



FINGER LAKES INSTITUTE

HOBART AND WILLIAM SMITH COLLEGES

601 S. Main St.
Geneva, NY 14456
Phone (315) 781-4390
Fax (315) 781-4399
E-mail: fli@hws.edu
<http://fli.hws.edu>

About the Finger Lakes Institute

The Finger Lakes Institute (FLI) is a world-class research and education center initiated and operated by Hobart and William Smith Colleges in Geneva, N.Y. Based on approximately three decades of scientific environmental research at the Colleges, the idea for the Finger Lakes Institute began in 1999. A \$1 million grant from the State of New York, through the advocacy of Senator Michael Nozzolio (R-Fayette), officially initiated the FLI. Situated on the shores of Seneca Lake, the largest and deepest Finger Lake, the FLI is located in a newly renovated building at 601 S. Main Street (Route 14), Geneva, N.Y.

The Institute serves as a base for research and education on the Finger Lakes. Collaboration with regional non-profit organizations, local, state, and federal government agencies, watershed management programs, and other academic institutions allows the FLI to serve as a clearinghouse of information about the Finger Lakes and the surrounding region. These collaborations enable the development of outreach programs that foster communication and sustained connections among the numerous stakeholders in the region.



The Finger Lakes Institute at 601 S. Main St., Geneva, N.Y.

FLI Mission

The Finger Lakes Institute (FLI) is dedicated to the promotion of environmental research and education about the Finger Lakes and surrounding environments. In collaboration with regional environmental partnerships and state and local government offices, the Institute fosters environmentally sound development practices throughout the region, and disseminates the accumulated knowledge to the general public.

FLI Goals

- Advance, coordinate and disseminate scientific understanding about the Finger Lakes environment
- Provide interdisciplinary training for the next generation of environmental researchers, educators and policy makers
- Serve as a clearinghouse for environmental information about the region
- Enhance understanding of environmental issues by regional policy makers and the general public
- Create and provide educational resources and opportunities at all levels

Inside this issue

2 Meet the FLI Staff

- Marion E. Balyszak
- Eric Primrose
- Sarah A. Meyer

4 Community & Educational Outreach

The FLI works in close collaboration with state and regional agencies

5 FLI Research

See what HWS faculty and students are studying

8 Greening It Up

See the many ways that FLI has made a commitment to the environment.

Finger Lakes Institute Staff

Interim Director

Marion E. Balyszak was named interim director in February 2004. Balyszak brings more than 20 years of non-profit administration experience to this new position, seven of those years in the area of water quality. She also serves as half-time executive director of Seneca Lake Pure Waters Association and chairwoman of Seneca Lake Area Partners in Five Counties (SLAP-5). A former program assistant with the Finger Lakes-Lake Ontario Watershed Protection



Alliance (FL-LOWPA), Balyszak also has significant experience with grant writing and collaborative affiliations with a number of other regional committees and organizations. As interim director, she is providing leadership for the Institute as it initiates and establishes a comprehensive, externally funded program based at Hobart and William Smith Colleges, focusing regionally on the 11 Finger Lakes. She is working closely with the Colleges' administration and faculty as well as regional representatives with an interest in protecting these valuable resources. Balyszak can be contacted at balyszak@hws.edu or (315) 781-4381.

Education Outreach Coordinator

Eric Primrose has been the educational outreach coordinator at the Finger Lakes Institute since October 2003. A native of the Finger Lakes area, Eric graduated from Hobart College in 1996 with a B.S., majoring in geoscience. He is currently pursuing a Master of Science degree in education at St. John Fisher College in Rochester. Primrose is spearheading efforts to improve educational outreach opportunities offered by Hobart and William Smith Colleges and



the Finger Lakes Institute. Efforts to expand and improve the Science on Seneca (SOS) program in conjunction with science and education faculty at the Colleges and input from local high school science teachers has been a primary focus. Primrose serves as the Science on Seneca resident expert, joining teachers and their students on cruises, assisting with writing lesson plans

and determining how the Science on Seneca program fits into the guidelines for New York State science standards and core curricula. He is available to give presentations to schools, either in classrooms or at the Finger Lake Institute in Geneva. Primrose can be contacted at eprimrose@hws.edu or call (315) 781-4380.

Community Outreach Coordinator

The Finger Lakes Institute appointed **Sarah A. Meyer** as community outreach coordinator in April 2004. A native of Geneva, Meyer received a Bachelor of Science degree and Masters of Professional Studies degree from the State University of New York College of Environmental Science and Forestry in Syracuse, N.Y. Her



higher education concentrated on water and wetland resource studies.

