

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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Asian Clam Populations Mapped and Management Activities Showing Promise

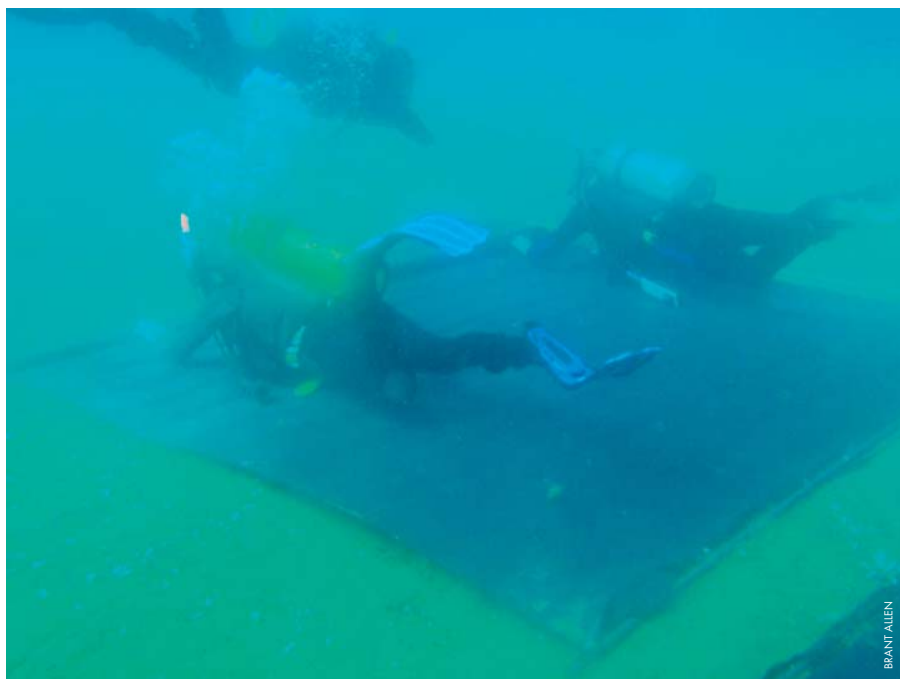
This past summer TERC researchers and collaborators using the GAVIA Autonomous Underwater Vehicle were searching for clams around the entire perimeter of the lake. Researchers found that the Asian clam populations were restricted to primarily the southeast portion of the lake, with satellite populations at the south end of Glenbrook Bay, Camp Richardson and Emerald Bay.

Clams were also found at great depths near Nevada Beach (at 84 meters or 275 feet depth). It is unknown whether these deep-water clam populations are self-sustaining (i.e. reproducing) because

water temperature at that depth may be too low for clam reproduction. No other lake researchers are currently reporting clam populations at such depths.

Two non-chemical management techniques were tested this summer to try to control the populations of clams. The use of diver assisted suction removal and various bottom barriers (inverted chambers, and plastic, polyethylene and rubber tarping) have been

implemented on a small scale and monitored for reduction of dissolved oxygen concentration, mortality of clams and recolonization. Researchers found that diver assisted suction removal is costly, but effective at reducing (but not eradicating) Asian clams within limited areas. Laying a rubber barrier over clam beds reduced dissolved oxygen to zero (0 mg/L) in 36 hours under summer temperature



Researchers roll out the bottom barriers to evaluate Asian clam population control methods

LETTER FROM THE DIRECTOR

The snow on Mt. Tallac, accumulating storm by storm, is a sure sign that winter is upon us and that another year is drawing to a close. And what a year it has been. Despite spending freezes on state funds and furloughs for university staff, so much has been accomplished across the full range of our activities.

Research has, as always, been at the forefront. The work being done at Tahoe to control Asian clams and other invasive species has garnered wide attention. Working with an international team from four universities, we have been able to pioneer new methods to remotely map the locations of Asian clams at Lake Tahoe and have devised and tested methods that may ultimately lead to their

eradication. Tremendous progress has also been made on other key issues such as climate change, lake clarity and floodplain restoration. These results have been reported in journals and conference proceedings nationwide and internationally. My thanks go out to all those who participated either directly or indirectly in our research efforts this year.

Every summer TERC hosts student interns from all over the country. Working with our researchers and education staff, they learn practical skills to complement their coursework, and at the same time they make real contributions to our research and education mission. With their assistance, combined with the efforts of our three AmeriCorps members and our team of dedicated volunteer docents, we have continued to attract



Geoffrey Schladow, Ph.D., Director Tahoe Environmental Research Center

thousands of visitors to our Center. My thanks go out to all of them! This is a true team effort.

Finally, my thanks go out to the public who have continued to support our efforts through generous gifts, both large and small. These funds, from our valued donors and new friends, support student research, new and improved exhibits, guest speakers, better

equipment and our ability to respond quickly to new and emerging challenges at Lake Tahoe. Our continued excellence increasingly relies on this crucial private support and we are grateful to all for it.

I wish you all the very best for the holiday season and for a wonderful New Year.

A handwritten signature in black ink that reads "Geoff".

RESEARCH

Asian Clam Populations Mapped Management Activities Promising, continued

conditions (16-18°C) and remained at this level until the barriers were removed. After a 1 month period there was 100 percent

Asian clam mortality under the rubber barrier. Of the methods tested to date, rubber bottom barriers have the greatest potential as a

successful non-chemical and economically feasible control strategy for Asian clams.

A scaled-up version of this

experiment is scheduled to be implemented in Summer 2010, with a one-acre application of rubber barriers in southeast Lake Tahoe.

