

## **Costa-Pierce authors groundbreaking book, *ECOLOGICAL AQUACULTURE***

The aquaculture industry in the United States and around the world will never grow to its full potential unless it radically reforms its practices and reduces its impact on the environment and society. That's the premise of a landmark new book called *Ecological Aquaculture: The Evolution of the Blue Revolution* by Barry Costa-Pierce, Rhode Island Sea Grant director and URI fisheries and aquaculture professor.

The book details specific new technologies that must be implemented, practices that must be reformed, and policies that must be enacted for the industry to resurrect its reputation and gain the support of its many detractors.

"Environmental groups have done a service to society by pointing out the ecological impacts caused by aquaculture," says Costa-Pierce. "Those concerns are appropriate. Aquaculture does have an impact on the environment, just as agriculture does."

Those impacts include habitat degradation, nutrient discharges from feed and wastes, introduction of diseases and parasites, and the genetic dilution of native wild species from breeding with escapees from aquaculture facilities. In addition, a variety of social inequity issues arise from aquaculture in its present form.

Costa-Pierce defines ecological aquaculture as "an alternative model of aquaculture research and development that brings the technical aspects of ecological principles and ecosystems thinking to aquaculture."

"To make this happen," he said, "we need to get beyond the constant user conflicts between marine fisheries, aqua-culturists, coastal zone management, and coastal communities."

Costa-Pierce's recommendations include:

- ❖ Use of advanced waste collection and recycling systems
- ❖ Escapement control and recovery procedures
- ❖ Reduction in the feeding of fish meal so aquaculture facilities do not consume more protein than they produce
- ❖ Submersible cages to eliminate the visual blight of surface facilities
- ❖ Elimination of the use of chemicals that are harmful to human and ecosystem health
- ❖ Establishment of environmental labeling programs to certify products produced or harvested in a sustainable manner so consumers can make informed buying decisions
- ❖ Industry-wide enactment of professional codes of practice
- ❖ Better-coordinated facility planning and operations to maximize social benefits, both regionally and locally

The technologies and practices Costa-Pierce recommends are already available to the industry, but he suggests that much more research and development is needed.

Some aquaculture facilities are already operating as the URI scientist recommends. “There are several facilities that are models of ecological aquaculture,” Costa-Pierce said. “They’re making good money and producing healthy products for consumers using ecologically sensitive practices.”

For example, one finfish facility uses its wastes to grow hydroponic vegetables and animal feeds, and both fish and vegetables are certified. Another uses seaweed and shellfish to filter and absorb wastes from a salmon-rearing operation, resulting in no wastes being discharged to the environment.

“It’s all going on commercially; it’s just not well known yet,” he said.

Global consumption of fish is skyrocketing and traditional capture fisheries are unable to meet demand. As a result, aquaculture is the fastest growing sector of the world food economy, growing at 11 percent per year in the 1990s. It is anticipated that by 2030, capture fisheries will provide just two-thirds of the 150 to 160 million metric tons of aquatic foods that humans consume, leaving the difference to be made up by aquaculture.

But Costa-Pierce said this blue revolution, as he calls it, requires further evolution and “will go belly-up unless it embraces environmentally and socially sensitive codes of conduct that both industry and communities can accept.

“Aquaculture developers will need to spend as much time on the technological advances coming to the field as they do in designing ecological approaches to aquaculture development that clearly exhibit stewardship of the environment.”

*Ecological Aquaculture: The Evolution of the Blue Revolution* is available from Rhode Island Sea Grant. Please see the listing in “Publications” on the inside back cover or visit [seagrant.gso.uri.edu/bookstore](http://seagrant.gso.uri.edu/bookstore) for ordering information.

—Todd McLeish, URI News Bureau