



# The Sustainable Campus

*The Newsletter of the Berea College*

*Sustainability and Environmental Studies Program*

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## The Future Isn't What It Used To Be

*The Rationale for Radical Actions to Develop a Sustainable Campus*

By Richard Olson

The Roman General Varus in 9 AD, while watching his army being destroyed by new tactics developed by several German tribes, is purported to have muttered "Not like yesterday, not like yesterday."<sup>1</sup> Generals are often accused of preparing to re-fight the last war, particularly if they were previously on the winning side. If conditions have changed, this strategy can lead to defeat.

Individuals, institutions, and nations often make the same mistake, planning for success in a future that they expect to be quite similar to the recent past. For colleges in the United States, this means the expectation of a future in which energy is cheap and readily available, U.S. military supremacy is ensured, investments in the stock market increase 10% per year, and there are adequate natural resources to support an ever increasing Gross Domestic Product.

Berea College is celebrating its sesquicentennial at the same time that it takes steps to ensure that it will celebrate a bicentennial. If those steps are to be appropriate and sufficient, Berea will need an accurate projection of the future. A growing body of evidence suggests that the future will be far different and less hospitable than the past several decades. This article introduces five interrelated economic, social and ecological trends that may dramatically change the world in the next one or two decades. Future articles will describe each trend in more de-

tail. Institutions that do not change their methods of operation in response to these global changes will not survive.

*"If a path to the better there be, it begins with a full look at the worst." - Thomas Hardy, 1887*

1. Global peak oil – the year in which world oil production reaches its maximum and then begins to decline – will be reached within the next 10 years.<sup>2</sup> Recent increases in oil prices to \$65 per barrel are one indicator of the end of the era of cheap fossil fuels.



*Increasing oil prices indicate a growing shortage in world oil supplies.*

2. The population of the United States is projected to increase from its current 297 million to 420 million by 2050, and world population from 6.4 billion to 9.2 billion in the same period.<sup>3,4</sup>

3. Degradation of global ecosystems – and their capacity to provide materials and services such as food, fiber, and water purification – is accelerating. According to the United Nations *Millennium Ecosystem Assessment (MA) Synthesis Report*,<sup>5</sup> approximately 60 percent of the ecosys-

tem services that support life on Earth are being degraded or used unsustainably.

4. A burgeoning U.S. trade deficit (almost \$60 billion per month),<sup>6</sup> government spending deficit (\$412 billion in FY 2004)<sup>7</sup>, and consumer debt have driven down the value of the dollar and weakened the global financial system. Large debts put the United States in a weaker position to make the investments needed for sustainability.

5. Anarchy is increasing worldwide as central authority collapses. The ongoing genocide in Darfur (Sudan), the absence of central government in much of West Africa, the control of eastern Columbia by rebel groups, and Iraq are just a few examples of the decline of national governments. Closer to home, several Mexican border cities are near anarchy as drug cartels overwhelm local police.<sup>8</sup>

Any one of these trends could be catastrophic, but combined they present a challenge of unprecedented magnitude. It may be that no college will be able to survive, but it is certain that business-as-usual or even modest steps toward sustainability will not be sufficient to ensure a college's survival through the next half-century.

Berea College's steps to prepare itself for the future appear mixed with regard to the trends outlined above. The College's goal of reducing energy use by 45% by 2015 is right on, but the cornerstone of this effort – the new central heating plant – will be fueled primarily by natural gas at a time when natural gas production in North America has peaked. The B.C. Local Food Initiative to increase the College's purchase of local and

*(Continued on page 5)*

## Learning from Our Elders: A SENS Student's Experience With CCAT

By Megan Naseman

Arcata, California has so much to offer! Amazing rocky beaches, a lively farmer's market, one of the country's first community forests, a world-renowned wastewater treatment marsh, and the most amazing redwood trees. Nestled among all of this is the world-famous Campus Center for Appropriate Technology (CCAT) at Humboldt State University. An inspiration for our young SENS House program, CCAT has learned much in its 27 years of operation.

After being one of the SENS House Directors for the past school year, I'm honored to have worked with the CCAT co-directors this summer for my internship in Campus Sustainability Initiatives.

CCAT is based in a residential

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house in which three student co-directors live and work (similar to the SENS House with its four residential co-directors). Along with the three co-directors, CCAT has 18-22 student employees, a 20-member steering committee of past co-directors, faculty, and staff, and numerous volunteer workers. CCAT's mission is to demonstrate that living lightly on the Earth is practical and rewarding.

