

UpStream

News from Stroud Water Research Center



UpStream

Fall 2003

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ABOUT THE COVER

Jane Goodall speaking at The Water's Edge.
Photograph by Bill Fitch.

ABOUT US

UpStream, the magazine of the Stroud Water Research Center, 970 Spencer Road, Avondale, PA 19311, is published in the spring and fall each year.

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Evaporation – Good for Water, Bad for Us

And it's where our will to stop pollution has gone



Jane Goodall and Bernard Sweeney

FROM THE DIRECTOR

Evaporation is the ultimate source of fresh water. It also purifies the water by leaving contaminants behind. Thus, the cycle of evaporation provides the world with a continuous supply of clean fresh water.

Yet human activities pollute the water almost as quickly as evaporation supplies it. Airborne contaminants degrade cloud water even before it falls as rain, and that water picks up additional contaminants as it moves across and under the land and into our streams and rivers. Because the sources of many of these contaminants are our business, industrial and household practices, the task of reducing water contamination is in our hands.

If that is so, why haven't we done more in our backyards and communities to reduce our pollution contribution? One answer is evaporation – not of our water but of our will. Too often, our determination to make a change that will make a difference succumbs to the evaporation of our good intentions, either because old habits die hard or because our efforts seem so miniscule compared to the issues we face.

But one message I took away from Jane Goodall's visit is that true change must bloom first in our community gardens – from seeds that germinate in each of us. What you and I do individually may seem insignificant, but together what a difference we can make. "If you save one drop of water," Pete Seeger once said, "you've saved the world."

At the Stroud Center, we believe that. Our mission encompasses not only our effort to understand all we can about the world's fresh water, but also our efforts to protect our local watersheds. Our educators like to tell their students and visitors that everyone lives in a watershed – and each of us, as individuals and as members of a wider community, must take responsibility for the one in which we live.

In a world in which the evaporation of water is the source of all life – and in which the evaporation of human will can drown us all – we must always remember that every drop counts.

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Stroud shows the way in New York

First year, Phase 2: a wet sampling season ends

When the New York monitoring project was launched four years ago, many water officials were skeptical about the Stroud Center's sampling techniques.

Now as the second stage of the project begins, Stroud Center measurements, such as "nutrient spiraling" and "rates of production," are the talk of the water science community.

"There is growing recognition that measures of ecosystem health should not only include aspects of organization (e.g. biodiversity, species composition, food web structure)," S.E. Bunn, a freshwater ecology scientist from Australia, told this year's meeting of the North American Benthological Society. They should also include "vigor," such as rates of production and nutrient cycling, and "resilience" – the system's ability to recover from disturbance.

He was referring to some of the techniques and tasks the Stroud Center developed and practiced well before the New York project was born. For the past 37 years, Stroud Center scientists have been testing their comprehensive approach to the study of stream systems. In New York and at other project sites, they are putting into practice their belief that there are many parameters to a healthy aquatic ecosystem and that each must be studied to gauge the overall health of a stream.

PHASE 2

By the time UpStream goes to press in late October, Stroud's rain-soaked field-workers will be finishing their fourth summer of monitoring the streams and reservoirs of the 2,000-square-mile watersheds that provide New York City's drinking water. They will then return home to complete the lab work and analysis of the season's sampling of the first year of Phase 2 of the New York project.

Despite the tight budgets facing both state and federal agencies, New York State and the United States Environmental Protection agency agreed to the three-year, \$4-million Phase-2 project, which ends March 31, 2006.

In Phase 1, the three-year study that began in the spring of 2000, Stroud Center scientists subjected 60 stream sites and eight reservoir sites to the full range of their monitoring techniques. In Phase 2, they will monitor 48 new stream sites, plus 12 of the Phase 1 sites. In addition, they have added four new reservoir sites to four of the Phase 1 sites.

A new project coordinator, David Arscott, has joined the team, replacing Charles Dow, who now heads the Stroud Center's information services. Arscott taught aquatic ecology and water resources at the University of Minnesota in Crookston until he plunged into the New York project immediately on his arrival this summer.

