to present their findings and recommendations to.

TEACHERS attending the Summit had great things to say about student presentations.

> *"I like seeing the posters as well as hearing the presentations. You can see all the effort put into both."*
>
> *"[The posters] seemed even more creative this year!"*
>
> *"The presentations were fantastic."*
>
> *"The speakers were great!"*
>
> *"Quality of presentations went way up this year. Lots of agency/scientist contact."*

Several teachers commented that hearing presentations from beyond the local watershed their school monitors was a valuable experience.

> *"It was great to see data from a variety of situations in different watersheds."*

10th Annual Student Watershed Summit
May 17, 2002
Summary of Evaluation Comments

The best Summit yet??? Most of the Summit feedback points to another EXCELLENT event! Over 300 people, 225 of whom were students, were involved in this year's Summit. Each year SWRP uses the feedback we receive from the Summit to evaluate the event success and to determine changes that can be made to enhance future events. The following is a brief summary of feedback received from this year's Summit attendees.

STUDENT feedback on the Summit was overwhelmingly positive. Apart from presenting oral and posters sessions, students learned a lot from each other and really enjoyed interacting with judges and students from other schools.

> *"It brought students together from all around Portland to address issues we have been monitoring"* – Tess McBride, Grant HS

> *"It was a fun learning experience, and it was really neat to have the opportunity to present our data and receive excellent, professional feedback on it"* – Tess Piete, Tualatin HS

> *"I most enjoyed listening to the presentations because I liked how everybody went about it differently but it all worked"* – Sam Mowe, Grant HS

> *"I thought it was extremely gratifying and I learned tons! Thank you to the judges for their input!"* – Ember Morton, Columbia River HS

Based on feedback from previous years, the number of **oral presentations** in each session was expanded to six this year, although we still received plenty of feedback for *more* time to present and an opportunity to see *more* presentations.

> *"I thought the oral presentations were very interesting. They really made me think and taught me a lot"* – Grace Martin, Westview HS

> *"I liked that it gave students the opportunity to present the things that they have learned about their local watersheds to experts and to express to these experts their own ideas about and opinions on the conditions of the watersheds"* – Alicia Beck, Grant HS

Despite being held in a new location, nearly everyone felt the Summit was well organized. More room for the **poster displays** was the main recommendation we received for next year (other than having better cookies).

> *"Have the posters more spread out so that there's more room to stand when talking to visitors and judges"* – Brittany Feeney, Columbia River HS

> *"My favorite things were the displays, they were well made. And the presentations were good, some looked like they put a lot of pride into them."* – Jon Hurt, Madison HS

Bill Bradbury's keynote address received praise from students, judges and teachers alike.

> *"It was great hearing Mr. Bradbury. It helps me to see the all around picture"* – Lindsay Johnson, Grant HS

> *"Great speech; caught my attention on various things"* – Jon Green, Gresham HS

"Very good public speaker and shared relative and important information" – Steven Alsterberg, Tualatin HS

"I think it's good that he gets out to things like this and is showing support for what we do" – Alicia Dunn, Reynolds HS

"A good choice for SWRP's 10th anniversary. One of the best keynote talks that SWRP has had" – Stewart Rounds, US Geological Survey

"Related students' work to empowerment as citizens." – Summit judge

It comes as no surprise that the **JUDGES** felt interacting with students was the best aspect of the Summit.

"Interacting with young adults about such important environmental concerns and seeing the compassion they feel for their monitoring sites."

"[The best part of the Summit was] the enthusiasm, knowledge and interest that the students display."

Besides getting to interact with students, most judges couldn't decide whether the oral or poster presentations were better…

Oral Presentations

"Excellent, and get better every year."

"Great, as always. I continue to be impressed by the quality of student presentations" – Stewart Rounds, USGS

Poster Presentations

"The interaction with the students during the poster presentations – much more relaxed than their oral presentation"

"Obviously had spent time preparing them. Very skilled at talking about them."

"The poster session – talking personally with the kids helped me to really understand their streams and studies

Some of the other comments judges listed as the best aspect of the Summit:

"The large number of dedicated young people. Their professional level skills. The level of environmental and social consciousness."

