

Scientists Call for Concerted International Action to Save World's Oceans—

Note Damage to Marine Ecosystems Happening More Quickly than Previously Thought

A high-level international workshop convened by the IPSO met at the University of Oxford earlier this year.

It was the first inter-disciplinary international meeting of marine scientists of its kind, and was designed to consider the cumulative impact of multiple stressors on the ocean, including warming, acidification, and overfishing.

by Mary Robertson

An expert panel of scientists is warning that unless we change our actions dramatically, we may be on the verge of creating large-scale extinction in our oceans. The report, from the International Programme on the State of the Ocean (IPSO), stems from a workshop that drew scientists from six countries and multiple disciplines to examine the combined impact of many stressors, including overfishing, acidification, warming, pollution, and hypoxia.

"The findings are shocking," Dr. Alan Rogers, IPSO's scientific director, said in a statement released with the report. "We are looking at consequences for humankind that will impact our lifetime, and worse, our children's, and generations beyond that."

The three-day IPSO workshop, co-sponsored by the International Union for Conservation of Nature (IUCN), yielded the following report:

Rogers, A.D. & Laffoley, D.d'A. 2011. *International Earth system expert workshop on ocean stresses and impacts*. Summary report. IPSO Oxford, 18 pp.

The report summary (released 21 June 2011) outlines the main findings and recommendations, and is available online at <http://stateoftheocean.org>. The full report will be released at a later date. A full list of participants appears in the table at the end of the long version.

The scientists also noted the degradation of the oceans is happening much more quickly than previously thought, as the various effects can combine with deadly results. For instance, a coral reef bleaches more easily when both increased temperature and acidification are present than from either one alone.

The panel observed that the warming and acidification of the oceans, with a resulting increase in hypoxia (a state of lowered oxygen) are the three factors that have been present in every mass extinction in Earth's history. Scientists generally agree that over the past 540 million years there have been five such extinction events, when at least 50% of the species on earth have disappeared, the most recent occurring 65 million years ago to usher out the "age of the great reptiles."

This report came on the heels of several others that point to troubling trends. A World Resources Institute study released last spring suggested the world's coral reefs could be gone by 2050 if no significant steps are taken. Arctic ice is melting twice as fast as previously thought. Most recently, federal and university scientists predicted the annual Gulf of Mexico "dead zone" of low-oxygen water will be the largest in history—about the size of Lake Erie—due to increased agricultural runoff from the flooded Mississippi River valley. The April and May 2011 flood levels in seven Midwestern states were among the most damaging recorded in the last century. When the nutrient-rich water hits the Gulf, it creates a massive algae bloom, forcing fish, shrimp and many other species to flee or face dying.

Local researchers agreed the report's findings are troubling and have noted similar signs of the effects. "Our oceans, especially the coastal waters we use most heavily, are suffering substantial, diverse, and compounding impacts," said Lawrence Cahoon, Professor of Biology and Marine Biology at the University of

North Carolina's Wilmington campus. "Most people don't know this, but we have a seasonal hypoxia zone showing up every summer off Myrtle Beach. That's not normal."

Cahoon added that the buildup of carbon dioxide in the atmosphere not only contributes to global warming but acidifies ocean water as well. "And the pace of these changes is alarming. In each case where we have data and projections dating back a decade or more, the observed changes are on the high end of the forecast ranges. This is true for warming, for ice retreat, for sea level rise, and so on. The take home message is that the ability of the oceans to support the uses we humans currently enjoy is being impaired substantially. We have two choices: make changes or adapt as best we can."

Marine researcher Bonnie Monteleone crossed several oceans as part of her graduate work at UNCW. She notes overfishing, combined with the everpresence of plastic waste in the oceans, seem to be compounding both problems. She points to a recent paper published the Marine Pollution Bulletin as evidence: of the 670 fish necropsies done, one third had plastic in their digestive tract ranging from one to 83 pieces. Plastics not only contain toxins, they adsorb—or accumulate—pollutants from ocean water, thereby concentrating them. "Fish mistake plastic for food because for millennia, anything that floats typically meant food. This causes an uptake of chemicals such as DDT and PCBs," said Monteleone. Although now banned from many applications worldwide, these compounds remain circulating in the marine environment and serve as potent neurotoxins and endocrine disruptors.

"When an ecosystem as large as our oceans shows symptoms, the thresholds have been already exceeded, and to reverse that trend it will take an enormous effort," said Carmelo Tomas, also professor

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Scientists Call for Action – continued

of Biology and Marine Biology at UNCW. “Fortunately, ecosystems are intricate enough to be able to recover from many abuses provided the offending conditions do not continue.”

