LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Aug. 20-24, 2012

KTVU FOX 2 SEA CHANGES DISTURB MARINE LIFE

The Great Barrier Reef in Australia already has been affected by ocean warming and acidification.

If the levels of carbon dioxide continue to increase, certain marine species could be harmed or go extinct much sooner than expected.

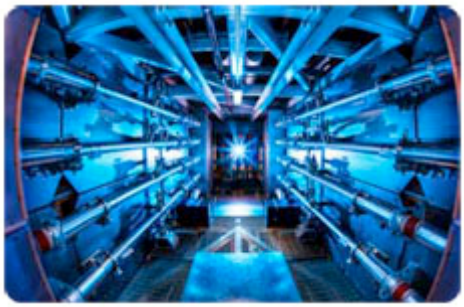
Current protection policies and management practices are unlikely to be enough to save them. Unconventional, non-passive methods to conserve marine ecosystems need to be considered if various marine species are to survive.

This is the conclusion of a group of scientists led by University of California, Santa Cruz researcher and Lawrence Livermore visiting scientist Greg Rau and colleagues.

The increasing concentration of atmospheric CO2 is thermally and chemically impacting the ocean and its ecosystems, namely warming and acidifying the oceans. By the middle of this century, the globe will likely warm by at least 2 degrees Celsius and the oceans will experience a more than 60 percent increase in acidity relative to pre-industrial levels.

To see an interview with Rau, go to KTVU.

TECH BRIEFS MAKING HISTORY



The preamplifiers of the National Ignition Facility are the first step in increasing the energy of laser beams as they make their way toward the target chamber.

Fifteen years of work by the Laboratory's National Ignition Facility (NIF) team paid off recently with a historic record-breaking laser shot.

The NIF laser system of 192 beams delivered more than 500 trillion watts (terawatts or TW) of peak power and 1.85 megajoules (MJ) of ultraviolet laser light to its target. Five hundred terawatts is 1,000 times more power than the United States uses at any instant in time, and 1.85 megajoules of energy is about 100 times what any other laser regularly produces today.

The shot validated NIF's most challenging laser performance specifications set in the late 1990s when scientists were planning the world's most energetic laser facility. Combining extreme levels of energy and peak power on a target in NIF is a critical requirement for achieving one of physics' grand challenges -- igniting hydrogen fusion fuel in the laboratory and producing more energy than that supplied to the target.

Fusion energy is the same source that powers the sun and stars.

To red more, go to *NASA Tech Briefs*.

Carbon dioxide emitted by the United States reached its lowest level since 1992 earlier this year, according to a U.S. Department of Energy report.

A shift in fuel from coal to less carbon-intensive natural gas is partly responsible, as was the unusual warm winter, the Energy Information Agency reported.

This shift in energy use is part of a trend toward the use of natural gas in the United States, said A.J. Simon, an energy systems analyst at the Laboratory.

Carbon dioxide emitted by the burning of fossil fuels, including coal, oil and natural gas, accounts for nearly 60 percent of humans' greenhouse gas emissions, according to the 2007 report by the Intergovernmental Panel on Climate Change.

To read more, go to *Live Science*.

The Exascale Report PUSH THE FAST FORWARD BUTTON

The Sequoia supercomputer

Around the end of March 2012, the Department of Energy informed the Laboratory that it has been selected to run the DOE's FastForward program.

Now LLNL is certainly not 'running' this on its own – the Lab is, for the most part, on equal footing with its sister labs: Argonne, Lawrence Berkeley, Los Alamos, Oak Ridge, Pacific Northwest and Sandia national laboratories.

They all have parallel and comparable research responsibilities, but for LLNL, those are now in addition to the very big task of managing the overall FastForward program.

The FastForward initiative is intended to speed up and influence the development of technologies that companies are pursuing for commercialization to ensure these products include features DOE Science and NNSA laboratories require for research.

To read more, go to *The Exascale Report*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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