



UC DAVIS

TAHOE ENVIRONMENTAL RESEARCH CENTER

THE TAHOE ENVIRONMENTAL RESEARCH CENTER (TERC) IS DEDICATED TO RESEARCH, EDUCATION AND PUBLIC OUTREACH ON LAKES AND THEIR SURROUNDING WATERSHEDS AND AIRSHEDS. LAKE ECOSYSTEMS INCLUDE THE PHYSICAL, BIOGEOCHEMICAL AND HUMAN ENVIRONMENTS, AND THE INTERACTIONS AMONG THEM. THE CENTER IS COMMITTED TO PROVIDING OBJECTIVE SCIENTIFIC INFORMATION FOR RESTORATION AND SUSTAINABLE USE OF THE LAKE TAHOE BASIN.

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TAHOE CENTER FOR ENVIRONMENTAL SCIENCES BUILDING IS ON TRACK

Construction of the new Tahoe Center for Environmental Sciences (TCES) is proceeding on schedule. Tom Stoddard, project manager with Turner Construction, anticipates that UC Davis Tahoe Environmental Research Center and Sierra Nevada College staff will be able to move into the completed building by the end of August 2006.

The foundation for the building is already complete. Steel and concrete columns for the first floor are in place and concrete pouring for the second-floor deck should take place in October. The projected date for the third-floor deck is in early November, followed by steel for the TERC laboratory walls and roof. Completion of the building roof, including photovoltaic (PV) solar roofing tiles, is expected in December 2005.

Since construction is contingent upon weather and Tahoe snow levels, the schedule leaves many of us hoping for a long fall season and a late start to winter. Hopefully the heavy snows at lake level will hold off until the roof is on.

The Tahoe Center for Environmental Sciences is pursuing a Gold LEED (Leadership in Energy and Environmental Design) certification level and project managers are hopeful of achieving a coveted Platinum level award. The Platinum LEED level award would make the TCES one of only 10 buildings worldwide to achieve this level of energy conservation and green building technology. TCES currently has 42 LEED certification points and will need 52 points to achieve a Platinum rating.

The building's construction will



The foundation of the Tahoe Center for Environmental Sciences is complete. For live webcam views visit <http://terc.ucdavis.edu>.

include energy efficient technology, including nighttime heat storage through specially treated insulation, solar power and the use of natural daylight to reduce the artificial use of energy. Rainwater and snowmelt will be collected and used for irrigation and toilets. Trees felled to clear the site were milled on site and will be used for building trim.

"It's intended to be an example of using several concepts of what builders or homeowners can do for their buildings," said Jeff Lundahl, the lead architect.

The U.S. Green Building Council (usgbc.org), a public-private partnership, developed LEED certification in 2000. There are five general criteria for a green building. These include:

- Land use — The building site is designed to minimize disturbance of the soils and vegeta-

tion. Low-impact development principles and best management practices (BMPs) are critical for reducing impacts to water quality and wildlife habitat.

- Water efficiency — TCES is designed for efficient water use both indoors and out. Practices range from low-flow shower and toilet fixtures to collection of rain and snowmelt for use in landscape irrigation and for flushing toilets.

- Energy & atmosphere — Conservation of energy and the production of energy through renewable resources such as solar power lessens the necessity for burning fossil fuels, which pollute the atmosphere and contribute to climate change. The TCES building is designed with passive solar features and photovoltaic solar tiles will be located on

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TCES UPDATE

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the roof. The site is also located near public transportation, and will include bicycle storage and changing rooms as well as a car-pool program for staff.

Architectural Energy Corporation (archenergy.com), an energy and environmental research consulting firm located in Boulder, Colo., is performing a detailed energy simulation to analyze future building energy consumption. This includes analysis of the heating, ventilating, and air-conditioning (HVAC) components, building automation system, lighting system components, and indoor water and outdoor irrigation system to analyze total water consumption.

