The Sustainability Scoop

March 2013

Global Warming and Plant Phenology

By: Karen Housel

Comparing the seeds from plant populations collected today with seeds collected from the same populations 50 years from now: how future biologists will discover the effects of environmental change on the microevolution of plants.

Evolution and Ecology professor Susan Mazer and colleagues at the University of Minnesota and Fordham University in New York have started **Project Baseline**: a seed banking project funded by the National Science Foundation. The primary goal of this national collaboration is to collect and preserve the seeds of dozens of wild plant species and populations; these seeds can then be accessed by future evolutionary biologists who may grow them simultaneously with seeds of the same species and populations collected in the future.

Mazer and her team are collecting seeds from natural populations of dozens of species throughout California wild lands and sending them to the National Center for Genetic Resources Conservation in Fort Collins, Colorado, where they will be preserved for decades under liquid nitrogen. This method, Mazer explains, "provides a frozen snapshot in time of the genetic diversity present in today's wild plant populations." The ability to access seeds that are collected and preserved now will allow future biologists to compare how seeds sampled from the past grow in comparison to plants in the future. This comparison will enable future evolutionary biologists to determine how environmental change, such as global warming, has affected the genetic diversity of plant populations, their life history, and their reproductive performance.

The effects of global warming on plants can affect the timing of life cycle events (such as germination or flowering) as well as the interactions between plants and the animals on which they depend. Mazer explains in a recent interview that many plants in highly seasonal environments (for example, those with cool winters and hot summers) begin to flower as soon as the weather begins to warm up in the spring. As global climate change generates warmer winters and earlier springs, some flowering plant species may have a competitive advantage over others by being the first to bloom and be pollinated, but only if their pollinators are available at the same time.

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Project Baseline hopes to find how environmental change in the temperate zone may influence the co-occurrence of plants, pollinators, and herbivores.

Mazer's advice to students is to get involved in research projects and to start learning about changes in the environment themselves. "When students participate in research, they sharpen their observational skills and learn about the process of scientific discovery first-hand," Mazer explains.

The UCSB Sustainability program is excited at the opportunities that Project Baseline will provide for advancing our understanding of rapid climate change and plant microevolution. We congratulate Professor Mazer and her team for their pioneering research. The creation of a time-capsule resource for future biologists and seed savers will provide a clearer demonstration of how human induced and naturally occurring climate change effects plants and natural life on our planet.□

PPC Event: Reducing Single-Use Plastic Bottles

By: Rebecca Bracken

The Plastic Pollution Coalition at UCSB (UCSB PPC) is a pilot project of the national Plastic Pollution Coalition's Plastic Free Campuses program. The UCSB PPC was initiated in the fall of 2011 with over 19 coalition members. The mission of the coalition is to reduce and ultimately eliminate single-use plastics from the UCSB campus. Last year, the coalition partnered with the UCSB Bookstore to transition from single-use plastic bags to compostable bags made of high-grade corn resin. The UCSB PPC works to educate the UCSB community, enact policy initiatives, and encourage sustainable alternatives to single use plastic items.

On **April 1st 2013**, the first day of spring quarter, the UCSB Plastic Pollution Coalition will be hosting its annual **Day Without a Bottle** event. There will be five booths in front of different University convenience stores giving away free reusable water bottles, educating students on how they can reduce their plastic footprints, and raffling off free prizes. The day will end with performances by campus students and local musicians.

Students, staff, and faculty are encouraged to participate by visiting the booths and learning about the different alternatives to single-use plastics. For those who want to be more involved with the Day Without a Bottle event, volunteers are needed to table and give out free reusable bottles. If interested, contact Alyssa Hall, Alan Evans, and Julianna Trowbridge at ucsbppc@gmail.com. Please visit the PPC website for more details.□

UC Santa Barbara Students Win National Sustainability Contest at White House

By: Shelly Leachman, UCSB Office of Public Affairs

An interdisciplinary team of UC Santa Barbara undergraduate, graduate, and doctoral students has taken a top prize at the 2013 Better Building Case Competition, an annual U.S. Department of Energy (DOE) contest meant to engage college students in the hunt for creative energy efficiency solutions.