CCAT is very involved with the rest of the campus, working with classes, teaching courses, and giving tours to HSU students. CCAT is also involved with the greater Arcata community through educational programs and monthly potlucks. We at Berea have a lot of growing to do!



CCAT co-directors managing a booth on the quad.

What can we learn from CCAT? Tons! The first lesson I learned in my time at CCAT is that the SENS House can't stand alone. Workshops don't need to be conducted solely by student directors; we should tap the skills of the community. Also, I was reminded of the importance of SENS branching out and working with other departments. Sustainability really is an inter-disciplinary issue, and the more we can work with other classes the more visible those connections will be for everyone.

The second lesson that I learned from CCAT is the value of institutional memory. Between the filing cabinets full of information and the steering committee members whose experience with CCAT spans several decades, there's a lot of his-

tory that has been saved here. Because SENS is such a young program, we've focused less on archiving and more on actually getting projects going. I'm excited about the history that *The Sustainable Campus* will record. It's CCAT's rich history that has enabled me to learn so much from the program.

The third lesson is the importance of making it easy for volunteers to get involved. Every Friday at CCAT is a work day. Volunteers can work from 10am till dusk on the CCAT grounds either gardening or working on one of the many natural building projects. Having a regular volunteer schedule is the key to getting a lot accomplished as well as to maximizing community involvement.

The fourth lesson from CCAT is one that I learned this past year in the SENS House. It's crucial to a program's success that it be run well. To do this the members must work well together. Although it's hard to prioritize building friendships, it's really the first thing that needs to happen.

*Sustainability really is an inter-disciplinary issue, and the more we can work with other classes, the more visible those connections will be for everyone.*

I could go on and on about specific ideas that would work well at Berea. Working with CCAT not only inspires me to help SENS grow, but also makes me appreciate what we do have as well. Not often are sustainability initiatives as well supported by faculty and administration as is the Berea SENS program. I believe that the SENS program will only continue to grow.

To learn more about CCAT visit: [www.humboldt.edu/~ccat](http://www.humboldt.edu/~ccat)

To read my travel log and internship reflections visit my blog at:

<http://megatccat.blogspot.com/>

*Megan Naseman is the Head Student SENS House Director for Fall '05.*

# A Campus That Mimics Nature

By Richard Olson

Through trial-and-error and lots of time, nature has developed, discarded, tested, and refined a set of strategies for sustainability. The rules underlying the strategies – which characterize most ecosystems – are referred to as ecological principles. *Ecological design* is the application of ecological principles to the design of sustainable technologies, buildings, communities, and landscapes. Or in other words, using nature as a model.

Using the oak-hickory forest native to Berea’s region as an example, we can illustrate some of the main ecological principles. The oak-hickory forest is:

**Solar powered:** More than 5 million kWh of solar energy strikes an acre of eastern Kentucky forest each year, and the system is designed to capture a portion of this sunlight as its sole energy source.

**Efficient:** Nutrients are cycled within the system, and inputs and outputs of nutrients and materials are small.

**Local:** The organisms comprising an oak-hickory community are adapted to local conditions, and oak trees don’t import nutrients hundreds of miles.

**Diverse:** Thousands of species of bacteria, fungi, plants and animals occupy each acre. This diversity gives the community flexibility and strength in adapting to stress.

**Adaptable:** Eight thousand years ago, what is now oak-hickory forest was a spruce-fir forest. As climate and other environmental conditions changed, so did the system.

**Integrated:** The organisms in the forest are bound by a web of relationships including not just competition, but a wide range of symbiotic and cooperative relationships as well.

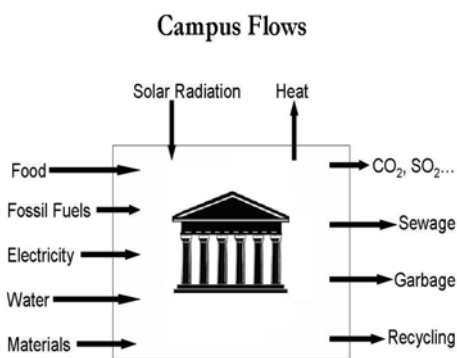
Nature runs on sunlight, fits form to function, recycles everything, rewards cooperation, depends on diversity, and requires local expertise. In contrast to nature’s approach, most human economies including Berea College function as linear throughput systems. Large amounts of high quality energy and mate-

rials are imported and large amounts of waste are exported.

