

AQUACULTURE III

5. WEEK

Shellfish Aquaculture and the Environment

WEEKLY TOPICS

Week	Topics
1. Week	Aquaculture Science and Aquaculture Engineering
2. Week	Aquaculture: Economic and Environmental
3. Week	Aquaculture: Innovation and Social Transformation
4. Week	Aquaculture: Food Ethics
5. Week	Shellfish Aquaculture and the Environment
6. Week	Advances in aquaculture hatchery technology
7. Week	Recirculating Aquaculture
8. Week	Selection and Breeding Programs in Aquaculture
9. Week	Ecological and Genetic Implications of Aquaculture Activities
10. Week	Aquaculture: Biotechnology
11. Week	Aquaculture nutrition: gut health, probiotics, and prebiotics
12. Week	Mucosal Health in Aquaculture
13. Week	Off-Flavors in Aquaculture
14. Week	Sustainable Aquaculture Techniques



Shellfish aquaculture and the environment: an industry perspective

Marine aquaculture has become an increasingly important contributor to global food production necessary to support an expanding world population estimated at 6 billion today and expected to grow to 8 billion by 2028 (U.S. Census Bureau 2009). Global demand for seafood products alone is projected to increase by 70% in the next 30 years as harvests from traditional capture fisheries either remain stable or continue to decline. Currently, production of seafood from fish and shellfish including aquaculture provide 15% of average annual animal protein consumption to 2.9 billion people (FAO 2008a, 2008b).

https://books.google.com.tr/books?hl=en&lr=&id=IDEnRR_nRQAC&oi=fnd&pg=PA21&dq=Shellfish+Aquaculture+and+the+Environment&ots=YcGQ1MkY5X&sig=NX_UdTboxl9gruhQ2ZeRdAlbV_M&redir_esc=y#v=onepage&q&f=false

Shumway, S. E. (Ed.). (2011). *Shellfish aquaculture and the environment*. John Wiley & Sons.

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- Management of productivity, environmental effects and profitability of shellfish aquaculture — the Farm Aquaculture Resource Management (FARM) model
 - This paper describes a model for assessment of coastal and offshore shellfish aquaculture at the farm-scale. The Farm Aquaculture Resource Management (FARM) model is directed both at the farmer and the regulator, and has three main uses: (i) prospective analyses of culture location and species selection; (ii) ecological and economic optimisation of culture practice, such as timing and sizes for seeding and harvesting, densities and spatial distributions (iii) environmental assessment of farm-related eutrophication effects (including mitigation).

Ferreira, J. G., Hawkins, A. J. S., & Bricker, S. B. (2007). Management of productivity, environmental effects and profitability of shellfish aquaculture—the Farm Aquaculture Resource Management (FARM) model. *Aquaculture*, 264(1-4), 160-174.

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- ▶ Shellfish aquaculture — In praise of sustainable economies and environments
 - ▶ Shumway et al. (2003) stated that in recent years it has become all too common for the press and some scientific literature to focus only on the negative aspects of man's use of the environment. Unless we as humans decide to eat substantially less seafood, which is contraindicated by the latest in health and nutrition research, aquaculture is here to stay; seafood production is a key to our present and future food supply. Worldwide, the demand for seafood continues to surpass supplies of wild caught fish and shellfish, and appetites for these products are growing steadily at a time when the world is increasingly looking to the sea to provide food. Promoting ecologically sustainable shellfish culture is promoting sound resource stewardship and a clean environment. There is a critical need worldwide to bring ecological balance to some forms of aquaculture and an urgent challenge to foster aquaculture as an environmentally sound and socially acceptable practice in the United States. Marine/estuarine shellfish culture is an optimally environmentally sustainable form of aquaculture.

http://www.edc.uri.edu/temp/ci/ciip/FallClass/Docs_2008/Shumway_etal2003.pdf

Shumway, S.E., Davis, C., Downey, R., Karney, R., Kraeuter, J., Parsons, J., Rheault, R. and Wikfors, G., 2003. Shellfish aquaculture—in praise of sustainable economies and environments. *World aquaculture*, 34(4), pp.8-10.

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- Assessing the suitability of a range of benthic indices in the evaluation of environmental impact of fin and shellfish aquaculture located in sites across Europe
 - The European Union-funded ECASA project (Ecosystem Approach for Sustainable Aquaculture) studied the impacts from aquaculture on ecosystems from northern Norway to Greece. The objectives of this investigation were to identify quantitative indicators of the effects of aquaculture on marine communities, and to assess their applicability over a range of ecosystems and aquaculture production systems. The study included 6 Mediterranean and 4 Atlantic sites, 7 of which produced finfish (seabream, seabass, tuna, salmon and cod), and 2 bivalve molluscs (oysters, mussels, and clams); one site produced both fish and bivalves.

<https://www.sciencedirect.com/science/article/pii/S0044848609004116>

Borja, Ángel, J. Germán Rodríguez, Kenny Black, Alain Bodoy, Chris Emblow, Teresa F. Fernandes, Janez Forte et al. "Assessing the suitability of a range of benthic indices in the evaluation of environmental impact of fin and shellfish aquaculture located in sites across Europe." *Aquaculture* 293, no. 3-4 (2009): 231-240.

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- ▶ The ecological role of bivalve shellfish aquaculture in the estuarine environment: A review with application to oyster and clam culture in West Coast (USA) estuaries
 - ▶ Aquaculture is viewed as a potential mechanism to meet the growing demand for seafood around the world. The future of bivalve shellfish aquaculture in the U.S. hinges on sustainable practices on the part of industry and a more consistent regulatory regime. Bivalve shellfish aquaculture is a recent practice relative to its history in other countries, beginning in the late 1800s along the U.S. West Coast where it is now well established with farm raised product utilizing land-based hatcheries and grow-out directly in numerous estuaries.

<https://www.sciencedirect.com/science/article/pii/S0044848609001926>

Dumbauld, Brett R., Jennifer L. Ruesink, and Steven S. Rumrill. "The ecological role of bivalve shellfish aquaculture in the estuarine environment: A review with application to oyster and clam culture in West Coast (USA) estuaries." *Aquaculture* 290, no. 3-4 (2009): 196-223.



- The interaction between shellfish culture and ecosystem processes

- The carrying capacity of the Oosterschelde ecosystem for the production of mussels (*Mytilus edulis*) was evaluated before and after completion of a large-scale coastal engineering project in 1987. This project caused hydrodynamic and water-quality changes; hence, phytoplankton-species composition changed and phytoplankton turnover increased, but primary production remained the same. In the prebarrier period (1980–1986), condition of mussels showed a significant negative correlation with the annual shellfish standing stock and a significant positive correlation with the annual primary production.

Smaal, Aad, Marnix van Stralen, and Egbertha Schuiling. "The interaction between shellfish culture and ecosystem processes." *Canadian Journal of Fisheries and Aquatic Sciences* 58, no. 5 (2001): 991-1002.

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- References
 - Regional Review On Status And Trends In Aquaculture Development In Europe – 2015, Fao Fisheries And Aquaculture Circular No. 1135/1 Fiaa/C1135/1 (En)
 - The State Of World Fisheries And Aquaculture 2016, Fao. 2016
 - Advances In Aquaculture Hatchery Technology 2013, Woodhead Publishing Series In Food Science, Technology And Nutrition: Number 242
 - Aquaculture: An Introductory Text, 2005, Robert R. Stickney
 - Aquaculture Farming Aquatic Animals And Plants, 2012, John S. Lucas