In the face of repeated delays due to the heavy rainfall, Arscott and crew are racing to finish sampling before the rain turns to snow, and the Catskill Mountains' notorious winter sets in. Arscott, at least, should be used to the snow – he studied for his Ph.D. at the Swiss Federal Institute for Environmental Science and Technology in Dübendorf, Switzerland.



David Arscott, new project coordinator for the New York project.

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ON NY'S CANNONVILLE RESERVOIR

Excerpts from diary of microbiology research technician Nancy Parsons

August, and field work moves from east of the Hudson River (big expensive homes, lots of suburbs) to west of the river (the Catskills, where you can still shop at an IGA and see the Milky Way at night). We stay at the Weyside Inn in Big Indian.

My fellow crew members this week are Dave Montgomery and Aaron deLong, one of our wonderful interns. We are working on the Cannonsville Reservoir between the towns of Deposit and Walton. The reservoir covers what once were other small towns. Our boat ramp

is an old road that used to go down into one of the towns. The guardrails are still there – three feet under water.

Except for an occasional fisherman in a rowboat we are alone. We have an 18-foot boat with an outboard.

DAY 1

Our first day on the reservoir is sunny and breezy. Mist is still coming off the water. We disturb a large group of common mergansers. Then we see an osprey. Lots of great blue herons and several loons make bird watching a bonus.

We must find an old station from last year (using the GPS) and two new stations. At each station we anchor a floating platform to hold experimental bottles. We gauge how far into the water the light penetrates, and take dissolved oxygen and temperature readings to the bottom. The reservoir is full, thanks to a wet season and our stations are in 18 to 25 meters of water. In last year's drought we were hard pressed to find 10 meters.



DAY 2

Next day we start before the mist clears. We motor through a thick nothingness. A bald eagle emerges from the mist.

This is the day we run column metabolism experiments. At each station we draw water from a variety of depths. We use a Van Dorn, a canister with flaps at each end. The flaps are fastened up and the canister lowered by rope. At the right depth a metal cylinder is dropped down along the rope, hitting the flaps and closing them, trapping the water inside the canister. We pull up the water and put it into bottles. We measure dissolved oxygen levels and temperature. The bottles are put in a holder and lowered to the appropriate depth and left to incubate for several hours. After all three stations are done we go back to shore and set up our portable generator so we can filter water samples for chlorophyll content.

The Cannonsville is always green and high in dissolved oxygen. We get lots of changes in our metabolism experiments and lots of chlorophyll on our filters.

We are visited by a police officer from New York City's Department of Environmental Protection. The DEP police patrol the streams and reservoirs. There are more of them since Sept. 11 and they are vigilant and take their jobs seriously. They are kind and helpful.

By the time we had pull up all our experiments, take all our readings and pack up the boat we have just enough time to make it to the local pizza place before it closes. We started at 6 a.m. and end at 8:45 p.m., tired, sunburned and sore.



Nancy Parsons



Aaron de Long uses a Van Dorn water sampler.



Dave Montgomery reads oxygen levels.

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THE KRESGE FOUNDATION

Excerpts from the foundation Web site at www.kresge.org.

HISTORY

Sebastian S. Kresge established the S.S. Kresge Company in 1899 with \$8,000 and half ownership of two 5 & 10 cent stores.

Over the next 25 years the company grew into a profitable chain of stores which eventually became known as Kmart.

Mr. Kresge established the Kresge Foundation in 1924 through an initial gift of \$1.3 million. By the time of his death, at age 99 in 1966, he had made additional personal gifts totaling over \$60 million. His instructions to the incorporating trustees were that the foundation's income was to be used "to promote the well-being of mankind."

Since its establishment, the foundation has awarded a total of 8,222 grants for \$1.92 billion.

The foundation stresses that it is not affiliated or associated with the former S.S. Kresge Company, now known as the Kmart Corporation, or any other corporation.

"Through our grant-making programs, we seek to strengthen the capacity of charitable organizations to provide effective programs of quality. Our geographic scope is national and, on occasion, international."

