Open Ocean Aquaculture

Proceedings of an International Conference

May 8 - 10, 1996
Portland, Maine

Sponsored by

University of New Hampshire
University of Maine
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Cooperative Extension

National Marine Fisheries Service

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About the Conference

The purpose of the conference was to bring people together from around the world to discuss the issues, problems, and opportunities for aquaculture in the open ocean or high-energy environment. The target audience was aquaculturists, information, marine biologists, fisheries scientists, ocean engineers, community development specialists, environmental regulators, policy-makers, students, planners, investors, and natural resource economists.

The conference was funded by the National Sea Grant College Program as part of a larger effort on aquaculture and high-energy environment. It was sponsored by the University of New Hampshire/University of Maine Sea Grant College Program, U.S. Cooperative Extension, the National Marine Fisheries Service, and the Massachusetts Institute of Technology Sea Grant College Program.

The conference steering committee is identified on the following page.

Over 250 people registered and participated in the conference. Thirty people made presentations. All but three of the papers presented were represented in the proceedings. A poster session was held on the first night of the conference featured 20 posters.

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Introduction and Welcome
Rollie Barnaby, Chairman
Conference Steering Committee
UNH Sea Grant/Cooperative Extension
Brunswick, New Hampshire

Welcome to Portland, Maine and the Open Ocean Aquaculture Conference. I am Rollie Barnaby, an Extension Professor with Cooperative Extension Sea Grant at the University of New Hampshire. My interest in this subject comes from my belief that the development of marine aquaculture is dependent on identifying growth areas. The possibility of finding near-shore, protected sites for grow-out cages on most of the U.S. coastline is very slim. I believe the industry will have to go to land based, warehouse type facilities or move to the offshore, open ocean environment.

As I outlined the possibility of moving to the open ocean, it became very obvious that there was a whole host of problems and issues that have to be dealt with. The first step in addressing these problems was to get as many people as possible from around the world together to find out "what we know, what we don't know, and what we need to know" to move aquaculture to the open ocean.

This conference is an attempt to do just that. It is being supported financially by the National Marine Fisheries Service through a Saltonstall-Kennedy Grant and the National Sea Grant College Program through a grant for the study of Boston harbor management.

I would like to introduce the steering committee that put together this conference: Amy Hayden, Resource Services, Brunswick, Maine; Cliff Goudrey, MIT Sea Grant Program; Grant Kelly, U.S. Army Corps of Engineers; Chris Manzer, National Marine Fisheries Service; Ruth Robertson, University of New Hampshire; and Eric Nelson, NOAA Corps, who could not be with us here in Portland. These people will also serve as moderators for the various sessions for the rest...
Overview of Offshore Aquaculture

James F. McVay
Program Director
National Sea Grant College Program
Washington D.C.

I would like to welcome you all on behalf of the conference sponsors: the Maine/New Hampshire Sea Grant College Program, UNH Cooperative Extension, the National Marine Fisheries Service (NMFS) and the Massachusetts Institute of Technology/Sea Grant College Program. We are especially pleased to welcome presenters and participants from so many countries (Norway, Canada, Sweden, Russia, Ireland, Israel, New Zealand, Italy, England and the U.S.) and representing so many disciplines (including biologists, engineers, economists, biologists, state and federal resource managers, extension agents and leaders, lawyers and entrepreneurs). Continued building is key.

Progression of Aquaculture

Aquaculture was recorded in China 4000 years ago. Chinese aquaculture is now valued at $13.6 billion dollars (FAO 1992). Chinese freshwater carp culture has evolved into well-balanced pond ecosystem management with several feeding levels and optimum levels contributing to overall production. The carrying capacity of the system is maximized and nutrient recycling is practiced. The system is sustainable because of this wise management of carrying capacity.

Progression from extensive to intensive culture has been marked. Extensive pond culture, which relied upon natural productivity without fertilizer or supplemental feeding, produced an average carrying capacity of 200-500 kg per hectare. Semi-intensive pond culture using fertilization, aeration, superior food and water exchange has a carrying capacity of 600 kg per hectare. Intensive culture – in raceways, tanks, cages and...