"What a wonderful experience – great lessons are taught here, outside the classroom that prepare the students for real life performance and issues."

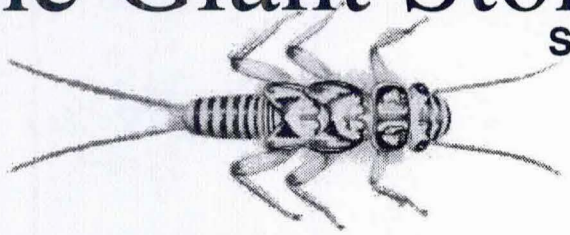
"The quality and amount of data collected – very important to study these watersheds. Some students discovered some very polluted creeks – very relevant data."

And be sure to check out SWRP's web site for pictures and more event wrap-up from the 10th Annual Student Watershed Summit.

www.swrp.org

The Giant Stonefly

Spring 2002



STUDENT WATERSHED RESEARCH PROJECT

Saturday Academy

10th Annual Student Watershed Summit

Friday May 17th
University of Portland

After April's spring sampling you will prepare to share your findings with scientists, teachers, and other SWRP students at the Student Watershed Summit. Twenty-four groups of SWRP participants will share their research findings and analyses of area watersheds on May 17th at the University of Portland.

Rusty Post from WA Dept. of Ecology discusses the Lacamas Watershed with Evergreen HS students

Anna Buckley from USGS reviews Beaver Creek with students from Madison HS

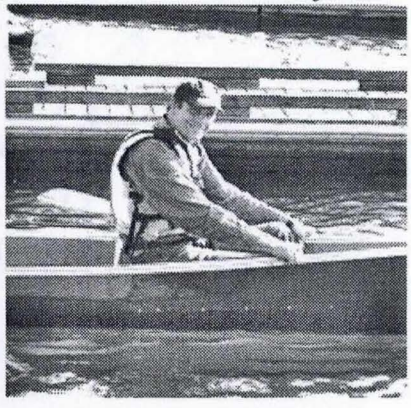
Each student group involved in SWRP prepares a poster and oral presentation for the Summit. Local scientists serve as judges to provide you with feedback on your presentations. The Summit allows you to engage with scientists, sharing your research results and recommendations for future management of our watershed resources.

Keynote Speaker - Bill Bradbury

SWRP is excited to announce that Oregon's Secretary of State, Bill Bradbury, will deliver the keynote address at our 10th Annual Student Watershed Summit.

Secretary Bradbury has proven his commitment to watersheds and stream health during his career. In 1981, he helped develop the Salmon and Trout Enhancement Program (STEP). As a state legislator, Bradbury helped enact the Oregon Watershed Health Program in 1993. In 1995, he founded *For the Sake of the Salmon*, a Portland-based non-profit organization dedicated to finding common ground for salmon restoration in Oregon, Washington, and California.

The last time Bill Bradbury attended SWRP's Summit was 1995, when he delivered the Keynote address to over 200 students. This year we look forward to hearing his perspective on the changes in our watersheds, their management and our understanding of these dynamic systems.



Bill Bradbury on the Willamette River

Student Watershed Research Project (SWRP)

What is SWRP?

Students and teachers monitoring watershed health. This is the tenth year that SWRP has worked to educate students to gather data on their local watersheds.

Local water quality agencies helped SWRP develop tests that 8 - 12th grade students can perform to collect high quality data. These same agencies help locate sites for which they want data collected. Student data is reported to these agencies each year.

Students from 24 Portland/Vancouver metropolitan area middle and high schools collect data twice each year (in the fall and spring). SWRP staff work to ensure that students collect useful watershed data and that the data students collect gets to the groups who can use it.

Saturday Academy is a self-funded program jointly allied with Portland State University and Oregon Health & Science University

www.swrp.org
great resources for watershed studies and research
find out the history of the watershed you live in
And lots more . . .

Resources Resources Resources!

Looking for information about your watershed as you prepare for the Summit? Need some help figuring out how to make the greatest Summit poster ever? Well, SWRP's Education Outreach Coordinator, Laura Minich has all the answers.