"The Foundation's grants support a range of organizations reflecting almost the entire breadth of the nonprofit sector. This diverse group is responding to the new challenges presented by their communities or sustaining activities that have demonstrated their effectiveness. We believe that a challenge grant toward an organization's capital project does more than just build a building or reward good programs. It presents an opportunity to build institutional capacity by helping an organization broaden and deepen its base of support from the private sector and by encouraging volunteer involvement in the fund raising effort and beyond."

"As stewards of the Foundation's assets, our Trustees believe that accountability starts with being accessible to those seeking our support. Through our printed materials, telephone contacts, appointments, and regional Information Workshops, we hope to provide sufficient information about our policies and application procedures to permit an organization to be an informed applicant. Through this dialogue, we also hope to be a more informed grant maker."



Stroud wins The Kresge Challenge

Science Initiative grant to upgrade instruments



Cartoonist Rube Goldberg's Professor Butts and his whacky contraptions bear uncanny resemblance to many of the Stroud Center's inventions.

The Kresge Foundation has awarded a \$500,000 challenge grant to the Stroud Center to buy new scientific instrumentation, which will enable its scientists to pursue new areas of research, upgrade existing research capabilities and replace aging instruments and equipment.

Under the terms of the Science Initiative grant, the foundation will contribute \$250,000 to the purchase of new equipment once the Stroud Center has raised \$500,000. In addition, Kresge will add the final \$250,000 of a \$1.25-million instrument endowment fund after the Center has raised \$1 million. Leadership gifts of \$75,000 from Mrs. Jessie Allred, \$10,000 from Bert Kerstetter and \$35,000 from the DuPont Company have kick started the fundraising initiatives.

Perhaps as important as the money, the grant application and implementation process required the Stroud Center to take a close look at every aspect of its organization – from its research and education programs to its development and outreach efforts, from its finances to its instrumentation, from the diversity of its board to the fidelity of its supporters.

“And not only to look at them, but to address them,” said Jamie Blaine, who was part of the Stroud team that led the application process.

“Kresge spurred us to look at every aspect of our organization and to think about ourselves in ways that would have made a big difference even if we had not won the challenge grant,” Blaine added.

The Stroud Center first looked into the possibility of applying for a Kresge grant early this year. It became evident that the intensive process would involve an enormous commitment of time and effort by the staff.

So the question arose, “Is all the effort worth it?”

After much discussion, the answer was “Yes.”

Stroud Center director Bern Sweeney then phoned the Kresge Foundation and was encouraged to apply. Soon thereafter he received an invitation to visit the foundation offices near Detroit; and in early March, Sweeney, Blaine, board Co-Chair Rodman W. Moorhead III and Claire Birney, development director, flew to Detroit and met with Kresge officials.

A good part of the spring was spent compiling more than 100 pages of material and writing the detailed application report, which was submitted in May.

News that the award had been granted arrived on September 24.

The Stroud Center has completed the first phase of the fundraising process by raising \$500,000 for the purchase of new equipment with a generous gift from the Davenport Family Foundation. The Center has until January 1, 2005 to raise the endowment funds necessary to complete the challenge.

Idea for a new scientific barometer



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Jane Goodall brings message of hope

She enthralls the young and the not-so-young in her talks



Photo by Bill Fitch

Director Bernard Sweeney presents a Leaf Pack Kit.

"I have to say that it's particularly inspiring for me to be here. I had spent time this morning with scientists of the Stroud Center and I was so excited to see what's going on here. And to see the extent of the Stroud research that's now spreading around the world helping people solve their water problems. I was particularly excited to see the outreach for young people and this is where I hope we can collaborate."

Dr. Jane Goodall

A crescendoing hoo-hoo-hoo-hoo-hoo sounded eerily through the hushed crowd packed into Longwood Gardens' tented auditorium.

Suddenly, seemingly out of nowhere, a slight woman appeared behind the lectern on the stage, her lips pursed like the chimpanzees she was mimicking.

Thus the crowd met Jane Goodall, the speaker at a special presentation of the Joan M. Stroud Memorial Lecture, called "The Water's Edge."