Meyer contributes experience and knowledge of environmental education and watershed hydrology through her previous employment with the New York State Department of Environmental Conservation in Albany, N.Y., the Great Lakes Research Consortium in Syracuse, N.Y., and the United States Forest Service Wrangell Ranger District in Wrangell, Alaska.

As community outreach coordinator, Meyer provides leadership and direction for the FLI community outreach program, manages the FLI Web site, and assists with regional collaborative efforts. Major projects include creating a clearinghouse of resource information through the FLI Web site, organizing public conferences, workshops and an annual research symposium, along with lecture series, publications, educational exhibits and student internships. Meyer can be contacted at smeyer@hws.edu or call (315) 781-4382.

Staff funding support has been provided by New York State through the advocacy of Sen. Michael Nozzolio (R-Fayette); a grant from the Triad Foundation in Ithaca, N.Y., and the Colleges.

Community Outreach and Public Service

Community outreach and public service in collaboration with regional non-profit organizations, local, state and federal government agencies, watershed management programs, academic institutions, and the public foster outreach programs that promote communication and sustained connections among the numerous stakeholders in the region. Outreach efforts include:

- Tours of the Finger Lakes Institute building
- Public lecture series
- Publications
- Educational exhibits
- Internships for college students
- Creating a clearinghouse of resource information through the FLI Web site
- Public conferences, workshops and a research symposia

Finger Lakes Resource Clearinghouse

The Finger Lakes Institute has established a library of resources pertaining to the Finger Lakes region. With generous donations made by the Seneca Lake Pure Waters Association and by many Hobart and William Smith faculty and staff members, the clearinghouse is composed of more than 400 documents, which include professional papers, books, videos, CD-ROMs and more. The clearinghouse was formed in an effort to disseminate accumulated scientific knowledge to the general public. The Institute is also working on an inventory of resources throughout the Finger Lakes region that can be either added to the library or linked through its Web site. Additional lake and regional information is being sought. The clearinghouse is available, free to the public, for research and investigation of the 11 Finger Lakes and their watersheds. In the future, the clearinghouse will be accessible on the Web at <http://fli.hws.edu>.

FLI Programs

The Finger Lakes Institute sponsored two public workshops in August.

“Constructing and Managing a Healthy Pond” was presented on Aug. 26 by Jim Balyszak and Rick Ayers, of the Yates County Soil and Water Conservation District, and Gail Mortimer, of the New York State Department of Environmental Conservation Bureau of Pesticide Management, Region 8 in Avon, N.Y. The workshop offered practical considerations and guidelines for pond design



Members of the Finger Lakes community learn how to assess environmental risk at home during the August 26 Home-A-Syst workshop.

and construction, pond ecology and ecosystem management, and the biological and chemical treatment options used to manage aquatic plants. In New York State, all surface water aquatic pesticides are restricted and their purchase and use must be approved through a permit process regulated by the state.

Home-A-Syst is a nationwide pollution prevention and risk assessment program supported by the United States Department of Agriculture (USDA) and the United States Environmental Protection Agency (EPA). The “Home-A-Syst: How Does Your Home Rate for Environmental Risk” workshop held on Aug. 31 provided an overview of how homeowners and renters can assess household environmental risk in order to protect health and the environment. Participants received practical information pertaining to drinking water, septic systems, landscaping, fuel storage and household hazardous waste.

One opportunity for the public to interact with scientific research in the Finger Lakes region included participation in the American Littoral Society’s 19th Annual International Coastal Cleanup. On Sept. 18, Finger Lakes community members collected and recorded the amounts of debris found on the Seneca lakeshore in Geneva. All participants in this event are provided with trash bags and data sheets to record the specific types and quantities of lake debris found along lakes, rivers, streams, bays, sounds, estuaries, and oceans of the world. The data collected are used to better identify sources of lake debris and find solutions for preventing it. In 2003, more than 10,000 New Yorkers came together to do something constructive for the environment by removing and documenting more than 334,000 pounds of debris from 351 sites! Find Seneca Lake debris data at www.alsnyc.org.

Add your name to our mailing list!

The Finger Lakes Institute has established a mailing list. If you would like to receive our publications, including our quarterly newsletter, sign up at <http://fli.hws.edu/MailingList.asp> or call (315) 781-4382. We offer our newsletter via e-mail to conserve resources.

Stay up to date

with current Finger Lakes regional community outreach activities at <http://fli.hws.edu/workshops.asp>.

FLI staff and HWS faculty are also available to do presentations related to the Finger Lakes.

You may contact the community outreach coordinator by e-mailing smeyer@hws.edu or calling (315) 781-4382 for further information.

