



CRC's GREEN SCENE

A bimonthly newsletter of the Sustainability Committee at Cosumnes River College

Photo by Jim West

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In This Issue:

- 1 **Take Back the Tap Campaign**
- 2 **Biosphere 2**
- 3 **A Perspective: There Is No Drought**
- 3 **Student Profile: Michael Kwong**
- 4 **SSF Joins CSSC**
- 4 **TOP Club**
- 5 **Restaurant Review: Mother**
- 5 **March for Real Climate Change**
- 7-8 **News In Brief: Tiny House; Sustainability Scholarship; Winn Center Represents California; CRC Town Hall**

Unique 'CRC Takes Back the Tap' Campaign Set to Launch

Debra Sharkey reports...

Students and staff will soon find it easier to avoid plastic single-use water bottles. Thanks to a unique collaboration among CRC's Students for a Sustainable Future Club, the Campus Sustainability Committee, and the CRC Foundation, reusable Klean Kanteen stainless-steel water bottles will be sold at a discount through a new 'CRC Takes Back The Tap' campaign. The primary goals of the campaign are to reduce use of plastic single-use water bottles and to promote greater consumption of free municipal tap water.

Students will be able to purchase the bottles in the CRC Bookstore or directly from the Students for a Sustainable Future club—at a 25% discount from retail price. Staff will receive a free water bottle (\$20



retail value) upon making a minimum \$25 tax-deductible donation to the campaign via the CRC Foundation office in Winn-109. Members of the public are also welcome to make tax-deductible donations to the CRC Foundation. A portion of the proceeds from each student purchase (or staff/public donation) will be used to buy more reduced-price bottles for students as well as to install more water-bottle refilling stations around campus. ♦



CRC will be celebrating Earth Day on Wednesday, April 22. Come join the festivities in the quad and attend the annual keynote speaker event at 1:30pm.



Sustainable Destinations Biosphere 2 – An Experiment to Replicate Earth

Editors' note: In this continuing series, we spotlight outings, hikes, or bike rides with a sustainable theme.

Debra Sharkey reports...

Imagine if humans could build a miniature model of Earth's biosphere to research what happens to plants and animals—including us—when carbon dioxide (CO₂) levels in the atmosphere rise or oceans become more acidic as they absorb that CO₂. Concerns of this kind led to the creation in the early 1990s of Biosphere 2 (Bio2), the world's largest closed ecological system, located in the desert northeast of Tucson, AZ. Long curious about this unique place, I was fortunate to join a small group of geographers in September for an in-depth, behind-the-scenes tour with a University of Arizona research scientist.

**Biosphere:
the interconnected
web linking all life
forms with their
physical environment in
habitats ranging from
the ocean floor to
five miles above
Earth.**

Constructed between 1987 and 1991 at a cost of \$200 million, with private funding from Texas billionaire Ed Bass, Bio2 remains the world's largest closed ecological system. Enclosed within its glass and spaceframe skin, based on a Buckminster Fuller design, this vivarium has 60 miles of sealed seams that flex with daily temperature and pressure changes inside the structure.

To prevent the glass panels from bursting due to internal air expansion, engineers invented an ingenious pair of lungs, each the size of a large ice rink, with a flexible neoprene roof anchored to a multi-ton metal disk that rises and falls with daily pressure changes inside the structure. I found it fascinating to stand inside one of these gigantic structures and watch the roof bob slowly up and down, almost as though it were breathing.

Designed to function like Earth (Biosphere 1), Bio2 was energetically open (sunlight and heat energy could enter or exit through its glass panels) and materially closed (a network of airlocks and seals prevented gas exchange with the atmosphere outside). Inside Bio2, seven habitats were spread over 3.15 acres, an area the size of 2.5 football fields, housing 3,800 carefully selected species from all over the world within 23 different soil types.

There were five wilderness biomes: a tropical rainforest with a 91-ft high roof and a mountain with a 30-ft waterfall; an ocean with a coral reef, coconut palm beach, and wave generation machine; a mangrove wetland designed to filter water and 100% of waste generated inside; a savannah grassland; and a coastal fog desert. The remaining two habitats were a half-acre organic farm and a residential area that included a machine shop, living quarters, kitchen, gym, offices, and other necessities.