Few of the guests who attended the October 3 lecture and the dinner that followed will forget the evening.

But for the 130-plus children who sat entranced for an hour on a hardwood floor earlier in the day, "Dr. Jane's" chimp calls and vivid descriptions of life among our closest living relatives was an experience of a lifetime. She opened her talk to the children with international greetings, "Good morning," "Bonjour," "Guten Tag" and "Hoo-hoo-hoo-hoo," to the delight of her responsive audience which echoed her salutations in all four languages.

She told the enthralled gathering – mostly members of local groups of the international Roots & Shoots organization Dr. Goodall founded – how as a young girl she had dreamed of going to Africa. Her hero was Tarzan, she said, and she gladly would have swapped places with her namesake, "that wimpy Jane."

She also spoke of the early influence of Doctor Dolittle, an eccentric country doctor who loved animals and learned to speak their language. The Doctor Dolittle stories originated as letters Hugh Lofting wrote home to his children while he was serving in World War I. (Later, Hugh Lofting's great-granddaughter Claire Murray, who is actively involved as a volunteer for the Stroud Center and lives just up the road, gave Dr. Goodall an original copy of "Doctor Dolittle's Post Office.")

At Dr. Goodall's invitation, representatives of the four local Roots & Shoots groups reported on their activities.

Afterwards Dr. Goodall and her young audience went outside for a group photo. Clearly she was among her most ardent fans. Many crowded around and asked for her autograph, while some just wanted to meet their heroine.

One girl, clutching a chimp doll in her arms, was so overcome she burst into tears when Dr. Goodall left the children to speak to reporters. A parent later brought the still-sobbing Abi Riley to Dr. Goodall, who immediately hugged and comforted her with words and a tissue. Abi's tears quickly turned into smiles.

Dr. Goodall has strengthened her outreach to children even more since she founded Roots & Shoots, a program for young people from kindergarten to university that encourages local action, care for the environment and animals, and peace. She noted several times at her Stroud Center appearances that the growth of Roots & Shoots,



Crowding in for autographs.

which started in Tanzania in 1991, had swelled after the World Trade Center bombing on September 11, 2001. There are now over 3,000 branches throughout the United States and in 70 other nations.

'CHIMPS ARE SO LIKE US'

The story of how a poor girl from London managed to find her way to Africa and into the lives of chimpanzees is now part of popular history, documented in books and films (*see sidebar on this page*). And her studies have helped change the definition of humanity.

“Most fascinating is how chimpanzees are so like us,” she told the evening crowd at the Water’s Edge. There is only a “one-percent difference” between the DNA structure of a chimp and human, she said. A chimp’s blood is interchangeable with a human’s, and its brain structure is closer to that of a human than any other animal. Like humans, chimp mothers keep their babies close to them for years.

But, she added grimly, “Chimps have got a dark and brutal aggressive side; they do show primitive warfare. The sad thing is that when I first learned about that I realized they were more like us than I had thought before.”

At age 69, Jane Goodall now spends 300 days of the year traveling about the world, spreading her message of peace, environmental and social responsibility, and hope to general audiences, organizations, officials and heads of states – and to children.

Next year, on Peace Day, September 21, “we shall have children ringing the bells of peace and giant peace doves spreading their wings,” she said. The bells, she added, will be made from melted down weapons of war.

She hopes the action will help generate a feeling around the world that is different from fear – that is hope and peace. “Hope for the future,” she said. “Hope for the involvement of every single one of us in doing our bit to make sure the right people are elected, to make sure we live in harmony with the environment, to make sure we help the environment, and above all to give the right example and leadership to our children.”

VISITING THE LABS

During the morning of October 3 Dr. Goodall spent several hours at the Stroud Center, speaking with the scientists and touring the laboratories.

“She was so genuine and engaging,” said Stroud Center Director Bernard Sweeney. “It’s incredible to think of what she’s done. One feels a little shallow when you’re with someone like Jane Goodall.”

“But we have something in common,” he added. “We [the Stroud Center and Dr. Goodall] are both about trying to make the world a better place.”



A hug for Abi Riley.