Finger Lakes Institute Dedication Week

Oct. 18-23, 2004

Visit the new FLI facility to learn why research on the Finger Lakes is so crucial. Lecture and workshop schedule is available on the web at <http://fli.hws.edu>.



Educational Outreach

Educational resources and opportunities at the K-12 level

The Finger Lakes Institute offers a variety of educational resources and opportunities at the K-12 level that build on and sustain a focus on the Finger Lakes environment. Educational outreach priorities include:

- Developing innovative curricular material, resources and educational opportunities for K-12 students and teachers
- Offering professional development programs for teachers and other educators
- Hosting school groups and participating students involved with Science on Seneca (SOS) and other outreach programs
- Providing educational opportunities for Hobart and William Smith students
- Contributing curriculum to K-12 schools through participation in school advisory boards and committees

Educational Outreach at the FLI also includes collaboration with local science teachers to create science-based inquiry-learning projects for entire schools as well as day trips and programs for students of all ages. Programs utilize the resources and facilities at the FLI, Hobart and William Smith Colleges, and the amazing outdoor classroom that the Finger Lakes region provides.

Science on Seneca

Science on Seneca (SOS) is a high school academic outreach program established in 1986 by the faculty at Hobart and William Smith Colleges. It is based on the environmental study of Seneca Lake. SOS has four objectives:

- To enhance the teaching of environmental science in area schools
- To introduce students to environmental field studies using Seneca Lake and its watershed as their laboratory
- To provide useful science content and standards-based curricula for local and regional science teachers and students
- To expand our understanding of Seneca Lake and its watershed via long-term monitoring.

Science on Seneca enables local science teachers to use Seneca Lake as an outdoor classroom. To participate, science teachers must take part in one of two annual training sessions held each year. During the training, teachers take a cruise on Seneca Lake aboard *The William Scandling*, Hobart and William Smith Colleges' 65 ft. research vessel. Teachers experience the full range of scientific tests and equipment available to them aboard the research vessel, including plankton tows, sediment samples, and water chemistry.

Teachers can use the activities they experience on board *The William Scandling* and the SOS Web site to create hands-on standards-based lessons and units for their students. For a nominal fee (\$15 per class), teachers may then return with their students to conduct research aboard *The William Scandling* and use all the resources of this unique floating classroom.

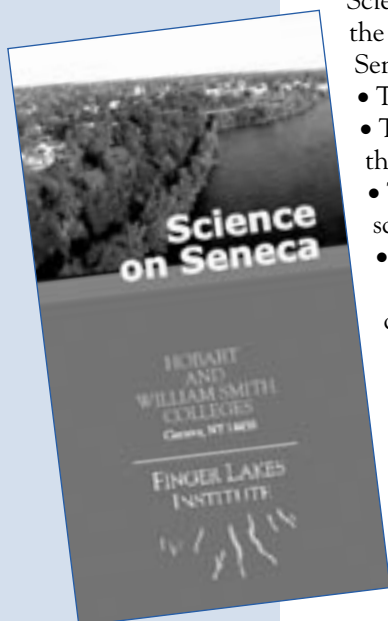
While many Finger Lakes area teachers have used this program in the past or are familiar with it, our goal is to make it an even more valuable tool for science teachers and to improve participation in the program by local teachers.

Science on Seneca Web Site

A comprehensive Science on Seneca Web site serves as an anchor for the program. The Web site includes a Student Center with informational and diagnostic resources and a Teacher Center with lesson and unit plans aligned with New York State science learning standards and the earth science, living environment, and chemistry core curricula. The Teacher's Center includes a discussion forum and teaching resources. Teachers and students will also be able to access the Seneca Lake database online and make additions to that database with their own information.

These improvements make Science on Seneca a more useful tool for Finger Lakes area science teachers.

The SOS Web site can be accessed at <http://fli.hws.edu/sos>. Comments, suggestions, or submissions of educational material may be directed to Eric Primrose at eprimrose@hws.edu, or call (315) 781-4380. SOS brochures are also available on request.



Project WET and WILD Teacher Education Programs

The Finger Lakes Institute has sponsored multiple teacher education programs including Project WET and Project WILD teacher training workshops. Project WILD (www.projectwild.org) is one of the most widely used conservation and environmental education programs among educators of students in kindergarten through high school. Project WET (www.projectwet.org) is a non-profit water education program and publisher for educators. The program facilitates and promotes awareness, appreciation, knowledge and stewardship of water resources through the dissemination of classroom-ready teaching aids. Both programs are co-sponsored by the NYS Department of Environmental Conservation and each provides an excellent and comprehensive curriculum and resource guide for teachers free of charge.