Supporting all of these was a vast underground technosphere (including tunnels filled with pumps, valves, air handlers, etc.) powered by an onsite natural-gas energy center. Passive solar and hot or cold water circulating in pipes provided heating and cooling for



most of the above-ground structure. This arrangement led one inhabitant to liken Bio2 to a “garden of Eden situated atop an aircraft carrier” (Poynter, “Life”).

On Sept. 26, 1991 (a day known as closure), a total of eight biospherians (four men and four women aged 29 to 69 years old, representing the US, England, and Belgium) were sealed inside for Mission 1, the first and longest of its kind, to test the feasibility of living for an extended period in an enclosed biosphere and to pursue research, education, and development of environmental technologies for use on Earth and in outer space. There they lived and worked for the next two years (and twenty minutes) before re-entry to Biosphere 1 on Sept. 26, 1993.

(see Biosphere, Page 6)

A Perspective: There Is No Drought

Heather Hutcheson reports...

During the semester—once a week, rain or shine—I, and some of my writing students, join the men waiting for work in the Home Depot parking lot—the one right off Highway 99. During our hour or so together, we practice language through spontaneous conversations in which we do our best to discuss the news, popular culture, customs, and—almost always—food.

Recently, a conversation with a man from Michoacán, México about the word *sequía*, drought, sparked a

debate. He insisted, “California is not facing a drought.”

He knows what drought is; he was in México a few years back when there was a drought. He explained that we will know when we are in a drought when we have to travel ten or more miles for five gallons of water. When those five gallons of water will have to serve us for an entire week of drinking, cooking, bathing, washing, and . . . , that’s a real drought. Here, we can turn on the faucet and waste gallons from the comfort of our own home. “There’s no drought,” he persisted. The

neighbors’ lawns are still green; the city has cut watering by only 20%. No drought. He will know a real drought when he sees it.

Initially, my students were alarmed that, as some global warming denier, he was refusing to accept that we are in a drought. Then, through the details of his story, they realized—as with war or famine—how few signs of reality we have to face on a daily basis. ♦

To enjoy more entries from Heather’s blog, go to <http://shewhodaesnothing.wordpress.com/2014/12/08/drought/>

Student Profile

Michael Kwong Returns to College to Study GIS and Field Ecology



Editor’s Note: In this series, we spotlight CRC students with an interest in sustainability issues.

After graduating from C.K. McClatchy High School, Michael Kwong chose to stay in town and attend California State University, Sacramento. As a

musician and language enthusiast, he intended to join the ranks of aspiring musicians or anthropologists; however, he began his college career with no declared major and enrolled in a variety of general education courses. While the majority of those classes became nothing but a distant memory, one in particular planted a seed in his head that would continue to grow for years to come. Professor Helen Roland opened his eyes to the industrial food system and to today’s cradle-to-grave way of living—and to the threat both pose to the well-being of wildlife, humanity, and the greater system that we all compose. Michael was never the same after that semester—it was time for a change.

To broaden his awareness of the world and his capacity to assist and act, he shifted his focus to—and eventually obtained a B.S. in—environmental studies. Over time, his specific interests have become geographical information

systems (GIS), ethnoecology, field botany, and restoration ecology. He has found opportunities to learn and give back through volunteering with the Sacramento Tree Foundation and the Effie Yeaw Nature Center in Carmichael.

At present, Michael is completing Certificates of Achievement in Professional Applications of GIS and Field Ecology at both CRC and SCC. Outside of class, he can be found conducting and assisting with fieldwork in the Delta with the Division of Boating and Waterways Aquatic Invasive Species Unit, teaching mallet percussion at Franklin High School in Elk Grove, or taking minutes as the secretary of CRC’s Students for a Sustainable Future Club. He is currently considering attending graduate school or obtaining an environmental science position with the State.

We wish him well! ♦



SSF Joins California Student Sustainability Coalition

César Aguirre reports...