Berea’s annual imports in recent years have included 12,000 tons of coal (consumed directly or as electricity), 65 million cubic feet of natural gas, 48 million gallons of water, and large amounts of food, paper, computers and other material goods. Meanwhile, the college exported 38,500 tons of carbon dioxide and one million pounds of solid waste along with large amounts of sewage, stormwater runoff, and air pollution.<sup>1</sup>

Many of the materials are imported long distances (for example, athletic apparel from China, lettuce from California). Internal recycling is minimal, and the recyclables that are collected are shipped off-campus with no guarantee that the College will buy recycled-content materials to close the loop. And most importantly, fossil fuels, not current solar energy, are the main energy sources.

However, the Berea campus is starting to change. Ecological design became a conscious planning tool at Berea College in 1999 as Van der Ryn and Cowan’s book *Ecological Design*<sup>2</sup> circulated within the administration. Since then, some of the applications of ecological design at the college include:



*A campus requires large amounts of high quality energy and materials, and exports large amounts of waste.*

- Apartments at the Berea College Ecovillage use passive solar design to maximize heating by the sun during the winter months.
- Students began the Ten by Ten cam-

paign for Berea to use 10% renewable energy by 2010, with the initial objective of installing a 1 kW photovoltaic panel array on the Alumni Building.

- Pre-consumer food waste from food services is composted and used to grow vegetables, some of which will be served in food service starting fall term 2005.
- Rainwater captured on the roof of Draper Hall is used to flush toilets.
- Green chemistry laboratory exercises designed by the Chemistry Department reduce the amount of toxic waste produced on campus.

*Nature runs on sunlight, fits form to function, recycles everything, rewards cooperation, depends on diversity, and requires local expertise.*

Ecological design continues to influence many of Berea’s ongoing renovation projects, and is reflected in the College’s ecological indicators of sustainability and their associated performance goals<sup>3</sup>.

In a sustainable campus developed from ecological design, solar energy will drive the system, reuse and recycling within the campus is maximized, fossil fuel use is eliminated, material inputs are reduced and the college is strongly linked to a local/regional economy, not the global economy. While Berea College has a long ways to go to reach ecological sustainability, the actions listed earlier are examples of some preliminary green steps that lead from the present system to a sustainable system that mimics nature.

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<sup>3</sup> <http://www.berea.edu/sens/indicators/indicatorsideshow/default.asp>

*Richard Olson is the Director of the Berea College Sustainability and Environmental Studies Program.*

## Measuring Berea's Progress Towards Sustainability

How can a college determine whether its policy decisions and actions are increasing its sustainability, and whether the actions being taken or contemplated are sufficient? Berea's Campus Environmental Policy Committee (CEPC) was charged by the faculty to develop a method for measuring the progress of Berea College toward ecological sustainability.

As a first step toward meeting its charge, the CEPC oversaw a college-wide process to develop a set of **indicators** of ecological sustainability for the campus. An indicator is a measurable variable that helps you understand where you are, which way you are going and how far you are from where you want to be. Based on student, faculty and staff input from a series of workshops, a review of the literature, and an examination of similar efforts at other colleges, the CEPC compiled a set of 24 indicators reflecting college functions in the areas of energy, water, materials, ecological capital, food, and environmental literacy. The CEPC's 2004 report showed that:

### **Berea College is becoming more sustainable as measured by:**

Total municipal water use (Indicator #7)

Municipal water use per capita (#8)

Construction and demolition waste recycled (#14)

Amount of hazardous materials shipped off-site (#15)

Percent of food purchased regionally (#19)

### **There is no change in Berea's status as measured by:**

Total energy use (#1)

Energy use per capita (#2)

Proportion of energy from renewable sources (#3)

Carbon dioxide emissions (#4)

Adequacy of the municipal water supply (#9)

Paper consumption (#16)

Land in higher diversity vegetative cover (#17)

Soil erosion (#18)

Percent of food produced organically (#20)

Proportion of food waste composted (#22)

Student environmental literacy (#23)

Faculty and staff environmental literacy (#24)

### **Berea is becoming less sustainable as measured by:**

Number of parking permits (#6)

Water quality (#10)

Proportion of campus in impermeable surfaces (#11)

Operational solid waste per capita (#12)

Recycling (#13)

Food waste (#21)

### **There is no trend established yet for:**

Motor pool fuel economy (#5)

The full report "Indicators of Sustainability 2004" can be read at:

<http://www.berea.edu/sens/indicators/indicatorssideshow/default.asp>

The CEPC will oversee regular updates of the indicators report, and the results will become part of college policy decisions.

## Students to Make Solar Shed Shine

The solar shed is the final – and smallest – part of the original building plans for the Berea College Ecovillage. The design of the shed demonstrates many examples of ecological design and green building techniques, while the construction process will maximize experiential learning opportunities for Berea students and community members.