Eric Primrose, education outreach coordinator, is trained as a facilitator for both programs, making the Finger Lakes Institute a central meeting place for elementary and secondary teachers interested in environmental education and conservation. Additional teacher-training workshops for these two very successful programs are planned in the near future. Further information on WET and WILD programs can be obtained by contacting Primrose at eprimrose@hws.edu, or call (315) 781-4380.

Environmental Studies Summer Youth Institute (ESSYI)

The Environmental Studies Summer Youth Institute (ESSYI) is a summer science program connected to the Finger Lakes Institute at Hobart and William Smith Colleges. ESSYI is a two-week residential program for talented students entering their junior or senior year of high school. It provides students with a hands-on introduction to environmental issues and is taught by Hobart and William Smith Colleges' faculty. Students attending ESSYI examine natural science, humanities, and social science approaches to a variety of environmental issues. Much of the student work is in the field, such as limnologic research on Seneca Lake aboard *The William Scandling* and an environmental analysis at the Colleges' 108-acre private research station, the Henry W. Hanley Biological Preserve. Students who successfully complete the Institute's program earn college credit from Hobart and William Smith Colleges.

Visit the Environmental Studies Summer Youth Institute Web site at <http://academic.hws.edu/enviro/index.html> to learn more about the program and to download application forms.



Professor Tara Curtin and local science teachers examine a sediment sample from Seneca Lake during a Science on Seneca Teacher Training Workshop aboard The William Scandling.

Students attending ESSYI examine natural science, humanities, and social science approaches to a variety of environmental issues.

Finger Lakes Institute Research

The Finger Lakes are important freshwater resources providing drinking water to more than 700,000 people. The Finger Lakes Institute and Hobart and William Smith Colleges are dedicated to evaluating the health of these important natural resources in order to determine immediate and long-range challenges to water quality, sources of those challenges, regional priorities for developing protective efforts, and key long-range planning initiatives for continued preservation of the Finger Lakes. This founding premise of the Finger Lakes Institute is based on nearly three decades of research by HWS faculty and departments.

Research projects in collaboration with watershed management and environmental protection programs currently in place throughout the Finger Lakes region enhance and improve the quality of training and research in environmental studies, science and natural resources. Some ongoing HWS faculty research includes:



Environmental studies students from Hobart and William Smith Colleges collect a plankton sample from Seneca Lake, to be analyzed using the floating classroom facility aboard The William Scandling.

John Halfman, director of environmental studies and associate professor of geoscience, conducts ongoing lake water quality research

The FLI and Hobart and William Smith Colleges' faculty and students conduct research projects in collaboration with watershed management and environmental protection programs.

in such areas as the paleoclimatic record preserved in the sediments of the Finger Lakes; water quality issues such as bacterial sources for total coliform and *E. coli* and herbicides like Atrazine; major ion hydrochemistry that includes assessment of chloride, sodium and sulfate bedrock sources as well as calcium sources and sinks; watershed and lake limnology studies that focus on long-term monitoring, exotic species impacts from zebra and quagga mussels, bathymetric surveys, hydrology and water resource issues; and human impacts on water quality.

Tara Curtin, assistant professor of geoscience, is completing core projects related to sedimentology that include deciphering the paleoclimatic/paleoenvironmental record of the Finger Lakes region as preserved in the sediments and involves analysis of sediment cores. An additional focus includes soil and bedrock geology for local wineries. In 2005, a newly funded project directed by Curtin will look at investigating holocene climate changes in the Finger Lakes region in conjunction with Halfman.

Nan Arens, assistant professor of geoscience, and **David Kendrick**, assistant professor of geoscience, focus on paleontology and are completing zebra and quagga mussel lake floor density studies.

Neil Laird, assistant professor of geoscience, specializes in meteorology and physical

oceanography. He is looking at regional scale meteorology that includes forecasting lake effect snow, Finger Lakes climate modulation and the impact of climate on lake dynamics and circulation patterns.

Anne Wibiralske, assistant director of environmental studies, specializes in soil biogeochemistry with a special focus on fire and its impact on regional forest ecology. She will also key future soil biogeochemistry research to focus on the Finger Lakes.

Jim Ryan, professor of biology, is conducting studies on the macroinvertebrate community, primarily benthic invertebrates, in select streams in the Seneca Lake watershed to indicate stream health. He completed training this summer to initiate key sampling of lake and tributary locations to assess the impacts of hormones, pharmaceuticals and personal care products on water quality.

Brian Shelley, assistant professor of biology, conducts studies on the spatial distribution of zebra and quagga mussels and their relationships to other benthic invertebrates to evaluate the potential impacts on the benthic community.