Midway through the fall semester of 2014, CRC's Students for a Sustainable Future club became an official chapter of the California Student Sustainability Coalition. The completely student-run coalition consists of members from the UC, CSU, community college, and private college systems across the state. CSSC holds biannual convergences at alternating campuses, attracting hundreds of students and community members. CRC's SSF club, led by current president Jaime Gonzalez, attended the fall convergence—with the theme Act Collectively, Transition Together: Systems for Justice—at UC Davis last November. The three-day event gave the Green Hawks the opportunity to learn from inspiring guest speakers, student and community led workshops, and breakout sessions examining the three main aspects of sustainability: ecology, economy, and equity. The convergence also yielded a wealth of networking opportunities as well as access to future events.

One such event was CSSC's Winter



(L to R) Karissa Gerhke, National Director of the Sierra Student Coalition; CRC students Jaime Gonzalez, Tenley Lillegard, Mariah Love, and César Aguirre; and Tyler Houghton, Greenpeace Sacramento Campaign Coordinator pose at the Fall 2014 CSSC Convergence.

Leadership Retreat, which three lead members of SSF, Tenley Lillegard, Jaime Gonzalez, and César Aguirre, were able to attend. The retreat was held January 20 through 22 at the charming Dancing Deer Farm, situated among the vineyards of Templeton, 24 miles north of San Luis Obispo. Between the main building and a large furnished barn, the farm housed easily the approximately 40 coalition members in attendance. Fueled by self-provided and prepared vegan meals, the young leaders engaged in numerous breakout groups led by veteran members. The sessions, designed to allow those veterans to pass on leadership tools,

also harvested the collective brainpower and unique perspectives in the room to strengthen the coalition's organization and support its initiatives. Attendees also participated in the World Cafe, a dinner and discussion with local community members of all ages, which aimed to bridge the gap between the different generations of environmental activists.

These events have galvanized SSF students to enact effective initiatives on our campus and beyond. We look forward to attending the upcoming spring convergence this April at Loyola Marymount College in Los Angeles. ♦

TOP Club Chooses Plant-Based Menu

Timaree Hagenberger reports...

Have you heard about the new TOP Club on campus? TOP stands for Thrive on Plants. The club's mission is to share a passion for plant-based food choices and to offer helpful information about how to improve our health and the sustainability of our planet—one bite at a time!

The amazing results many have experienced by making simple changes

to their food choices include shedding unwanted pounds and becoming leaner, accomplishing fitness goals, and helping themselves or loved ones battle against diabetes and other serious health issues. Our aim is to CELEBRATE life through fueling our bodies with delicious, plant-based whole foods, joyful movement, compassion, and mindfulness, all while taking much better care of our environment.



TOP Club's Elias Pena, Adina Magallon, Timaree Hagenberger, Tehreem (Timmy) Aslam, and Joann Helmich at Club Rush.

Whether you already thrive on plants, are curious about how to use the power of your fork, or are ready for an upgrade to feel better than you ever thought you could, come join us on Wednesdays at noon, in T-115. ♦

Restaurant Review: Mother Offers Creative Vegetarian Comfort Food

Steven Coughran and Julie Hawthorne report...

We've eaten at many vegetarian restaurants, especially along the Pacific coast, and Mother ranks among the best of them. From its opening in January 2014, this vegetarian restaurant has been our favorite comfort-food destination downtown—or even within a 90-mile radius.

Mother serves lunch and dinner in a small space right next to the Crest Theater, easy to reach via public transportation. It's popular with vegetarians and omnivores, so there's often a wait (though online-ordered

take-out, packaged in brown paper, is quicker). The atmosphere is casual and friendly. The mothersacramento.com site describes their food as “rustic, dynamic, and unfussy”—and we would add to that creative and even exciting.

On our recent visit, we sipped a red heather kombucha while waiting for a table and then enjoyed a dinner of appetizers with delightful flavor combinations: chicken-fried mushrooms with drive-through sauce, harissa potatoes with chimichurri, charred Brussels sprouts with crispy garlic and red onions, and seared cauliflower with quinoa, raisins, and

cashews. Vegan and gluten-free dishes are identified in the menu, and there are always plenty of choices. Most of the produce comes from local organic farms. Another nice touch was the arugula leaves and flowers, along with wild onion flowers, that decorated our dishes.