- Material & resource — Conservation of building materials through reduction, reuse and recycling of construction waste at the building site protects valuable resources. Construction waste management includes the

use of salvage or recycled materials, materials that are manufactured locally, and certified wood from lumber already on site or from companies who practice sustainable harvesting of forests.

- Indoor environmental quality — Protection of indoor environmental quality includes using low or no volatile organic compounds. That “new home smell” is composed of gases given off by new carpets, furniture, glues, paints, varnishes and other building materials. Some of these are volatile organic compounds (VOCs) which can be carcinogenic. Green building materials are certified “low or no VOC” products.

When going for Platinum, every small detail must be taken into consideration and documented. Regardless of the final certification level, we should expect this building to be a world-class green building.

Construction of the Tahoe Center for Environmental Sciences is governed by green building practices

NEWS

CORNERSTONE CEREMONY

Under sunny skies on August 20, a Cornerstone Ceremony and Reception was held at the TCES construction site on the campus of Sierra Nevada College in Incline Village, Nev. UC Davis Chancellor Larry Vanderhoef and SNC President Paul Ranslow were joined by elected officials U.S. Sen. Dianne Feinstein, D-Calif.; Nevada Gov. Kenny Guinn; and U.S. Rep. Jim Gibbons, R-Nev. About 200 people watched as officials pressed their hands into wet cement blocks and the cornerstone was laid to mark completion of the building’s foundation.

The center will allow more research and involve more collaborators to share their knowledge on many areas of research, such as urbanization, population growth and Lake Tahoe water quality.

“A large part of our emphasis is to use science to guide, inform and impact environmental policy and see what sorts of solutions are most effective,” said Geoff Schladow, director of the UC Davis Tahoe Environmental Research Center.



U.S. Sen. Dianne Feinstein, SNC President Paul Ranslow, Nevada Gov. Kenny Guinn, UC Davis Chancellor Larry Vanderhoef, U.S. Rep. Jim Gibbons and TRPA Executive Director John Singlaub take the stage for the TCES Cornerstone Ceremony

FEATURED STAFF

MONIKA WINDER JOINS THE TERC TEAM

Monika Winder is one of the newest members of the Tahoe Environmental Research Center team. Recently hired as a postdoctoral researcher with UC Davis, one major focus of Dr. Winder's research is the interaction of physical and biological processes in Lake Tahoe with an emphasis in plankton ecology. She is currently analyzing the historical dataset from Lake Tahoe to investigate changes in the structure and dynamics of the lake's phytoplankton (algae) community. Combining descriptive field studies and experimental research (both field and laboratory) with statistical modeling, Winder investigates species responses to external variations on ecosystem dynamics. These investigations will provide new insights on how the plankton community in Lake Tahoe is affected by nutrient inputs, climate

change, and human activities. This knowledge will help us to anticipate how Lake Tahoe will respond to future environmental changes and enable us to find preventative measures for the conservation of the Lake's water quality.

Winder is an Austrian native and earned her Ph.D. in natural sciences from the Swiss Federal Institute of Technology, Department of Limnology, in Zürich, Switzerland. She has conducted research in Austria, Switzerland, Germany, Costa Rica, New Orleans, Washington and Alaska. She has written numerous publications related to the consequences of environmental dynamics for ecosystem processes and natural communities in aquatic ecosystems.

In general, Winder's research interests span a variety of topics, including the effect of environmental change on ecosystem



Researcher Monika Winder to lead TERC biological research

processes, species dynamics, and community composition; nutrient and food-web dynamics in lakes and streams; behavioral and life-history adaptation to environmental variation; and modeling approaches for predict-

ing environmental changes on ecosystem and species dynamics. Winder will lead the biological program at the new laboratory facility at Lake Tahoe. Dr. Monika Winder can be contacted at mwinder@ucdavis.edu.