The IPSO report concluded by calling for immediate and coordinated global action to prevent large-scale extinction of species. But what actions to take?

“We need to shift from fossil fuels to clean energy,” said Zak Keith, local representative of Oceana, the world’s largest ocean conservation and advocacy organization. “This means breaking the oil habit and building clean energy to take its place. We should be focusing on renewable energy like offshore wind and solar.” Burning fossil fuels is a significant contributor to carbon dioxide emissions, which topped the IPSO list.

Steve Ross of UNCW’s Center for Marine Science, agreed the current situation is untenable. “The world’s population is too large for the way we manage things. We either need to change our management or reduce the population, or both would be better. It may already be too late to reverse some amount of the damage that is going to persist over the next 50-100 years. But we need to keep it from becoming worse.”

The IPSO report outlined specific steps it says will need to be taken to avert collapse of the world’s oceans. All of them—reducing carbon emissions, managing fisheries, and creating marine eco-preserves—require a major change in the policy and practice of how humans use ocean resources. The failure of recent attempts to reach global consensus such as the Kyoto agreement leave scientists and policymakers alike skeptical about the prospect of implementing such changes. The report’s call for a global governance of the oceans seems particularly unlikely. “Most nations recognize the 200 mile economic zone within their shores. What happens to the other 80% of the ocean is up for grabs,” said Tomas. “There needs to be a global political will, and an economic incentive to maintain it, to help the oceans reverse their downward spiral. The outlook is not very encouraging.”

“One thing the IPSO report demonstrates [is] that we need to get started, and stop getting our scientific analysis from politicians and industries that benefit from the status quo,” said Keith.

To learn more, visit:
<http://stateoftheocean.org>
<http://www.uncw.edu/cms/>
<http://na.oceana.org/>

2011 Coastal America’s Ocean Art Contest

Submission deadline December 20, 2011

As part of a continent-wide call for student art, twenty Central Ecosystem Learning Centers across North America (CELCs) are accepting entries for this year’s “Coastal America Student Art Contest.” The contest encourages young artists to convey the importance of the ocean, coasts and Great Lakes by interpreting one the Seven Essential Principles of Ocean Sciences created by the Ocean Literacy Network. The purpose is to enhance public awareness of the importance of the ocean in our lives and to convey how personal actions affect the ocean.

The contest is open to all students in the United States, Mexico and Canada enrolled in grades K–12 as well as full-time university and college students. Entries will be judged by grade-level categories: K–2, 3–5, 6–8, 9–12 and university and college. Each submission must reflect one of the following principles, and include a short narrative explaining which principle the work reflects:

1. Earth has one big ocean with many features.
2. The ocean and life in the ocean shape the features of Earth.
3. The ocean is a major influence on weather and climate.
4. The ocean makes Earth habitable.
5. The ocean supports a great diversity of life and ecosystems.
6. The ocean and humans are inextricably linked.
7. The ocean is largely unexplored.

Contestants must submit their artwork to the CELC nearest them; winning artwork



at each Center will advance to the next level. Two CELCs in North Carolina are participating: NC Aquarium locations at Ft. Fisher and Roanoke Island. See www.coastal-america.gov for the CELC nearest you, or call Megan Ennes at (910)458-8257 ext. 234 at the Aquarium.

The Planet Ocean Seminar Series

The University of North Carolina–Wilmington Center for Marine Science (CMS) offers four distinguished lectures each academic year, featuring prominent speakers from UNCW faculty and other leading research institutions, from well-known environmental organizations, and from government agencies. The Planet Ocean Seminar Series is free and open to the public, and is held in the auditorium at CMS, 5600 Marvin K. Moss Lane. Due to limited seating, reservations are required. To make reservations or for further information, please call the CMS at 910-962-2301.



2011-12 Series
 (remainder of the series)

February 7, 2012:
UNCW Shellfish Research Hatchery
 Ami E. Wilbur, Ph.D., Director, UNCW Shellfish Research Hatchery, Associate Professor, Biology and Marine Biology, UNCW

April 17, 2012:
The World of Deep-Sea Corals: The Hidden Reefs
 Steve W. Ross, Ph.D., Research Professor, Center of Marine Science, UNCW
 [See photographs from one of Dr. Ross’ expeditions in *Cape Fear’s Going Green*, Vol. 2, Issue 2: “Deep Sea Coral Reefs.”]