Held in Washington, D.C., at the White House, the competition is part of President Obama's Better Buildings Initiative, which is striving for a 20 percent reduction, by 2020, in commercial and industrial energy use. The endeavor also hopes to serve as a tipping point for revolutionary change in energy use across U.S. buildings.

The UCSB group snared a "Most Innovative" award for its strategic proposal to help Montgomery County, Pa., complete a renovation that achieves significant energy savings in a publicly owned, multi-tenant office building. Carnegie Mellon, MIT, University of Chicago, and Yale were also winners in the 14-university contest.

"This was UCSB's first year participating in the DOE's Better Buildings Case Competition," said Jordan Sager, LEED program manager for UCSB's Facilities Management department. "Our team was one of only two West Coast schools in the competition, and was very diverse in terms of fields of study, with members representing five departments on campus. Winning in the Most Innovative category is an acknowledgment of both the analytical power and the creativity fostered by this type of interdisciplinary collaboration."

Assembled by Sager and Katie Maynard, sustainability coordinator for the Department of Geography, UCSB was represented by Bren School graduate students Ben White, Harry Bergmann, Justin Lichter, and James Choe; mathematics doctoral candidate Martin Harrison; Michael Georgescu, doctoral candidate in mechanical engineering; art history undergrads Melanie Jones and Jacob McConnell; and environmental studies undergrads Alex Kovalick and Jason Dale.

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"My teammates and I are honored to be among the top-tier schools receiving this award," said Dale. "This achievement showcases not only the hard work and discipline of students at UC Santa Barbara, but also the university's dedication to sustainability. UCSB has been leading innovation in building use and design through its Green Building policies and many sustainability initiatives. The achievement by my fellow students and me at the Better Building Case Competition is simply a derivative of successful policy and vision for a sustainable future."

According to the DOE, the competition provides the next generation of engineers, entrepreneurs, and policymakers with skills and experience to start careers in clean energy. Further, it generates creative solutions to real-world problems that could actually be implemented by commercial businesses and other organizations across the marketplace. Presented with true-life scenarios, each team tackles a case study said to be representative of the most common, and most stubborn, barriers to energy efficiency in private and public sectors alike. The cases use real situations, information, and data provided by partner companies and municipalities currently facing the problems presented.

Given one month to develop their problem-solving proposals, the teams gathered on March 8 for a penultimate workshop at the White House, where they presented their ideas to expert judges, including Assistant Secretary of Energy David Danielson.

The UCSB Associated Students Finance Board, the Bren School of Environmental Science & Management, the Art History Department, the Environmental Studies Department, and U.S. Green Building Council C4 Chapter, all provided funding to support UCSB's participation in the competition.□

Shelly Leachman and George Foulsham from the Office of Public Affairs have covered a number of sustainability stories, and UCSB Sustainability appreciates this collaboration.

Upcoming Events

Monday, April 1st – PPC's Day Without a Bottle

A day without a bottle helps to show UCSB students a convenient, cheap, sustainable alternative to single-use plastic water bottles. Join us on April 1st and pledge to use reusable bottles. You may even win some awesome prizes! See the PPC website for more details.

Friday, April 12th – Figuring Sea Level Rise Conference, 9am to 5pm at Corwin Pavillion

This all-day event is the culmination of the Critical Issues in America: Figuring Sea Level Rise series. It focuses on several crucial, and highly misunderstood, questions in the debate about climate change and sea level rise: Who is likely to be directly and immediately affected? What is likely to happen to them? And why is it so challenging to accurately identify and communicate the likely impacts? See the conference website for more details.

Divestment: The New Strategy to Achieving Climate Justice

By: Emily Williams

Climate change is possibly the largest threat facing modern society. Whether you consider yourself an environmentalist, socially-aware, or simply concerned about your own future and that of your future children, climate change should give us all a pause.

Most of us are tired of hearing about how the ice caps are melting and polar bears are dying. But here's a new thought: if all of Greenland's glaciers melt, worldwide sea-levels will increase by three meters.

Student activists have decided to take matters into their own hands. Not wanting to wait on bureaucracy anymore, students started the viral movement that is the fossil fuel divestment campaign.