For the past several months, Laura has been digging through mountains of information on the watersheds monitored by SWRP students and has created a phenomenal new resource on SWRP's web site. Laura has composed web pages that give details about the history and issues of the region's watersheds. The new WATERSHED web pages contain information about the geology, hydrology, history, land use, water quality, and water quantity of the Portland area watersheds.

Laura comes to us as an avian-adoring biology major, recently graduated from Bowdoin College, in Maine. She is serving as an AmeriCorps member before she begins her graduate education (she wants to be one of those PhD types). Laura plans to continue studying sea birds, but she is enjoying learning about watershed monitoring and sharing that knowledge with SWRP teachers and students. As SWRP's Education Outreach Coordinator, Laura really enjoys getting to spend time sharing her knowledge with students in the field and classroom.

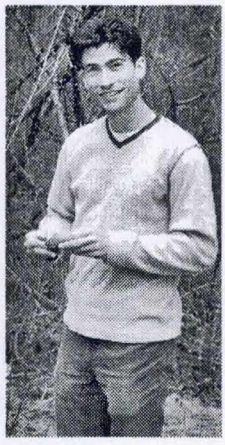
Check out the WATERSHED PAGES at **www.swrp.org** and follow the "Watersheds" hyperlink in the "Watershed Monitoring" section.

If you have questions about watersheds, specific parameters, (or birds), or need help preparing for the Summit, contact Laura at (503) 748-7724 or Laura.Minich@pdx.edu

Who are the people that come to your classrooms and field sites?

We are the SWRP Staff!

Program Director
Stacy Renfro
503-748-1363
renfro@pdx.edu



Technical Coordinator
Torrey Lindbo
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Education Outreach Coordinator/ NWSA AmeriCorps Member
Laura Minich
503-748-7724
laura.minich@pdx.edu

Featured Scientist:

The following was submitted by a Portland/Vancouver area scientist

Dr. Rob Stockhouse
Professor of Biology
Pacific University

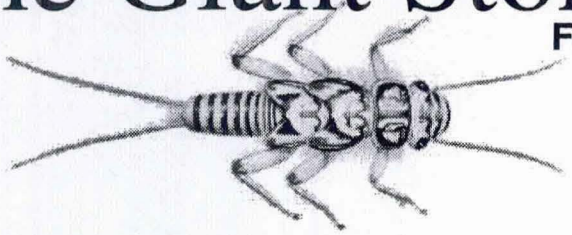
I received my bachelor's degree in 1969 from Colorado State University in botany. I spent the next four years completing my doctorate in "plant systematics" at CSU.

I have been interested in riparian and wetland ecology since taking my first course in plant ecology in 1967. My independent research project for that class was a comparison of vegetative structure and cover in protected and non-protected wetlands in the Fort Collins, Colorado area. That project shaped my career, as I am now a wetlands biologist. I currently teach Wetlands Monitoring Techniques, Plant Systematics, General Botany, General Biology, Ecology and do independent research and monitoring with my undergraduate students in wetlands in the greater Portland area. I also consult for several environmental firms.

I have been involved with SWRP since its inception. I worked with Dr. Wes Jarrell on the original SWRP grant proposal, which was submitted to the National Science Foundation. I am particularly pleased with the SWRP program because I BELIEVE in field research for students. Field research is one of the most important "eye openers" for up and coming biologists. SWRP has provided the first field experiences for hundreds of students over the past ten years, with the additional opportunity for data synthesis and delivery in terms of oral presentations and posters at the SWRP Summit. Students learn by DOING science and SWRP is an excellent example of students doing science. I enjoy teaching and I especially enjoy getting students involved with real research problems in field settings. Working in wetlands literally allows my students to "get their feet wet"!

The Giant Stonefly

Fall 2001



STUDENT WATERSHED RESEARCH PROJECT

Saturday Academy

Student Watershed Research Project (SWRP)
Saturday Academy

What is SWRP?

Students and teachers monitoring watershed health. During the past nine years, SWRP has worked to educate students to gather data on their local watersheds.

Local water quality agencies helped SWRP develop tests that 8 - 12th grade students can perform to collect high quality data. These same agencies help locate sites for which they want data collected. Student data is reported to these agencies each year.