In 2005, a new faculty position of aquatic biologist will be created with a specialization in ecosystem modeling using the Finger Lakes region as a natural laboratory.

Economic Development and Regional Planning

The long-range impacts from increased development in the Finger Lakes region and pressures associated with an emerging tourism industry and economic development initiatives must be linked to environmental protection. Watershed management programs are local grassroots initiatives that integrate technical information, applied research and education with public involvement in local policy development for land use planning and economic development. The Finger Lakes Institute provides research and a clearinghouse of information on:

- Land use and regional planning
- Sustainable or low-impact development
- Green industrial practices and incentives
- Infrastructure capacity
- Drinking water quantity and quality
- Alternative energy sources
- Community environmental issues and concerns



FLI Research Vessels

The William Scandling

The William Scandling is a 65-foot steel-hulled research vessel, owned and operated by the Hobart and William Smith Colleges for teaching, research, and educational outreach. Since arriving on campus in the summer of 1976, it has provided a safe and reliable platform to investigate the Finger Lakes. *The William Scandling* is well equipped for both local and extended voyages. Extensive scientific equipment makes *The William Scandling* the perfect floating classroom. It is operational with state-of-the-art radar and navigation equipment, data management computers, marine and CB radios, fathometers and a life boat. The vessel is operated by a licensed captain, John Nichols, and first mate, John Abbott.



The J. B. Snow

The newly arrived *J.B. Snow*, a 25-foot pontoon boat, serves as an auxiliary field research vessel allowing research and comprehensive water monitoring on all 11 Finger Lakes. Research equipment enables it to deploy and recover limnological, seismic and sediment core data. The vessel has high resolution seismic processing and acquisition equipment to collect bathyrythmic data from lake sediment thicknesses, computer equipment, a global positioning system, depth finder and piston corer. Nearshore bacterial sampling on Seneca Lake and bathyrythmic studies on Owasco Lake have recently been completed in collaboration with the Institute for the Application of Geospatial Technology (IAGT) in Auburn, N.Y.



Acquisition and research equipment for *The J.B. Snow* were provided by the J.B. Snow Foundation of Syracuse, N.Y. and the United States Department of Education through the advocacy of Congressman James Walsh.

DID YOU KNOW?

Five Finger Lake Facts

- The 11 Finger Lakes supply drinking water to more than 700,000 residents of New York
- Zebra mussels have spread to all of the Finger Lakes except Canadice Lake
- The Finger Lakes contain more than 1.5 quadrillion (1,500,000,000,000,000) gallons of water
- A watershed is defined as an area of land that drains into a specified body of water, such as a marsh, stream, river, lake or groundwater
- The 11 Finger Lakes drain 2,300 square miles of land area into Lake Ontario via the Seneca-Oneida-Oswego Rivers Basin and the Genesee River Basin

10 ways you can support a Green Initiative:

- Turn off the lights when you leave a room.
- Don't let the water run while you brush your teeth.
- If you have to, water your lawn during the coolest part of the day.
- Replace your old toilet with a 1.6 gallon water efficiency toilet.
- Reduce, reuse, and recycle!
- Protect your drinking water! Don't throw used batteries into the trash!
- Pick up pet waste to protect high nutrient levels in water sources.
- Plant a tree. Shade trees planted on the east and west side of your house can naturally cool your home.
- Celebrate Energy Awareness Month and World Water Monitoring Day on the Oct. 18.
- Make environmentally conscious actions a way of life for you and your family.

Finger Lakes Institute Green Facility Up and Running on Renewable Resources

The Finger Lakes Institute has declared a commitment to the environment and makes an effort to generate awareness of alternative energy sources by incorporating wind, solar and geothermal energies into the FLI's new building design.

In an age when oil, gas and coal have proven to be finite, exhaustible resources, a “green” initiative towards economic development and lower greenhouse gas emissions is being fostered through the Finger Lakes Institute at Hobart and William Smith Colleges. The Finger Lakes Institute has declared a commitment to the environment and to generating awareness of alternative energy sources by incorporating wind, solar and geothermal energies into the FLI's new building design.

More than two dozen students, including members of Hobart and William Smith Colleges' environmental group Campus Greens, created a design for potential alternative energy source options for the Finger Lakes Institute facility during the fall semester of 2002. Students enrolled in Environmental Studies 110 “Topics in Environmental Studies,” a class taught by Geoscience Professor John Halfman and Economics Professor Tom Drennen, learned about geothermal heating, R factors, and solar and wind energy.

Their research on energy and sustainability allowed students to propose recommendations to make the Finger Lakes Institute building a green facility relying solely on renewable energy sources. The Syracuse architectural firm designing the building delayed the design process for two months in order for student recommendations to be formally incorporated into the final design. The result of the students' input is a balance of historic renovation and energy conservation.