The hexagonal shed will be a post-and-beam structure built with timbers from local forests. A central skylight will be surrounded by a living or green roof, the soil and plants of which will insulate and cool the structure and reduce stormwater runoff. Each wall will demonstrate a different alternative building technique including cob, cordwood, and earthbag construction. Greenhouse glass on the south-facing wall will maximize passive solar heating in the winter, while a trellis overhang will provide shade during the summer.



*Students mix concrete for shed footings.*

will be designed specifically for Ecovillage residents and their kids. Students from Brad Christensen's technology courses and Jim Dontje's ecological design and green architecture classes will also gain hands-on experience in natural building as they join in constructing the shed.

When complete, the shed will be an important demonstration of ecological design for visitors to the Ecovillage, and the hub for gardening at the Ecovillage as it provides space for storage, potting benches, and shelves for starting seedlings.

For information about upcoming workshops, contact Phil Hawn: [phillip\\_hawn@bera.edu](mailto:phillip_hawn@bera.edu)

A photovoltaic panel will charge the batteries that power the shed lights.

The shed will be built through a series of workshops led by SENS House Director Phil Hawn, former president of the North Carolina Natural Builders Association. The workshops will be open to the public, and some

## Campus Steering Committee Explores Sustainable Food Network at Berea

By Tammy Clemons

The Berea College Local Foods Initiative (LFI) was formed in Fall 2004 when Leslie Ferguson, a student SENS House Director, convened a steering committee composed of students, faculty, staff, and a retiree with interest in sustainability and local food systems. The LFI mission is “to promote the participation of Berea College in the development of a sustainable food system.”

Over the past academic year, LFI has undertaken a number of projects in pursuit of its mission, including research on (1) local food initiatives at colleges and universities around the country; (2) how the Berea College food system currently works; (3) the challenges involved in moving toward a more sustainable food system; and (4) some of the special resources Berea College and the wider community could contribute to a sustainable food system. LFI also compiled a comprehensive database of nearly 500 farmers/producers in the surrounding region, and

the group administered a campus-wide survey to gauge the knowledge and interest of Berea College students, faculty, and staff in College-grown and local foods.

In addition to its research, LFI sponsored several outreach activities including (1) a Green Steps Forum with an introductory presentation on LFI and a dinner featuring local foods; (2) a *Pinnacle* article; (3) a website; and (4) a SENS Seminar presentation on “Food Services for a Sustainable Future” with a lunch of local food products.

Given Berea’s institutional and academic commitment to sustainability, there are many compelling reasons why Berea College is the right place and this the right time for a local food project. LFI strongly believes that such a project would not only integrate learning, labor, and service, but that it would also contribute to the vision of Berea College as an integrated and continuous learning community where students, faculty, and staff focus their learning and action on real-

world problems and practical applications. Creating and supporting a local food system at Berea College would also foster stronger local economies, a healthier community, and enhanced local food security.

The Berea College Food Service has already begun working with the college gardens to increase the production of salad greens for campus consumption in the fall. LFI also produced a report to the Berea College Administrative Committee with recommendations for further action. LFI plans to continue its local food research, education, and assessment efforts in 2005-06. The group will produce a display for food service that will educate students about the nutritional value and importance of locally grown food. LFI will also produce a “local food guide.”

If you would like more information about the LFI, visit us at:

<http://www.berea.edu/localfoodinitiative/>

To participate in the LFI, contact Jason Fults, SENS House Director, at [Jason\\_Fults@bera.edu](mailto:Jason_Fults@bera.edu).

*Tammy Clemons is a member of the LFI steering committee.*

## The Future Isn’t...

(Continued from page 1)

regional food, and the Ten by Ten campaign for 10% renewable energy by 2010, are rationale responses to the global trends, although both are still small student-driven initiatives. And while the global economy is increasingly vulnerable to energy shocks, currency problems, and social unrest, Berea’s reliance on its endowment investments makes it “tied to the global financial markets in ways that no other college in America is.”<sup>9</sup>

Throughout human history, communities and societies have had to adjust to changes in their ecological, social, and economic environment. Some of these changes were of their own doing, some were not. But as Jared Diamond describes in his book *Collapse*<sup>10</sup>, those societies that could not adapt to change did not last. The first step toward adaptation is a realistic look at the future.