Students from 24 Portland/Vancouver metropolitan area middle and high schools collect data twice each year (in the fall and spring). SWRP staff work to ensure that students collect useful watershed data and that the data students collect gets to the groups who can use it.

Saturday Academy is jointly sponsored by Portland State University and Oregon Health & Science University

www.swrp.org
great resources for watershed studies and research
See if your stream is "water quality limited"
And lots more . . .

Why Monitor the Health of Watersheds?

In 1972 the Clean Water Act was signed into law. This historic act stated that the United States must have "fishable and swimmable" waters. In other words, the characteristics of surface water that we value as a society and as individuals must be maintained and protected. We like to fish and we like to swim and we should be able to do these activitities in our rivers, lakes and streams.

The Clean Water Act identified two kinds of pollution in our water;

Point Source Pollution - incudes any single identifiable source of pollution (a pipe, a storm drain, ship, ore pit, etc.) and

Nonpoint Source Pollution – pollution that cannot be traced to a single containable source (land use practices etc.).

Point Source Pollution has been regulated fairly well over the past several years. Rivers are no longer burning, they generally do not stink, and as was the case with the Tualtin River, you can no longer "walk across" the sludge that was the river. But our beneficial uses are still not being protected. Fish are not returning and pollutants make it dangerous, if not just plain yucky, to swim in our surface waters. Nonpoint source pollution is the culprit.

Because nonpoint source pollution is difficult to quantify, monitoring the health of our watersheds is a good place to start. As land use practices change, changes in the quality of our watersheds can be tracked. We can determine what practices are working, and what kinds of nonpoint source pollution various land uses contribute to our surface waters.

SWRP Students to Conduct Monthly Monitoring of Fairview Creek

Fairview Creek is a tributary to the Columbia Slough which has been listed as "water quality impaired" by the Department of Environmental Quality under the Clean Water Act.

Once this listing occurs, the law requires that a TMDL (*total maximum daily load*) be set for the impaired water body. A TMDL is the plan of action to bring the water quality back into compliance with state and federal standards. The first step for a TMDL is to develop an understanding of the baseline conditions of the water body in question.

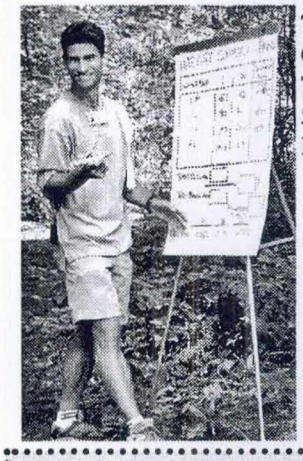
SWRP participants from Reynolds High School Natural Resources Academy, Gresham High School, Alpha High School, and Madison High School will help the Cities of Gresham, Fairview, and Wood Village gather baseline data on Fairview Creek so that a TMDL can be developed.

Who is involved in SWRP Fall 2001?

Check out the following list of schools involved in SWRP. How many of the following stream names do you recognize?

School	Stream
Aloha HS (Sprague)	Bronson Creek
Alpha High School (Aumack)	Fairview Creek
Cascade Ed Corp (Lippert)	Scoggins Creek
Catlin Gabel (Jones)	Gales Creek
Columbia River HS (Lehrman)	Cougar Creek
Evergreen HS (Akers, Harger)	Lacamas Watershed
Glencoe HS (Wolf)	E & W Forks Dairy Creek
Grant HS (Street)	Clear Creek
Grant HS (Hollands)	Deep Creek
Gresham HS (Slichter)	Fairview Creek
Hillsboro HS (Turner)	Rock Creek (N Wash Co)
Lake Oswego HS (Goodrich)	Springbrook Creek
Levi Anderson (Ferris)	Beaverton Creek
Madison HS (Yan & Hinton)	Beaver Creek
Madison HS (Mitman)	Osborn Creek
Reynolds HS (Callister)	Beaver, Clear, No-Name
Reynolds HS (Gilkison)	Fairview Creek
Sandy HS (L'Hommedieu)	Tickle Creek
Sherwood HS (Dewees)	Cedar & Rock (S Wash Co)
Sunset HS (Soule)	Rock Creek (N Wash Co)
Tualatin HS (Moore)	Cedar, Chicken, & Hedges
West Linn HS (Sherman)	Hedges & Saum Creeks
Westview HS (Cooper)	Willow Creek

Who are these people that come to your classrooms and field sites?
We are the SWRP Staff!