Book signing at The Water’s Edge.

The story of how a poor girl from London managed to find her way to Africa and into the lives of chimpanzees is now part of popular history, documented in books and films that tell:

□ How she was helped by Louis Leakey, the famous Kenya-born anthropologist who shifted the focus of the search for human origins from Asia to Africa. Leakey felt that research on humankind’s closest relative, the chimpanzee, would help his own work, and he encouraged her explorations in this area.

□ About the chimpanzee characters she made into household names – starting with David Greybeard, the first chimpanzee to let her get close. Others include Goliath, Flo, Fifi, Mr. Worzle and Mike.

□ How she destroyed the myth that only humans used tools. She watched and recorded David Greybeard as he picked a leafy twig, stripped the leaves off and used it to “fish” for ants in holes. “It’s no wonder David Greybeard holds a special place in my heart.”

□ How she ruffled Cambridge dons by attending their university to study for a doctorate without even having an undergraduate degrees.

The academics also sniffed at her tendency to anthropomorphize her subjects by giving them names and attributing human qualities – such as emotions – to them.

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for local Roots & Shoots info

‘Sustaining the FLOW of Knowledge’



CAMPAIGN OBJECTIVES

- E**nhance research capabilities.
- B**uild and maintain a staff committed to scientific excellence.
- E**xpand and deepen the ability to educate the public.
- E**ncourage the stewardship of streams, rivers and watersheds.
- B**roaden the Center’s donor base and increase fundraising capacity.

CONTRIBUTORS TO DATE

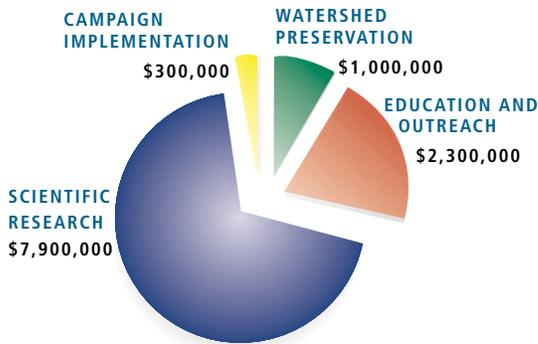
Leadership Gifts to the Campaign

Mr. & Mrs. Rodman Moorhead III	Mr. & Mrs. Ralph Roberts
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Ms. Marion B. Stroud	Mr. Luke Bradford
Cabot-Wellington Foundation	Anonymous Donors (3)

Stroud Center launches capital campaign

The goal is to raise \$11.5 million to meet growing demands

\$6.9 million has been raised to date



Faced with higher costs of maintaining world-class scientific research staff and standards in an increasingly competitive society, the Stroud Center has launched a \$11.5 million capital campaign.

After months of planning and deliberation and approval by the Stroud Center's Board of Directors, the campaign was officially announced on October 3 during the visit of renowned activist Jane Goodall.

Of the many factors that have contributed to the Stroud Center's growth, none is more significant than its endowment, which provides 25 percent of its operating budget.

Yet because of the growing demand for first-class freshwater research, education, and preservation, the present endowment is no longer adequate.

Among the urgent challenges the Stroud Center faces is the need to:

- Hire more scientists, technicians, especially in key research areas such as fisheries;
- Upgrade laboratories, computers, instruments and facilities to assure the best data;
- Expand the ability to disseminate the results of the Center's research;
- Educate people in government, science, industry, agriculture, media, and beyond.
- Strengthen capacity to have an impact on legislation and public policy.

The challenges to preserving fresh water are enormous, said Stroud Center Director and President Bernard Sweeney. "We must ensure our ability to attract and retain top scientists, equip them with the right technology, and give them the time to concentrate on areas most likely to produce the greatest impact on fresh water – both locally and around the world."

To date, \$6.9 million has been raised in gifts and pledges toward this \$11.5 million goal from generous and forward-thinking "Friends of the Stroud Center."

Jessie
Allred

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The Storm of 2003



The White Clay Creek takes back its flood plain as it laps at the doors of the Stroud Center





The White Clay recedes . Most of the foot and horse bridges upstream were washed away.



