

Aquaculture: Overview

The commercial culturing of marine species in California is limited primarily to the production of shellfish such as oysters, mussels, and abalone. While the culturing of finfish for enhancement purposes is well established in California, commercial culturing has been limited in scale and remains focused on solving technical questions through research. The commercial production of most cultured shellfish has declined from recent peaks. Oyster production is down from a peak in 1994; abalone production is down from a peak in 1996; and mussel production is down from a recent peak in 1997. In several instances, demand exceeded production and the declines reflected several ongoing challenges faced by these industries in their efforts to maintain production. More information on production levels can be found in the specific sections that follow.

Developing and maintaining production of cultured marine species is still influenced by technical problems, in some cases in spite of a well-established production history. Fledgling industries, such as those engaged in scallop and finfish production, face technical challenges in developing breeding and rearing techniques. The well-established industries, such as oyster and abalone culture, face technical challenges in maintaining production when faced with environmental change or disease impact. Human-caused changes in water quality, for example, present significant challenges to culture facilities that are sited in bays and estuaries. In order to address product safety concerns in these areas, the production of mussels, oysters, and clams are often subject to closures or depuration requirements. The presence of a shellfish aquaculture facility in an area can, as a consequence, provide a contamination early-warning system for sport-harvest of shellfish and an assessment of the biological conditions in the general area. With the exception of concerns related to the accumulation of biotoxins, changes in water quality do not present significant technical challenges in the culturing of scallops because of the tendency in that industry to site in offshore areas. Natural changes in water quality have also hampered shellfish production. Much of the recent decline in production can be attributed to El Niño-related impacts, particularly in the culturing of mussels and abalone. A broader discussion of these technical challenges can be found in the specific sections that follow this overview.

Development of a technical response to disease, and conforming to regulatory requirements related to disease control have both influenced production in the oyster and abalone industry and have influenced the success of white sea bass enhancement efforts. Oyster production in Tomales Bay, for example, continues to be influenced

by a significant summer-time mortality of unknown cause. Abalone production has been influenced by mortality from withering syndrome and hampered by regulatory requirements intended to prevent the spread of an exotic parasitic worm. Large numbers of juvenile white seabass have been destroyed to address disease concerns. In each instance, the industry made positive contributions to cooperative efforts among resource agency disease-management researchers.

Taken as a whole, the industry has ardent entrepreneurial support, has great economic potential, and has been a source of significant positive societal benefit. If not conducted in a resource-sensitive manner, aquaculture can also cause negative environmental impacts, by introducing exotic species, by introducing or contributing to the spread of disease, or by altering the natural systems within which production facilities are located. The key to achieving the positive aspects of aquaculture while minimizing negative ones rests in how effectively the industry, the research community, and regulatory agencies can work together. Industry leaders are now focusing on developing best management practices to ensure that shellfish culture does not impact the health of ecosystems upon which they depend. A common goal will be to ensure that the industry achieves its successes in resource sensitive ways without having to do so under an undue regulatory burden. Our ability to achieve that goal may hinge on developing trust through effective communication.

Fred Wendell

California Department of Fish and Game