Mother has won a variety of well-deserved local awards, and we highly recommend you enjoy a meal there and find out for yourself why. ♦

Mother
WINTER • SPRING • SUMMER • FALL

SSF Members March for Real Climate Leadership in Oakland

Jaime Gonzalez reports...

On February 7 2015, thousands of environmental activists and concerned citizens joined forces in Oakland, CA, for the March For Real Climate Leadership to demand that Governor Jerry Brown end the controversial practice of hydraulic fracturing (fracking) taking place throughout our state. Fracking is the process of extracting oil and natural gas by drilling deep into the ground and injecting a mixture of water, sand, and toxic chemicals to fracture the rock and release oil and gas deposits. Largely unregulated, this practice has been found to contaminate water supplies and endanger the health of local communities—and has even been linked to seismic activity.

Amongst the passionate activists in attendance were



Students Vivian Tran (CRC), Karina Alvarez (LMU), Eva Malis (UCB), Mariah Vasquez (CRC), César Aguirre (CRC), and Tenley Lillegard (CRC) demonstrate in Oakland to end fracking.

members of CRC's Students for a Sustainable Future club. These students worked for weeks in advance to promote the march and create colorful signs, such as “End fracking now!” and “Real climate leaders don't frack!” Excitement and solidarity were in the air as we hit the streets with other student leaders in the climate justice movement. Beginning in Frank Ogawa Plaza, the march was led by frontline community members (from

those communities most affected by fracking) through the city, ending in a convergence celebration at Lake Merritt.

Over 8,000 people participated in the march, making it the largest anti-fracking demonstration in our country's history. CRC students left the march that evening feeling inspired, focused, and ready to continue the fight to protect the Earth and our communities. ♦



Biosphere 2

(From page 2)

During their time in Bio2, the biospherians faced a number of challenges, including species extinctions, population explosions of pests such as “crazy ants” and cockroaches, and problems producing enough food (they grew 80% of what they consumed; the other 20% came from reserves grown before closure and seed stock stored inside for later use). As a result, the biospherians ate only 2,000 to 2,200 calories/day and lost, on average, 16% of their body mass over two years—one factor among many that led them to separate into two increasingly antagonistic groups.



A more serious problem was the discovery that their atmosphere was mysteriously gaining CO₂ and losing O₂ (oxygen) over time, which caused them to work feverishly to sequester carbon by increasing plant growth, stopping soil irrigation (in hopes it would reduce microbial respiration from carbon-rich soils), stopping tilling, and so on. Over several months their atmosphere lost 7 tons of O₂, declining from 21% to 14.2%, the equivalent percentage

at 13,400 ft in elevation. They developed sleep apnea, became increasingly fatigued, and generally felt terrible. Their life support system was failing—a terrifying prospect. While they knew they could walk out of the airlock at any time to rejoin Biosphere 1, they chose not to.

Ultimately, the outside management team decided to add O₂ on two occasions to allow the mission to continue, causing some outsiders to question the scientific integrity of this experiment. A two-fold cause for the rise in CO₂ and reduction in O₂ was finally discovered. Prior to closure, too much CO₂ had been put into the soil in the form of compost, which increased soil respiration—and in turn CO₂. At the same time, carbon and oxygen were reacting with exposed concrete to form calcium carbonate, thereby causing the O₂ level to drop.

Related design flaws were to be fixed and tested by a new 7-member crew during Mission 2 in 1994. However, while this second crew was completely self-sufficient in terms of food production, a severe dispute between the exterior management team and the owner, Ed Bass, resulted in the early aborting of the mission.

In retrospect, Bio2 has taught us a lot about how large-scale ecosystems and our atmosphere function. Walter Adey, the Smithsonian marine scientist who designed its ocean



biome once stated that “we needed to know how to run these ecosystems in a box. Our whole world is in a box now. Learning to do this was the most important thing that could have been done by science in the tail end of the twentieth century” (Poynter 334). Given our continuing need to understand the complex interworkings of our atmosphere, lithosphere, hydrosphere, and biosphere amidst rapid climate change, I argue the lessons learned inside this “box” are even more valuable today.