Education project at Wyeth farm

School kids learn about riparian buffers and ecosystems

“It’s OK to get your hands dirty,” Sanford School science teacher Mark Bosick jokingly told his class. “But that’s not a license to jump in the creek.”

His sixth graders giggled as they looked doubtfully at the chilly Brandywine Creek. It was late April and the Sanford students were there to learn hands-on about restoring riparian (streamside) forests. On this, their first day, they would be planting sapling native trees, measuring them and taking careful notes of the size and condition of each

The project, initiated and coordinated by the Stroud Center’s education department and Director Bern Sweeney, is being done on the Point Lookout Farm in Delaware.

The idea was suggested to the Sanford School by Stroud Center educator Christina Medved. “We jumped on it,” said Bosick.

This is one of the few times that students have been actively involved with helping to generate and gather data on a research project conducted by the Stroud Center.

The restoration area covers a large field on a tributary of the Brandywine Creek with plantings that were arranged in 40-by-100-foot plots along the treeless stream. The idea is to restore the riparian areas that help keep the streams healthy by shading them and providing the leaf litter on which the aquatic insects feed.

At this initial planting the students broke up into small groups, each responsible for planting a row of trees. Under Stroud Center educators’ patient guidance, students dug the holes, planted the trees, and recorded height measurements. Students then hammered a support pole into the ground and slipped a tubular shelter over each sapling to protect it from animals and the elements.

“It’s like a miniature greenhouse,” educator Kristen Travers explained. In two days, the students planted 80 trees.

“The students from Sanford School did an outstanding job installing trees on several of the experimental areas,” said Sweeney. “I personally did the quality assurance inventory on their areas and did not find one error. This shows that they were both well prepared by their teachers and Stroud educators and very enthusiastic and engaged in the entire project. I could not have been more pleased with the outcome.”

Afterwards, Stroud Center educators gathered aquatic insects from the Brandywine Creek. The students then sorted and identified the insects to better understand the connection between the trees they had planted and the health of the stream.

The project launching coincided with Earth Day and Arbor Day.



Kristen Travers, right, shows how.



Measuring the sapling



James McGonigle holds up a tiny bug.

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Sandra Postel with Stroud Center Director Bernard Sweeney. Postel spoke at the spring 2003 Joan M. Stroud Memorial Lecture. She is a leading authority on freshwater issues, director of the Global Water Policy Institute and senior fellow at the World Watch Institute.

COMMUNITY CONNECTIONS



Planting lilies at Jenner's Pond.

The Jenner's Pond retirement community had a problem: the ponds on the 80-acre property this past summer turned into an "ugly, stinky mess" of filamentous algae.

The residents called the Stroud Center, which had helped the community restore a woodland habitat around its streams and wetlands that are part of the Chesapeake watershed.

Stroud Center Director Bernard Sweeney prescribed two remedies. "For ponds with limited supply of freshwater beyond storm runoff, I suggested getting a permit from the state and putting in sterile grass carp to eat and control the algae," said Sweeney.

For the pond that also has a plentiful supply of groundwater, Sweeney suggested planting lilies "to shade the algae out."

Jenner's Pond resident Alan Bates and some of his fellow residents put the plan into action.

"It will take a few years to really get them established but relief is on its way," said Sweeney.

NEW DATE FOR UPSTREAM FESTIVAL & RUN

September 18, 2004

Next year, the Stroud Center 5K Run/Walk for Fresh Water and Upstream Festival will be held in September.

Please note the change of season and specifically the change of date for our ever-growing annual event, the Stroud 5K Run/Walk for Fresh Water and UpStream Festival.

Without putting too much pressure on the odds of a clear, crisp fall day as opposed to one during a cool, rainy spring, the event will take place September 18, 2004, rather than April, as in the past eight years.

Think apples and crisp sunny weather. Fall is the best time for streamside walks and demonstrations with our scientists and educators. The flora, fauna and insects are abundant at this time of year – so there will be so much more to experience during the festival.