GIVING TO THE TAHOE ENVIRONMENTAL RESEARCH CENTER

Charitable gifts to the Tahoe Environmental Research Center provide crucial support for research, teaching and public outreach that helps promote understanding and conservation of the Lake Tahoe Basin and other lake systems. Your gift helps ensure the Center's continued excellence in restoring Lake Tahoe and other lakes around the world - now and for generations to come. Thank you!

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TERCGFT

RESEARCH

Stormwater Team

Stormwater is the dominant source of fine sediment and phosphorus loading into the lake. What's encouraging is that we have many opportunities to manage stormwater, unlike air pollution.

But how do we know how best to manage stormwater? This is where the UC Davis Tahoe Environmental Research Center stormwater team comes in: Collin Strassenburgh, Raph Townsend, and Andrea Parra, along with Alan Heyvaert of the Desert Research Institute. They monitor stormwater around the lake with automated samplers to capture runoff during storm events. By monitoring at various sites, the stormwater team is able to characterize what sort of impact different land uses have on the lake, be they residential, urban, forested, or commercial.

The stormwater team also assesses the effectiveness of Best Management Practices (BMPs) by sampling inflows to and outflows from rock-lined trenches, vegetated swales, catchment basins and constructed wetlands.

No matter what time

of day, no matter what day of the week, or time of year, the team must be ready for storm events. "It always rains on Friday nights," says Collin, only half-joking. A Friday night storm means going into work over the weekend as samples usually need to be processed within 24 hours.

The automated samplers do a fair bit of the work; they continuously log the level of the stormwater flowing through a site at five minute intervals. Automated samplers also collect stormwater samples. Despite the sophistication of the equipment, a good deal of human input is still required. Before it rains, calibration and battery charge need to be checked, and sampling intervals must be programmed based on the predicted duration and intensity of a coming storm. So the stormwater team tracks the weather in a number of ways; when a storm is close they check the weather radar almost constantly. It's not just a single field of science either. "You have to be passionate about a lot of things,"



Raph Townsend of the Stormwater Team studies wetland plants

explains Raph. "You have to understand hydrology, data modeling, and chemistry too."

Once stormwater samples are taken back to the lab, they are processed and analyzed for pH, turbidity, total suspended solids (TSS), particle size distribution, electrical conductivity, and organic content, amongst other constituents. The stormwater team also prepares the samples to be tested for nutrient levels.

These different factors are not just an aesthetic threat to Tahoe's blue waters—they are an indication of water quality and watershed health. Polluted water in the Tahoe basin affects all living things within

the watershed, from the mayflies to the trout to the osprey to the human beings. Thanks to the efforts of the stormwater team we can see how well our BMPs are performing and understand how we are affecting our watershed.

UC Davis and the Desert Research Institute are also collaborating on a stormwater treatment test plot system at the Tahoe City Field Station, which will determine the most effective ways to treat stormwater before it drains into the lake. The test plot system is still in the development phase, but it will be exciting to see what we learn from it in the near future.

EDUCATION AND OUTREACH

Save the Date: July 10, 2010

Plans to develop interpretive signage and exhibits at the Historic Fish Hatchery in Tahoe City are once again moving forward. After the State budget freeze in December 2008 the entire project was put on hold, but the American Recovery and Reinvestment Act (federal stimulus funding) approved earlier this year and funding from the North Lake Tahoe Resort Association has made it possible to resume activity.

There will be a number of exciting additions to the historic site including:

Eriksson Education Center

An indoor exhibit area and walkway around the restored building will provide access for the public to learn about how our choices and actions directly impact Lake Tahoe, its environment, and its future.

Visitors will find interior and exterior interpretive signage along with an interactive touch-screen video display that will display historical hatchery operations, video footage of current research and interactive games.

Summer Saturday tours, school field trips, wetlands outreach training, demonstrations and an annual wetlands celebration event will become programmatic components of the new education center.

Demonstration Garden

The newly developed community demonstration garden will include areas designated for native grasses, attracting butterflies, upland plants and wetland plants. Signage will provide visitors information about plants native to the Sierra Nevada.

Test Plot System for Field Testing

Together with the Desert Research Institute, TERC staff will provide field testing for alternative erosion control and water quality treatment options in the new Best Management Practice (BMP) Test Plot System to compare fine sediment and nutrient removal efficiencies.

Children's Environmental Science Day

Children's Environmental Science Day will be held on July 10, 2010, 1 - 4



Join us for Children's Environmental Science Day and Eriksson Education Center Opening on July 10, 2010

p.m. at the Tahoe City Field Station ("Historic Hatchery"). This free community event for children (ages 8+) and their families includes hands-on science activities designed to create an awareness of the unique ecology of Lake Tahoe and teach about the various areas of environmental science.

Eriksson Education Center Opening

Everyone is invited to an Open House on July 10, 2010, 4 - 6 p.m. The new Eriksson Education Center and Demonstration Garden will be unveiled. Following the Children's Environmental Science Day, visitors will be treated to tours,

science activities and refreshments. UC Davis researchers and staff will also be on hand to discuss the future of Lake Tahoe research.

As parking is limited, we recommend walking on the bike path or taking the Tahoe Trolley or TART bus. Additional details will be made available closer to the event.

We hope you will celebrate the completion of this wonderful community resource with us!

If you would like additional information, please contact Heather Segale, education and outreach coordinator, (775) 881- 7562.

SAVE THE DATE: JULY 10, 2010

Save the date for the Tahoe City Field Station Eriksson Education Center Open House and Children's Environmental Science Day. More information is available on the Tahoe Environmental Research Center website at <http://terc.ucdavis.edu>.

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