RESEARCH HIGHLIGHTS

TERC MAINTAINS NETWORK OF REAL-TIME METEOROLOGICAL RESEARCH

Researchers from the Tahoe Environmental Research Center maintain a network of real-time meteorological and lake temperature stations on the water and on land. Along with collaborators from NASA's Jet Propulsion Laboratory (JPL), TERC has a network of six research buoys and rafts on Lake Tahoe. Serving as research stations, these vessels provide information that ensures Earth-observing satellites are measuring the Earth's surface temperature correctly. Several environmental satellites, including Terra, Landsat, Aqua and Envisat, fly over Lake Tahoe to collect data, with about six satellites passing by each day. The NASA and UC Davis scientists have been collaborating



One of six buoys that forms the joint TERC-NASA real-time meteorological and lake temperature network at Lake Tahoe. Each station reports at 15 minute intervals.

to collect data on Lake Tahoe and to validate the data gathered by the environmental satellites since 1999.

These research stations are the only permanently moored objects on the lake and each is a mini-research laboratory. Each has a radiometer that can measure the lake's surface skin temperature to within 0.05 of a degree; a temperature sensor trailing in the water that measures the lake's temperature at depth; and meteorological equipment that determines air temperature, wind speed and direction, pressure, relative humidity and net radiation.

The research stations seem to be continually growing, as more equipment is added. For example, California's Air Resources Board

recently added an air sampler to one of the stations, and the UC Davis Tahoe Environmental Research Center has for several years maintained a deposition sampler to see what is coming into the lake from the air. The deposition sampler enables scientists to measure the amount of nitrogen and dust falling into the lake from the atmosphere.

Temperature data from the research stations can be field-tested for accuracy and compared to the satellites' measurements for calibration. These validated NASA satellites collect temperature data, which are used for a variety of purposes, such as creating surface temperature maps used in weather forecasting, as often seen on The Weather Channel. The NASA/JPL site (http://laketahoe.jpl.nasa.gov/get_met_weather.asp) provides access to the data acquired from four of these continuous monitoring stations.

Another six meteorological stations are located at the shoreline on private docks surrounding Lake Tahoe. Information such as wind speed, wind direction, wind gust, air temperature, air pressure, radiation, precipi-

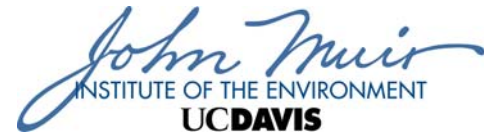
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JOHN MUIR INSTITUTE OF THE ENVIRONMENT

TERC is a research center of the John Muir Institute of the Environment (JMIE) at the University of California, Davis. JMIE, established in 1997, is a center of excellence for research and outreach programs related to the biological, physical and human environment. Visit <http://johnmuir.ucdavis.edu> for details.

The Tahoe Environmental Research Center combines field research and computer modeling to provide scientific input to lake, water-

shed and airshed management. In the Tahoe Basin, the results of their research have provided the scientific underpinnings for the export of wastewater to protect water quality, the construction of artificial wetlands to manage urban stormwater runoff, and development of the modeling tools to address the requirements of the Clean Water Act. In other systems, such as the Salton Sea, TERC field research and models are being used to guide



the development of restoration alternatives. For more information about the UC Davis John Muir Institute of the Environment, visit <http://johnmuir.ucdavis.edu>.

METEOROLOGICAL STATIONS

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tation, relative humidity and water temperature are available from http://remote.ucdavis.edu/tahoe_location.asp, along with data from the other two buoys. Direct digital readouts are also available at several locations around the basin.

The data collected from these stations have multiple uses. UC Davis researchers are investigating lake circulation, clarity loss and other environmental changes. Geoff

Schladow, along with graduate student Todd Steissberg and Dr. Simon Hook of NASA/JPL, has been using the data to develop maps of the surface currents of Lake Tahoe. "Understanding how wind-driven currents transport particles and nutrients up from deeper parts of the lake and redistributes them across the entire surface, is changing our view of the lake as a system," says Schladow.

Data from the buoy stations and satellites will enable graduate students and researchers to study the physical processes that contribute to Lake Tahoe's unique clarity and build computer models to categorize and understand these processes. Using the data, students can build their own models in the classroom, and see firsthand the highly variable conditions that exist in these subalpine environments.

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