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## Like Snow On The Mountains— Restoring The American Chestnut to the Appalachian Forest

By Brenda Richardson

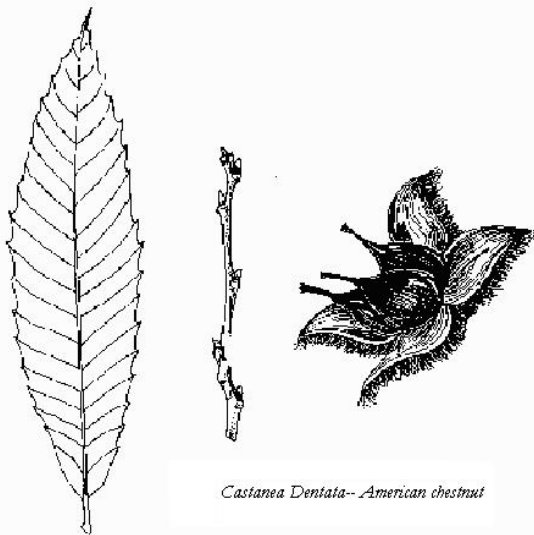
Some evening before fall ends, find some trees to stand under and listen to the katydids. Imagine yourself in a forest where trees stood a hundred feet tall and grew limb-free for half that height. Insect clatter from that distance would have held the stars in place, and songs of the wood thrush must have echoed down like cathedral bells. No wonder American poets, writers and philosophers found a confidence of place amid the early oak and chestnut forests that stretched across the eastern edge of this continent. No wonder people saw permanence in a land supported by trees such as the American chestnut.

The seamless grain of its wood made straight lumber, its rot-resistance made lasting posts and railroad ties, and its abundance made homes, barns and fencing accessible to even the most impoverished immigrant. Felling one tree of a species with an average five-foot diameter could yield more than enough wood for a season's heat and cooking fires. Chestnut trees provided forage for wildlife and hogs, and their wood and bark fueled a vital tanning industry. Street vendors sold roasted chestnuts in winter, and music pouring from instruments fashioned from chestnut wood set feet to dancing in ways that became particular to a region. American chestnut trees supported the creation of a culture that has become part of these United States. The story of the American chestnut is an integral part of Appalachian American history.

By 1950, however, the story had taken a bitter turn, and the chestnut blight, an Asian fungus first found in the United States in 1904, had killed all but a few American chestnuts. The species that

had dominated millions of acres of forests from Maine to Mississippi disappeared in half a century. The American chestnut story has become silenced to the point that there are few people remaining who recognize the significance of its name.

June 3-4, 2005, Berea College supported a step toward a happy ending to the chestnut story by hosting "Our Common Wealth" Teacher Workshop as part of the American Chestnut Project, a coalition of schools and communities in Appalachia focused on restoring the American chestnut tree in ways that create sustainable forests and communities. Members of Berea's Forestry Department, SENS Program, and Education Studies Department joined teachers from five eastern Kentucky counties to continue development of a "chestnut curriculum." Teachers described oral history projects in which children interviewed elders who remembered the chestnut forest, and biology lessons centered on the planting and care of chestnut seedlings.



*Castanea Dentata-- American chestnut*

To restore the chestnut, engagement of the children is vital, for it is only the younger generations who may live to see their mountaintops appear snow-covered in springtime, as they once did, under blankets of creamy white chestnut blossoms. Faye King, a

retired teacher and principal from Stanton, KY, and the project's founder says, "The depth of commitment of the adults involved in this project is unparalleled in my thirty years of education experience. . . It is the dream of an Appalachian forest once again housing regal mature trees that can captivate the interest and quicken the spirit of all participants. It is our hope for a better future for our youth."

John Perry, the Berea College forester, is helping to achieve that future by maintaining an orchard of hybrid chestnuts that are 15/16ths American chestnut and 1/16 Chinese chestnut. It is hoped that many of these trees will acquire immunity to the chestnut blight from the Chinese chestnut while maintaining the desirable characteristics of the American chestnut.

John G. Fee knew the importance of dreaming, hoping and taking action for the sake of those beyond ourselves and our time. Many who came after him have helped to sustain the commitments of Berea College with

their own dreams, hopes and action for the sake of people and the earth. The autumn of Berea's sesquicentennial year will also mark the initial efforts of Berea College students and teachers in working with these younger students, teachers and community members to carry out the mission of the American Chestnut Project. With them, Berea is forming new partnerships in generating dreams of sustainable living, and in working together to realize those dreams.

*Brenda Richardson is an instructor in the Berea College Education Studies Department. For more information on the American Chestnut Project:*

<http://www.howecharities.org/AmericanChestnutProject.php>

*See also the American Chestnut Foundation, [www.acf.org](http://www.acf.org)*