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Are you interested in a great summer experience for 2002?

Saturday Academy's
Apprenticeships in Science and Engineering (ASE) Program is for you!

2001 Apprentices worked for;
Oregon Department of Environmental Quality, Berry Botanical Garden, USDA Forest Service, USDI Bureau of Land Management, Oregon Department of Fish and Wildlife, US Environmental Protection Agency, The Nature Conservancy, And many more

Call ASE for application materials 503-748-1215

Featured Scientist:

The following was submitted by a Portland/Vancouver area scientist

Karen Font Williams
Volunteer Monitoring Coordinator
Oregon Department of Environmental Quality
Water Quality Monitoring Section, Laboratory

I received my undergraduate degree in geology from Smith College, Northampton, Massachusetts, and a few years later, received a Master of Science degree in hydro-geology from the University of Nevada, Reno.

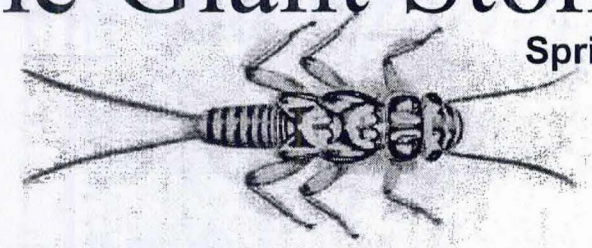
I worked for an environmental consulting company before and after graduate school, investigating soil and groundwater contaminated by leaking underground storage tanks, poor disposal practices, and spills. I worked in the field quite at bit, overseeing drilling of monitoring wells and sampling soil and groundwater. Back in the office I would create groundwater flow direction maps, compare this information with the results from the laboratory analysis of the samples, and write up all the information in a report. After graduate school I managed a project that involved serious groundwater contamination near drinking water wells. I worked with a team of scientists (hydrologist, risk assessor, microbiologist, engineers) to find the depth and extent of contamination and begin to evaluate different techniques for removing or breaking it down.

In 1998, I started working for the Oregon Department of Environmental Quality in the Water Quality Monitoring Section of the laboratory as the Volunteer Monitoring Coordinator for the state. I train groups like watershed councils, soil and water conservation districts, and others to conduct water quality monitoring projects in their watershed. I review monitoring plans, distribute equipment, conduct training sessions so groups have the tools they need to answer their water quality questions. I emphasize strict quality assurance and quality control so data collected by volunteers can be used alongside data collected by professionals. I provide technical assistance via telephone and electronic mail and visit volunteer groups as often as possible to review their techniques and answer their questions.

I enjoy being a liaison between scientists and laypeople, and especially enjoy working with volunteers because they are enthusiastic about learning and are committed to improving their watersheds.

The Giant Stonefly

Spring 2001



STUDENT WATERSHED RESEARCH PROJECT

Student Watershed Research Project (SWRP)
Saturday Academy
Oregon Graduate Institute

What is SWRP?

SWRP is students researching watersheds. For the past nine years, SWRP has worked with local teachers, training students to gather data on the health of local watersheds.

Agency scientists responsible for water quality helped SWRP develop tests that 8 - 12th grade students can perform to collect high quality data. Local agencies and watershed councils identify stream sites for which they need data.

Students from 20-30 Portland/Vancouver metropolitan area schools collect data in the fall and spring each year.

SWRP staff work to ensure that the data students collect will be useful to local resource managers and decision-makers. Student-collected data is managed by the SWRP program and reported to SWRP partners each year.

Saturday Academy

OREGON GRADUATE INSTITUTE OF SCIENCE AND TECHNOLOGY

Student Watershed Summit – Friday, May 18th

The Student Watershed Summit provides SWRP's participating students the opportunity to present their findings to teachers, scientists, interested community members and their peers. This year 24 groups of SWRP participants will share their hypotheses and research on area watersheds.

Clyde Doyle of the US Geological Survey inspects Aloha HS's poster on Bronson Creek.