Wind

For centuries, wind power has been used to grind grain, pump water, and generate electricity without introducing harmful by-products into the natural environment. Even though it is dependent upon weather and location, wind is a renewable resource in the Finger Lakes region that is harvested to supply electrical energy.

Eighty percent of the electricity used by the Finger Lakes Institute — from providing light to running computers — is generated by wind energy. The green power source is the Fenner Wind Power Facility, in Fenner, N.Y. (Madison County). It uses 20 GE Wind Energy 1.5 MW wind turbines to generate 89 million kilowatt hours of green power to the New York state electric market. Power produced by the turbines is delivered to the Niagara Mohawk Power Company and then transmitted to customers like the Finger Lakes Institute.

The turbines, structures that can be as tall as a 32 story building, have blades that “lift” as wind passes over them. As the blades begin to spin, mechanical energy is produced that drives



HWS students at the Fenner Wind Power Facility

an electrical generator creating green power.

Renewable energy, such as wind, has minimal effects on the environment compared to coal burning and nuclear energy. According to the EPA, every 1,000 kilowatt hours of electricity generated by wind turbines offsets the equivalent of 1,100 to 2,200 pounds of carbon dioxide. Sulfur and nitrogen oxides, particulates, trace metals such as mercury, and solid waste from fossil fuel generation are also offset.

In 2003, HWS used 771, 750 kwh of wind energy, which offset approximately one million pounds of CO₂ from entering our atmosphere. As wind energy installations increase across the country, it is anticipated that its use as a clean, reliable, and low-cost energy source will become more popular.

Solar

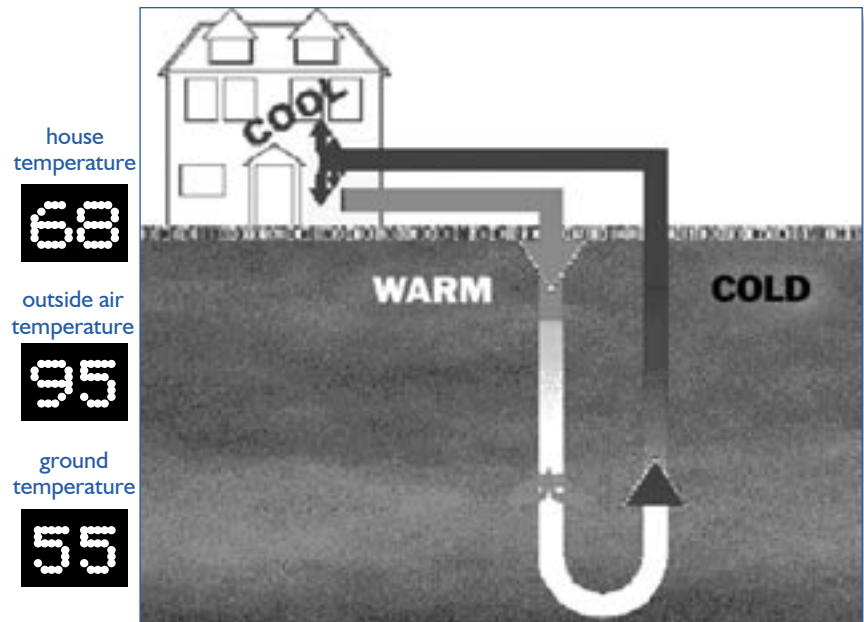
The sun is a clean, renewable, domestic energy source. According to the EPA, each day more solar power hits the Earth than the total energy that the 5.9 billion inhabitants of the planet would consume in 27 years. Solar cells were first used to power satellites in space. Today, it is common to see solar cells on calculators or even along the road side powering road signs, buoys, and street lights.

There are two types of solar energy technologies, photovoltaic and solar thermal, used to collect solar energy and convert it either to direct or indirect electricity. The Finger Lakes Institute will install 20 solar photovoltaic cells along the southeastern side of the building to convert sunlight directly to electricity. As an economic benefit, excess energy collected by the panels, but not used by the FLI building, can be sold to the power company and deducted from monthly energy bills. The solar cells, installed at the Finger Lakes Institute will supply approximately 20 percent of the electricity for the building.

Each photovoltaic cell contains a semiconductor, often made of silicon, which absorbs light energy. As energy enters the semiconductor, electrons are freed, rapidly bounce around and flow freely. The electrons are forced to flow in a certain direction by an electrical field, thereby creating an electrical current. Metal contacts, located above and below each photovoltaic cell, draw the electrical current away from the cell so that the electricity can be collected and used externally. This process creates no noise and requires no fuel to run. The only greenhouse gases involved in this alternative energy source are involved in the manufacturing of solar technology, rather than their use. According to the EPA, the life-cycle greenhouse gas emissions associated with any solar power technology are nominal compared with those of fossil fuel power plants.