In addition to offering our beautiful rural setting for an enjoyable family day, this year we will showcase the very significant and absorbing work done by Stroud scientists, and its relevance to each and every one of us. We will unlock the many secrets of fresh water by presenting educational activities and having our scientists welcome you into their labs. We will be partnering with other organizations closely aligned with our mission in order to present to you the most meaningful and fun programs we've ever had at the festival.

So mark your calendars now for Saturday, September 18 which gives you plenty of time to train for the 5K Run/Walk! You can also look forward to an entertaining and enlightening experience along the banks of the White Clay Creek while supporting the unique and crucial work of the Stroud Center.

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NEW STAFF

Dave Arcsott: Project Coordinator for NY
Jan Battle: Entomology
Chris Cain: Watersheds
Jamie Blaine: Research Associate
Andy Byler: Entomology
Susan Herbert: Watersheds
Erika Kratzer: Entomology
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Blair Wyatt: Development
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SUMMER 2003 INTERNS

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Gordon Rose
Erin Shea
Sam Voss
Jenna Wright



Applications for summer internships are posted at the Stroud Center Web site, www.stroudcenter.org, in January each year. Appointments are announced by the end of March.

SWEENEY WINS NATIONAL AWARD

Stroud Center Director Bernard Sweeney has won the Natural Resources Conservation Service's 2003 Excellence in Conservation Award.

NRCS, a division of the U.S. Department of Agriculture, seeks to help people conserve, maintain and improve the nation's natural resources and environment.

The national award was presented on June 13 in

Washington, D.C. Richard Shockey of the Pennsylvania office of NRCS nominated Sweeney for his leadership in research on streams, rivers and watersheds.

NRCS cited the Stroud Center's more than 30 years of research on riparian forest buffers, which has demonstrated how tree planting along stream banks improves the water quality and habitat of stream life. The agency also recognized the Center's willingness to share its research and to develop practical applications for its use.



Teresa Friedrichson
and Bob Groover.

TEACHING TEACHERS

Instead of going to the beach high school science teachers Teresa Friedrichsen and Bob Groover spent their summer on the banks of the White Clay Creek learning about water science at the Stroud Center.

Their eight-week program, called Research Experience Teaching, was funded by the National Science Foundation.

"We would like to transfer some of these ideas into things our students can do," said Groover, who teaches chemistry at Bordentown High School, New Jersey.

Groover and Friedrichsen, a biology teacher from Villa Maria Academy in Malvern, Pennsylvania, said their time at the Stroud Center had been a rich and rewarding experience.

STROUD ADDS TWO NEW COURSES AT U.PENN

Stroud Center scientists are teaching four courses this year at the University of Pennsylvania, including two new ones.

One of the new courses, "A Primer on Streams & Rivers," is a 15-week course that explores streams and rivers from the perspectives of the natural and social sciences and the arts. Students get a solid grounding in the hydrology, geology, physics, chemistry, and biology of streams and rivers, and learn how all these fit in a watershed ecosystem. They examine the impacts of human development on ecosystems over time and explore the impact of rivers on humans and their communities through

art and literature.

The other new course, "Introduction to Field Ecology," surveys the diversity of terrestrial and aquatic ecosystems in the Philadelphia region through a combination of field trips and field research exercises. The terrestrial ecosystem component is taught by Dr. Jim Thorne of Natural Lands Trust (www.natlands.org). The aquatic ecosystem component, team-taught by scientists from the Stroud Center, focuses on the White Clay Creek watershed, part of the National Wild and Scenic Rivers System.

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Upstream Festival

Hundreds flock to the annual event



They're off on the White Clay 5K

Hooray for the White Clay!

“Celebrating the White Clay Watershed

Community” at the Stroud Center’s Upstream Festival on April 26 came easily for more than 350 visitors who participated in all the environmental and educational family programs and activities offered. The first 5K run and walk, sponsored by Trail Creek Outfitters, was a huge success with 80 participants who ran or walked in high spirits, despite the rain.

Many of the diverse community groups that play a critical role in protecting our watershed set up exhibits in every corner of the Center. Some of those present included representatives of federal and state agencies from Pennsylvania and Delaware.