Each student group involved in SWRP prepares a poster and oral presentation for the Summit. Scientists from universities, agencies, businesses and other resource professionals serve as judges to provide students feedback on their presentations. The Summit provides an excellent opportunity for students to engage with scientists, sharing their research results and recommendations for future management of our watershed resources.

Students from West Linn High School discuss Saum and Hedges Creeks with Jan Miller.

Year after year, scientists continue to be impressed with student accomplishments.

"The overall knowledge of the students was very impressive. They are starting to look at the whole picture and how complex the entire watershed is." - Jan Miller, Unified Sewerage Agency

Life after SWRP?

Anna Buckley has one!

Anna, an AmeriCorps member, served as SWRP's Education/Outreach Coordinator until December 2000. She is now working in the field, collecting data on Fanno Creek in the Tualatin watershed as a Water Quality Technician for the U.S. Geological Survey.

THANK YOU ANNA!!

Tying it all together – Data Analysis

So… You measured DO and temperature, Group 2 inventoried the riparian vegetation, and Group 3 measured *E. coli* –

How do you put them all together?

If the vegetation group found good cover from trees, shrubs and groundcover, you wouldn't expect to see high water temperatures since there should be plenty of shade. If the vegetation buffer was 50 feet wide before a fenced pasture, then E. coli probably gets filtered from the runoff by the healthy vegetation.

Every parameter measured at your site can be related to another measurement. Every parameter can also be related to land use activities in the watershed – What have you seen?

Just because you don't have a value that leads you to believe something is WRONG at your site, analyzing multiple parameters together is the best way to really understand what's going on. For example;

1. Try graphing temperature and streamflow together. Do you see a relationship? If the flow is low, would you expect more temperature fluctuation than if the flow is high?
2. Do low *E. coli* levels really mean the stream is healthy? What if someone has been emptying chlorinated water into the storm drain? A graph of *E. coli* and chloride would clearly show this.

When you analyze the data you collected, spend some time figuring out the possible relationships between parameters. Play with your data and you will find some great ideas for your Summit presentations.

Check out the SWRP web site for great resources, more examples, pictures of last year's Summit, etc:

www.swrp.org

Who works for SWRP?

The staff at SWRP is always available to assist you. If you have questions about watershed monitoring or about the SWRP program, please visit our web site **www.swrp.org** or contact us!

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Stacy Renfro
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Featured Scientist:

Karen Streeter

Clackamas County Endangered Species Act Program

When salmon and steelhead were placed on the Endangered Species Act list in 1999, my job became increasingly important to the recovery of these fish. I work for Water Environment Services, the department of Clackamas County that works on water quality, fish habitat, and stormwater treatments.

I have a Bachelor's Degree from Boston University in Environmental Science, an interdisciplinary program, with minors in General Ecology and Geographic Information Systems (GIS). I really enjoyed college because I was able to study so many different subjects for this degree like hydrology, biology, geology, and climatology. After graduating from college, I worked for the U.S. Forest Service (doing wildlife biology) and then for an environmental consulting firm (as a junior wetland biologist). In 1998, I came to work for WES, and I really enjoy my job.

On a daily basis, I use scientific principles such as properly functioning habitat conditions, eutrophication, population dynamics, carrying capacity, and statistics. I plan and conduct restoration projects and I review new commercial and residential developments (subdivisions and warehouse buildings) to determine whether they will have a negative impact on water quality.

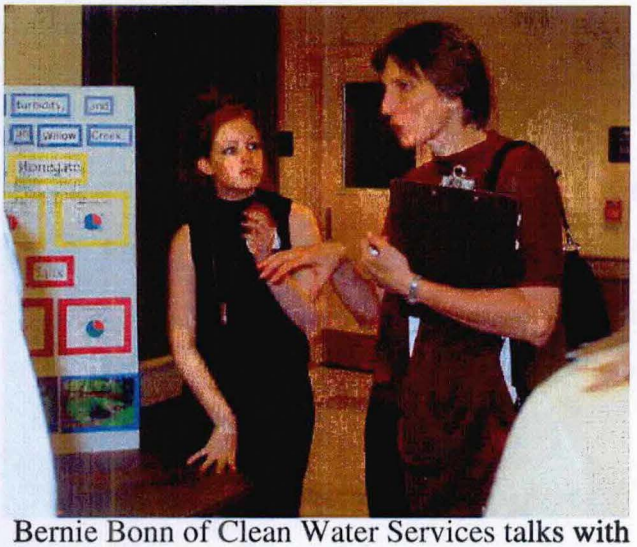
Most of my fieldwork is focused on urban stream restoration projects to enhance habitat for salmon. To do my job well I have to know about native trees, and which species grow the best in different conditions. I also have to know what salmon need for an ideal habitat, and how to design a project to create that habitat.