This nationwide movement, at over 250 campuses, is an effort to get the college and university endowment pools to divest their funds from the fossil fuel industry. There are 200 fossil fuel companies being targeted--including Chevron, Duke Energy, and Arch Coal. These companies have the largest reserves of carbon (in oil, coal, and natural gas), and are thus responsible for the accelerated change in our climate we've been experiencing.

UCSB started its own Fossil Free campaign in summer 2012, and since then has made much progress. On February 13th, the Associated Students Senate unanimously passed a resolution urging the Regents to divest. Since then, the Faculty Legislature of the Academic Senate passed a resolution on March 7th to begin a series of roundtable discussions and panels discussing divestment as a tactic.

And what's more is that the UC's are working together. As the first strong nationwide movement of its kind for years, the strength behind the campaign is helping the UC's solidify. So far, all but UC Irvine is currently working on divestment, and the campuses are devising a UC-wide strategy. The goal is for the Regents of the University of California to divest.

In the 1980's, universities across the nation divested from the apartheid that was plaguing South Africa. They divested, and with that, the UC's divested $3 billion, which is half of the current day endowment pool. Nelson Mandela is on record having said that the UC's are largely responsible for ending the apartheid.

There is little difference between that movement and the one of today. Though the threat posed by climate change may not be as obvious as that of the apartheid, it is nonetheless as responsible for mass social and environmental injustices. As the leaders of knowledge and progress, universities are key in combating climate change. While divestment will not financially cripple the fossil fuel industry, it sends a clear message: enough is enough. We want climate justice.□

Satellite predictions provide Developing countries an early-warning of drought catastrophes

By: Karen Housel

UCSB faculty Dr. Chris Funk, Joel Michaelsen, and Greg Husak collect data which help African governments make more sustainable decisions on where to develop & distribute communities.

Developing countries that experience malnourishment and overpopulation are often in too difficult of circumstances to prepare for random, fluctuating weather alternations as a result of climate change. With unforeseen atmospheric conditions, communities are often left in arid environments with little to no rainfall.

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Weak rainy seasons have made it difficult to sustain cattle and grow crops leaving communities depleted of first-hand resources. Now, imagine a world where you could predict natural disasters—where food scarcity and community fatigue could be prevented by utilizing technology to predict future droughts; where people could prepare for disasters by acquiring enough food to last these arid circumstances and to find the most appropriate, sustainable locations to grow crops. Dr. Chris Funk and his colleagues have found a way to do so.

In 2003, Dr. Funk, Professor Michaelsen and Dr. Husak launched the Climate Hazards Group (CHG) which uses satellites to track rainfall and precipitation patterns associated with long-term trends in climate change. Primarily working within Sub-Saharan African communities, Dr. Funk explains that the droughts hitting East Africa are caused by similar changes in ocean temperature which are making it dry in the South-Western United States. The fluctuations in temperature and droughts give signs that they are linked to climate change.

Although droughts are slow on-set disasters, it is hard to determine when a drought will really hit. Using satellite research, climate data is sent to the U.S. Agency for International Development, the United Nations, and the African Government where officials can develop emergency plans and acquire equipment through disaster response. The huge advantage of these predictions is being able to store food in advance despite difficult plant growth periods.

Dr. Funk explains, "We are trying to advise governments to intensify agriculture in climate secure areas and limit expansion into dry regions. We also use models to estimate water in the soil and track atmospheric motions."

In addition, the program has scientists that work at UCSB and are stationed in regions in which the program is focused. "We like to work with African scientists to improve things in Africa," Dr. Funk explained in a recent interview. This way, officials in Africa can help make sustainable development choices and provide better food security in the future.

By substituting unnecessary travel to Africa with teaching permanent African residents, the CHG hopes to make their research a lasting asset for these communities.

The CHG is a part of a unique cooperation between a geological survey, the government, and the University. Each year, the United States spends billions of dollars on humanitarian assistance, and a small portion of that fund supports research at UCSB, which allows researchers to better provide civilized aid to those who are ensnared in difficult circumstances.

Dr. Funk was open to sharing encouragement with students who are struggling with science and geography courses. He explains, "A little bit of suffering now can open up doors for the rest of your lives. While it might be a challenge to learn some of the technique they can help you pursue fascinating questions. Looking back at some of my friends who took the easy path in college, they sometimes ended up in careers that were boring in 10 or 15 years. That's one of the greatest advantages about science." □