There was something for everyone – the return of the popular cockroach races, an orienteering course, several live animal programs, music by Two of a Kind and Sam Lam and the White Clay Tributary, cooking with bugs, and the Watershed Waddle scavenger hunt. The craft tables were filled with enthusiastic visitors creating masks, beaded creatures, and graceful origami, with the help of local artists, Jeff & Barbara Bole and Terry Anderson and Jill Benjamin.

The Stroud Water Research Center thanks the First National Bank of Chester County and the dedication of the Upstream Festival chairperson, Julia Loving. The Center is also grateful to all the volunteers who shared in the Center’s mission of reaching out to the public and inspiring them to become better stewards of our most precious natural resource – water.

ART CONTEST

A contest organized by Wild & Scenic Task Force and sponsored by the National Parks Service and the White Clay Watershed Management Committee produced an array of submissions of photography, poetry and art illustrating the natural and cultural values of the White Clay Creek. Winners included: Emily Scott, Virginia Brown, Rick Darke and Cindy Hiles.



Tomorrow's scientists



Should I or shouldn't I?



Barbara Bole,
beads & bangles



The entertainers

PLEASE NOTE CHANGE OF DATE

Saturday, September 18, 2004.

Stroud Center 5K Run/Walk for Fresh Water and
the UpStream Festival

CONTACT

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Sharing the wisdom of water is critical ... Thank you

The Stroud Water Research Center gratefully acknowledges all those who contributed to our annual Fund.

The "Friends" raised \$227,564, a 30-percent increase over last year, and the number of "Friends" increased by 7 percent.

It is with great pride and even a sense of awe that we see the Stroud Center having an ever-increasing global impact on freshwater research ... knowing that this remarkable journey began by once asking questions about a small stream in Pennsylvania. Your past support has been both gratifying and invaluable and we thank you.

We hope you are particularly proud of your association with the Stroud Center and that you will renew this commitment by making an especially generous gift this year.

And please remember ...

Where freshwater is concerned, every drop counts.

Friends of the Stroud Center Annual Fund

I/we wish to participate in the "Friends of the Stroud Center" to meet the environmental research and educational challenges of water. Enclosed is my/our fully tax-deductible gift to the "Friends of the Stroud Center" at the following level:

- | | | | |
|------------|---------------------|------------|----------------------|
| ___\$ 25+ | Every drop counts! | ___\$ 500+ | Streamkeepers |
| ___\$ 50+ | Rainmakers | ___\$1000+ | Riverwatchers |
| ___\$ 100+ | Headwaters Sponsors | ___\$5000+ | Watershed Protectors |

Name(s)
(As you wish it/them to appear on the donor list)

Address

City State Zip

Phone (h) (w)

E-mail

Please make checks payable to the Stroud Water Research Center.

A copy of the Stroud Water Research Center's official registration may be obtained from the Pennsylvania Department of State by calling toll free, in Pennsylvania, (800) 732-0999. Registration does not imply endorsement.

MAKE A TRIBUTE TO OUR TRIBUTARIES

... and receive a stream of income in the process.

Thirty-six years ago, W. B. Dixon Stroud and Dr. Ruth Patrick foresaw the importance of research on our freshwater ecosystems. Thus, the Stroud Water Research Center began.

Please reflect on the importance of fresh water during the next 37 years - and then consider the Stroud Center as a beneficiary of your gift planning.

By naming the Stroud Center in your estate plans, you can take pride in knowing that your support will enable Stroud Center scientists to meet the challenges of understanding and preserving fresh water for future generations.

And your gift may fit with your own long-term needs as well ... for a charitable gift annuity can provide a lifetime income (at very appealing yields) and substantial tax benefits.

For more information, about charitable gift annuities or other gift planning options ...

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The Stroud Water Research Center seeks to understand streams and rivers and to use the knowledge gained from its research to promote environmental stewardship and resolve freshwater challenges throughout the world.

Jane Goodall poses at the Stroud Center with members of the local Roots & Shoots international organization she founded.



UpStream

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