Earth

The Finger Lakes Institute interior temperature is regulated by a geothermal heating and cooling system, also known as a “geoexchange system,” that relies on the earth’s consistent temperature of 55 degrees Celsius. Geothermal heating and cooling systems work by moving heat rather than by converting chemical energy to heat like in a furnace. Combinations of 20 wells,



Summer: In a geothermal heating and cooling system, the heat pump is connected to the building by a distribution system — most commonly air ducts. The heat pump is connected to the earth through a series of pipes called a loop. The system exchanges heat with the earth, meaning that no noisy or unsightly outdoor unit is needed.

drilled into the earth to the depth of 100 feet, were installed to use the earth’s constant temperature as a heat source and heat sink, depending on the season. In each well, a water and antifreeze solution is circulated through a continuous buried pipe keeping a “closed loop.” As the system functions, the liquid within the loop transfers heat between the earth and the building by a process of compression and evaporative cooling. In the winter, the fluid within the heat pump passes through a heat exchanger (evaporator) and absorbs heat from the low-temperature source. The fluid evaporates into a gas as heat is absorbed. The gaseous fluid then passes through a compressor where it is pressurized, raising its temperature to over 180 degrees F. The hot gas then circulates through a heat exchanger where the heat is removed and sent through the air ducts of the building. As the refrigerant loses heat, it changes back to a liquid, and the process begins again. The heat pump system for the Finger Lakes Institute consists of six units located throughout the building. These pumps use electricity to move heat from the geothermal source to the surface. This process produces less environmental harm and more efficient energy use.

The EPA has concluded that the geothermal heating and cooling system is the most favorable technology to use in terms of operating efficiency and economics.

The Finger Lakes Institute will install 20 solar photovoltaic cells along the southeastern side of the building to convert sunlight directly to electricity.

The heat pump system for the Finger Lakes Institute consists of six units located throughout the building — a process that produces less environmental harm and is a more efficient use of energy.

Although geothermal heat pumps cost more to install than conventional space conditioning systems, the additional investment can be recovered in 3-5 years through lowered heating and cooling bills and minimum maintenance expenses.

Water and Soil Conservation

The FLI makes a conscious effort toward soil and water conservation throughout the interior and exterior of the building.

Interior

The Finger Lakes Institute installed ultra-low-flow 1.6 gallon water-saving toilets in an effort to conserve water. According to the EPA, the nation's wide use of low-flow toilets through new construction and normal replacements is preliminarily estimated to save in excess of 7.6 billion gallons of water per day by 2020. This savings is nearly 19 percent of the total amount of water supplied by U.S. public water systems in 1995. Not only do low-flow toilets save water and money, they will also lower the demand for larger wastewater treatment plant capacity.

In addition to conserving water with the low-flow toilets, the use of three Ariston on-demand mini-tank hot water heaters in the Finger Lakes Institute building saves money, energy, space, and time. Electricity, generated by wind and solar energy, provides power. Instead of heating and reheating a large water storage tank, the 2.5 gallon on-demand system heats water immediately after the hot water tap is opened with an electric heating module as water passes through the heat exchanger. Hot water is supplied until it runs out. The recovery of hot water takes approximately 20 minutes. This on-demand system saves the energy and time a traditional central storage tank would otherwise use to heat, reheat and supply hot water. There is no water wasted down the drain while waiting for hot water. Energy is also saved by eliminating the long runs of pipe and the need to heat an entire water storage tank for small amounts of water.

Exterior

The FLI is a supporter of preserving campus beauty without compromising the natural environment. The HWS buildings and grounds crew maintains the Finger Lakes Institute property. Multiple efforts are taken campus-wide to conserve water, prevent runoff erosion, stabilize lakeshore property, limit fertilizer and control products — while creating an aesthetically pleasing, natural environment.

In appreciation of the natural water cycle, the FLI supports landscaping techniques that conserve water by retaining moisture and reducing irrigation. Bark mulch, used around plantings ensures moisture retention and requires less watering. By using highly decomposed mulch, nitrogen is retained in the soil, thereby avoiding the need to apply supplemental fertilizers. The type of turf grass grown on the FLI grounds has a low water demand for survival and is planted in a high density growth pattern to avoid weed growth. This choice of turf avoids the need to use control products for disease and insect suppression. Once the FLI turf grass is established with extensive root growth, watering is no longer needed.