Bio2 is now managed by the University of Arizona, which, in addition to keeping Bio2 open to the public, is conducting large-scale, tightly-controlled studies related to climate change and biogeochemical cycling of energy, nutrients, and water. To learn more about current research activities and about visiting Bio2 yourself, look out for a followup article in a future issue of the *Green Scene*. ♦

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News In Brief

Tiny House Team Adopts Living Building Challenge Philosophy

Editors' Note: For more information on the Tiny House competition, see the Green Scene's Nov/Dec 2014 issue.

John Ellis reports...

In preparation for the design phase (due to start in March) of the SMUD Tiny House Competition, CRC's student design team has adopted the Living Building Challenge (LBC), an environmental design philosophy and the most advanced rating system, as the basis for their research on building systems and landscape. Susan Rainier, AIA, an ambassador for LBC, recently presented the system to the student design team.

The 2012 winner of the Buckminster Fuller Prize for Socially Responsible Design, the LBC essentially asks

this basic question: "What if every intervention resulted in greater biodiversity; increased soil health; additional outlets for beauty and personal expression; a deeper understanding of climate, culture, and place; a realignment of our food and transportation systems; and a more profound sense of what it means to be a citizen of a planet where resources and opportunities are provided fairly and equitably?" ♦



To learn more, check out the International Living Future Institute at <http://living-future.org/>

New Campus Sustainability Committee Scholarship Available for Students

Eight staff members of the Campus Sustainability Committee recently teamed up to create the new Campus Sustainability Committee Scholarship for students majoring in environmental studies and sustainability. This year the scholarship amount is \$270.

Interested students needed to apply by the deadline for all campus scholarships (Friday, March 6) to be eligible for consideration. The committee intends to offer this scholarship on an annual basis. ♦

Winn Center Represents California in LEED



TOP 10 STATES FOR LEED

#7 CALIFORNIA

John Ellis reports...

In their rankings of the top 10 states for LEED (Leadership in Energy and Environmental Design), the United States Green Building Council used the Winn Center as the poster child for California:

"Already recognized as one of the strongest academic community colleges in California, Cosumnes River College took another step to reinforce its prestigious position with the Winn Center for Architecture and Construction. This design-build facility houses the construction, architecture,

pharmacy technology, and photography programs for the college campus. In addition to classroom space, there are design studios and laboratories within the building.

The 41,500-sq.-ft. LEED Platinum building is designed to bring construction and architecture professionals together to work and learn as a team. It also serves as a gathering place for members of the industry to meet and interact with each other and with students aspiring to join them in the industry." ♦



News In Brief

Cosumnes River College Sustainability Committee

Members:

Steven Coughran (Chair)
 Julie Elliot
 John Ellis
 Cindy Erickson
 Cath Hooper
 Bob Johnson
 Christina Ocrant
 Andrea Salmi
 Sangchin Sertich
 Debra Sharkey
 Linnell Violet

Student Members:

César Aguirre
 Jaime Gonzalez

Newsletter:

Cindy Erickson
 Cath Hooper
 Christina Ocrant



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CRC Town Hall Offers Opportunity for Sustainability Message

Christina Ocrant reports...

On February 6, the Town Hall meeting for the Cosumnes River College presidential search was held in the Winn Center Community Room, with Chancellor Brian King and Board Member Kay Albiani in attendance. Facilitated by Chris Iwata, the discussion addressed the skills, abilities, and characteristics that CRC faculty and staff would

like to see in the future CRC president. Sustainability Committee members were vocal that support for sustainability should be one of the search criteria for the new president. It also submitted a written statement that references sustainability as part of the college's vision and values statements and emphasizes the degree to which this awareness is woven into the culture here at CRC. ♦

30th Issue

With this edition, we celebrate the 30th issue of the Green Scene since its inception in October 2008. Woo-hoo!



Thank you for reading.