

## **Fertilizing the Seas for Climate Mitigation—Promising Strategy or Sheer Folly**

Author: Parks, Noreen

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# Fertilizing the Seas for Climate Mitigation—Promising Strategy or Sheer Folly?

NOREEN PARKS

**A**s the effects of global warming appear more ominous, and the world community makes minimal progress in curbing fossil-fuel emissions, geoengineering schemes for climate mitigation are taking on new allure. One proposal, “fertilizing” ocean waters with micronutrients such as iron or nitrogen to stimulate the growth of carbon dioxide-guzzling plankton, is spurring commercial projects targeted on the global carbon-credits market. Fearing that ill-conceived commercialization could drive development of this strategy before its impacts and feasibility are adequately evaluated, scientists, policymakers, and environmental groups are calling for clear policy guidelines to regulate ocean fertilization.

The dozen experimental releases of iron in relatively small areas of open ocean between 1993 and 2005 produced mixed results—measuring the effects of iron seeding in moving water proved especially difficult. Kenneth Coale, director of Moss Landing Marine Laboratories and chief scientist on all US-led iron expeditions, explained that these efforts were designed to address questions about past climate. “None assessed the ecological consequences of much larger-scale or frequent fertilization efforts for climate mitigation,” he said.

Nevertheless, the idea excites some entrepreneurs who are eager to exploit prospects for selling carbon credits to the burgeoning numbers of people and corporations seeking to offset their carbon footprints. Last spring, California-based Planktos, Inc., announced plans for several iron-seeding ventures, beginning with the dumping of 100 metric tons over a 10,000-kilometer stretch of international waters west of the Galápagos Islands. When the Environmental Protection Agency (EPA) informed Planktos that the project might require a permit under the US Ocean

Dumping Act (which governs activities of US-registered ships, even outside federal waters), company officials responded that they would use a foreign-flagged vessel, effectively flouting EPA’s authority.

In October the Australian-based Ocean Nourishment Corporation, with the intention of triggering plankton blooms in the Sulu Sea near the Philippines, started trial releases of nitrogen-containing urea without permission from the Philippine government. The government is investigating the incident.

A symposium at Woods Hole Oceanographic Institution (WHOI) in September 2007 considered the scientific, economic, and legal questions raised by ocean fertilization. Researchers pondered whether broadscale efforts might cause harmful algal blooms, generate excess greenhouse gases, turn marine midwaters eutrophic, negatively affect fisheries, or lead to other adverse, unanticipated consequences. John Cullen, an oceanographer at Dalhousie University, warned that the combined impacts not only might wreak havoc but also could be impossible to trace to a single liable party.

Margaret Leinen, chief scientist for the start-up company Climos, believes private enterprise could help answer critical questions by responsibly carrying out more research, while profiting from the sale of carbon credits. Climos has adopted a voluntary code of conduct for ocean-fertilization activities and a methodology that, according to company officials, is “based on precedent established by the Kyoto Protocol’s Clean Development Mechanism.”

In November, members of the international Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter—an agreement now ratified by 82 countries—unanimously endorsed a statement prepared by its scientific advisers,

cautioning that large-scale ocean fertilization is not yet justified, because of gaps in scientific knowledge. Signatory nations should “use the utmost caution when considering [such] proposals,” the statement read. Convention representatives agreed to discuss the issues further and decide on regulations at a meeting in 2008.

Lacking enforcement authority, the convention relies on member countries to enforce its provisions. In the United States, that responsibility rests with the EPA. Elizabeth Kim, head of the agency’s Ocean Dumping Management Program, told WHOI conferees that the government supports research into technologies such as ocean fertilization “if the risks are evaluated and found to be acceptable.” There have been no applications for permits for ocean seeding, the EPA reported, but Leinen said agency officials told her the process will be similar to that for other permitted activities.

Nonetheless, the enforcement question remains open. “If a US ship re-flags and conducts activities on the high seas, there’s not a lot the government can do,” said Lisa Speer, a policy analyst with the Natural Resources Defense Council. “The worst possible thing we could do in the name of climate mitigation would be to invest in something that doesn’t work and has big, unanticipated impacts on the global commons,” she cautioned at the WHOI symposium. “The world community needs to know there’s been an open, transparent, scientifically informed evaluation of this idea before we move ahead with experiments on a mass scale, and commercialization.”

*Noreen Parks (e-mail: nmparks@q.com) is a freelance science and environmental writer who lives on Washington’s Olympic Peninsula.*

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