To minimize organic yard waste, HWS uses lawn mowers that recycle grass clippings to the size of sawdust as it mows. The clippings remain on the ground to provide insulation for retaining soil moisture and cool temperatures. Leaves and grass clippings that are four inches or more in length are collected and placed in a compost area on campus.

Shoreline and watershed-based erosion cause poor water quality, increased turbidity, and accelerated nutrient inputs to the lake each year. In recognition of the impacts of shoreline development and land use practices, the Finger Lakes Institute has chosen not to alter the shoreline of its Seneca Lake property. The large trees and ground cover that currently exist stabilize the soils along the steep bank and absorb nutrients that would otherwise enter the lake via runoff. Planting dense turf holds the soil together and prevents runoff. Fertilizers that may be used initially to establish root growth are plastic-coated pellets that break down and slowly release nutrients to the soil, thereby avoiding damage to soil composition.

Interior Building Materials

The Finger Lakes Institute was constructed with energy efficiency as its top priority. The Icynene Insulation System, installed within the walls, ceiling and floors, reduces heat flow by 92.2 percent and controls air leakage so that building heating efficiency is increased by 30-50 percent. In addition to its effectiveness, use of Icynene foam improves air quality by eliminating the penetration of dust, allergens, and pollutants and controls humidity that can cause mold and mildew. Icynene also reduces airborne sound entering from busy streets, airports, loud entertainment rooms and busy classrooms.

In addition to conserving water with the low-flow toilets, the use of a mini-tank hot water heater saves money, energy, space, and time.

The Icynene Insulation System, installed within the walls, ceiling and floors, reduces heat flow by 92.2 percent and controls air leakage so that building heating efficiency is increased by 30-50 percent.



Exterior Building Materials

The back deck of the Finger Lakes Institute was built with an artificial decking material made from recycled and reclaimed wood and plastic products, primarily of recycled plastic grocery bags, reclaimed pallet wrap and waste wood. The durable textile contains no toxic chemicals or preservatives and there is no need to seal or stain the deck. Using synthetic materials is an action that echoes the “wise use” effort that the FLI ultimately supports. In terms of wise use, the deck is long lasting, resistant to rotting, cracking, and splintering, eliminating the probable need to replace an otherwise natural wooden deck.

Energy Conservation

There are a number of ways the Institute

was constructed to conserve energy. In terms of saving electrical energy, motion detector lights in each room function only when a room is in use. Each computer and printer is an Energy Star certified product that functions at low power during a sleep mode. The six thermostats, located throughout the building, can be set for daily-scheduled use so that the air circulation system does not run while the building is not in use. Each window in the building is an Energy Star certified window composed of insulating glass plus a low emissivity layer which keeps heat in the building in cold months and reflects warmth out in summer months.

Resource Conservation

As the statewide effort to reduce, reuse, and recycle increases, the FLI participates in waste

There are a number of ways the Institute was constructed to conserve energy.

HOBART
AND
WILLIAM SMITH
COLLEGES
FINGER LAKES INSTITUTE



601 S. Main St. Geneva, NY 14456

Non profit org.
U.S. Postage
PAID
Permit No. 69
Geneva, NY

reduction and resource conservation. Blue bins, scattered throughout the FLI building, are depositories for paper, cardboard, plastics, aluminum cans and batteries. The FLI encourages the act of recycling and the use of products made from recycled material. One example is the use of recyclable printer paper and printer cartridges.

Special attention was given to selecting the items used to furnish the Finger Lakes Institute. For example, recycled oak wine barrel staves from the Finger Lakes region were used to create a seat for the bench in the reception area. Furniture for the majority of the building was chosen specifically because of the environmental efforts of its maker, KI of Rochester, N.Y., to use manufacturing methods that emphasize pollution prevention, including waste minimization, recycling and the use of alternative, non-hazardous materials. The FLI chose particular office furniture that contains up to 100 percent recycled fabric, plastic, and steel components.

One of KI's many environmental programs, the use of a water-based glue, drastically reduced KI volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions. By increasing the use of recycled water, KI saves nearly 41 million gallons per year. The company also employs a recycling program that includes paper products, aluminum, steel, bi-metal cans, cardboard, wood pallets, plastic purgings, foam, and fabrics.

Visit our new facilities to learn how wind, solar and geothermal energy mechanisms can be efficient, environmentally sensitive, comfortable and economical systems in your home. For a tour of the FLI building and its workings, contact Community Outreach Coordinator Sarah Meyer at (315) 781-4382 or write smeyer@hws.edu.

References used for this article can be obtained by contacting Sarah Meyer.

Visit us on the Web — <http://fli.hws.edu>