I am a native of Oregon, and cannot imagine a time in the future when salmon might not be here. I am trying to do my part to make sure that these fish are around for future generations to enjoy.

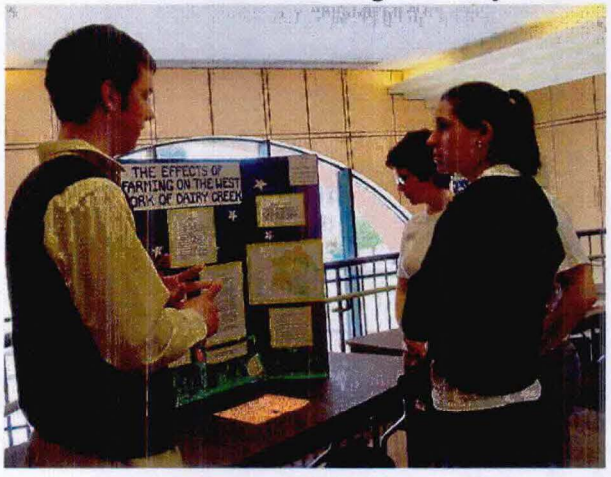
I am always excited by how many volunteers come to the tree planting events that WES hosts. I encourage everyone to VOLUNTEER for tree planting events-- they're a ton of fun and your work helps to make the world a better place.

10th Annual Student Watershed Summit, May 17, 2002

Students from Grant and Glencoe high schools discuss the effects of farming on Dairy Creek.



Bernie Bonn of Clean Water Services talks with students from Westview High School about Willow Creek.



Students from Madison high school present their findings on Arrata Creek, a tributary to the Columbia Slough

Students from Grant High School tell Tim Shibahara of PGE about their findings on the heath of the Deep Creek watershed in the Clackamas Basin.

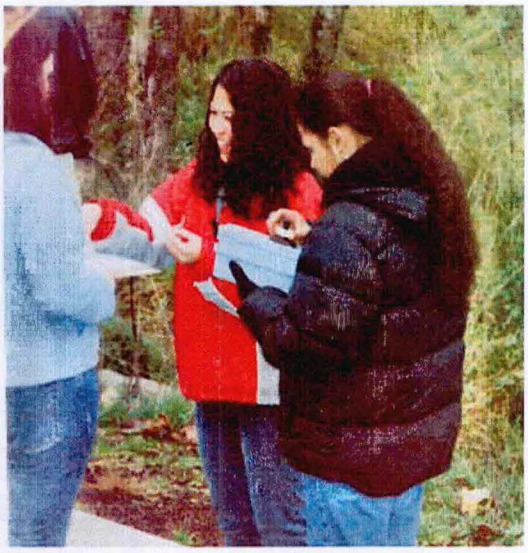
STUDENT WATERSHED RESEARCH PROJECT

SWRP Students in the Field

Wilsonville High School students conduct a series of water chemistry tests on Boeckman Creek. Note the stagnant water in the background, In the spring of 2002, the beaver dam which had caused this back up for three years had disappeared.

Stacy Renfro helps a student from Alpha High School conduct the nitrogen analysis on Fairview Creek. When a class is short handed, SWRP staff lend a hand.

Madison High School Students measure the depth of Osburn Creek.



Madison High School students test for alkalinity in Osburn Creek.

Grant High School students present their information on Deep Creek to the Clackamas River Basin Council.

Gresham High School Students calibrate the YSI multi-meter probe. These students were involved in the monthly monitoring of Fairview Creek in cooperation with the City of Gresham.