Ecological Considerations for a Growing Oyster Mariculture Industry in North Carolina

Chuck Weirich, North Carolina Sea Grant.

Hoi Toiders Mariculture

Photo courtesy of Oysters Carolina

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Effects Vary by Gear & Lease Types

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Outer Banks Voice

- Water column leases with floating gear
- Bottom leases with anchored gear
- Bottom leases with managed beds

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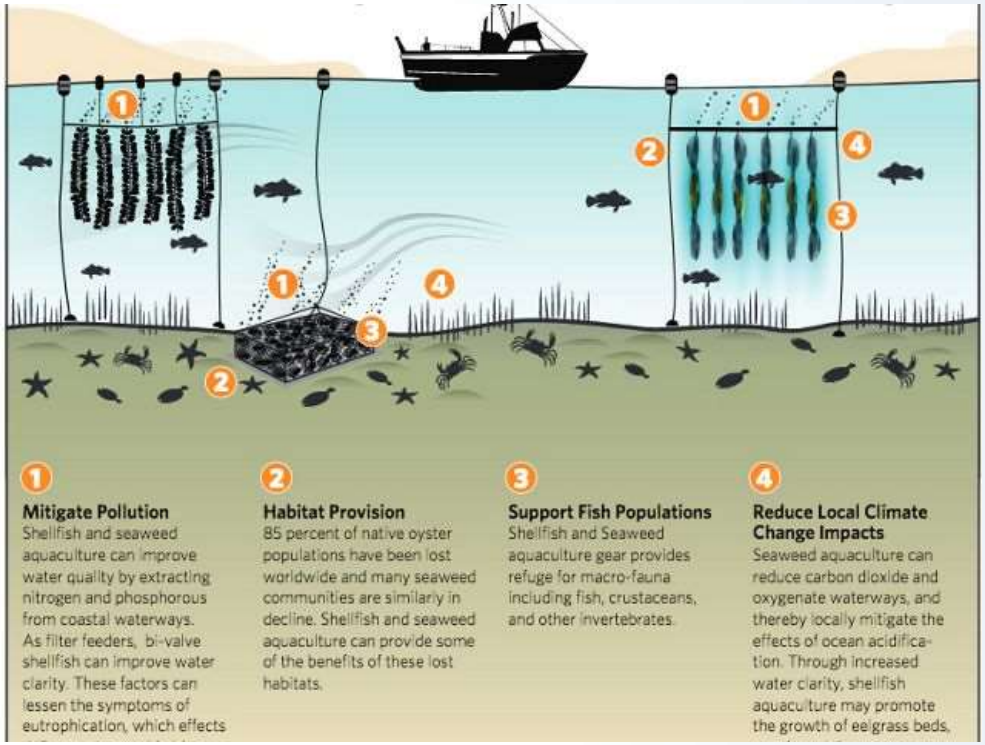
Potential Benefits of Oyster Mariculture

- Reduction in fishing pressure on wild stocks, with potential benefits for habitat recovery
- Possibility for analogous habitat use and filtration benefits as natural reefs
- Enhanced abundances of nekton relative to unstructured habitat
- Use by higher predators, and refuge provision by cages
- Nutrient and algal bloom reduction
- Enhanced filtration and water clarity
- Potential benefits to SAV habitat



BENEFITS OF AQUACULTURE Ecosystems Benefits of Aquaculture Infographic © TNC

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Benefits and Concerns

	Effect	Consequences
Water column and nutrients	Phytoplankton modification	Bloom modification
	Reduced turbidity	Increased light penetration
	Increased NH4+	Increased primary production
	Metals concentration	
Sediment and benthic habitat	Increased deposition	Anaerobic sediment
		Increased bacteria and meiofauna
		Decreased suspension-feeders
		Increased deposit feeders
	Modification of topography and hydrography	Habitat creation/modification
	Removal of calcium carbonate	Increased acidification
		Decreased positive feed-back
Other marine species	Nutrient and habitat modification	Increased crustaceans & some fish
		Seagrass displacement
		Disturbance for mammals and birds
		Creation of new habitat for birds
	Food competition	Decreased zooplankton & larval fish
Introduction	Introduction of nonnative species	Diseases introduction
		Pest introduction

Table 1: Main effects of bivalve aquaculture on the environment and their direct consequences. Grey highlight represents effects that can be considered both negative and positive depending on the situation.

Effects of Bivalve Aquaculture on the Environment and Their Possible Mitigation: A Review
Daria Gallardi; Fisheries and Oceans Canada, 80 East White Hills Road, PO Box 5667, St John's, NL, A1C 5X1 Canada*

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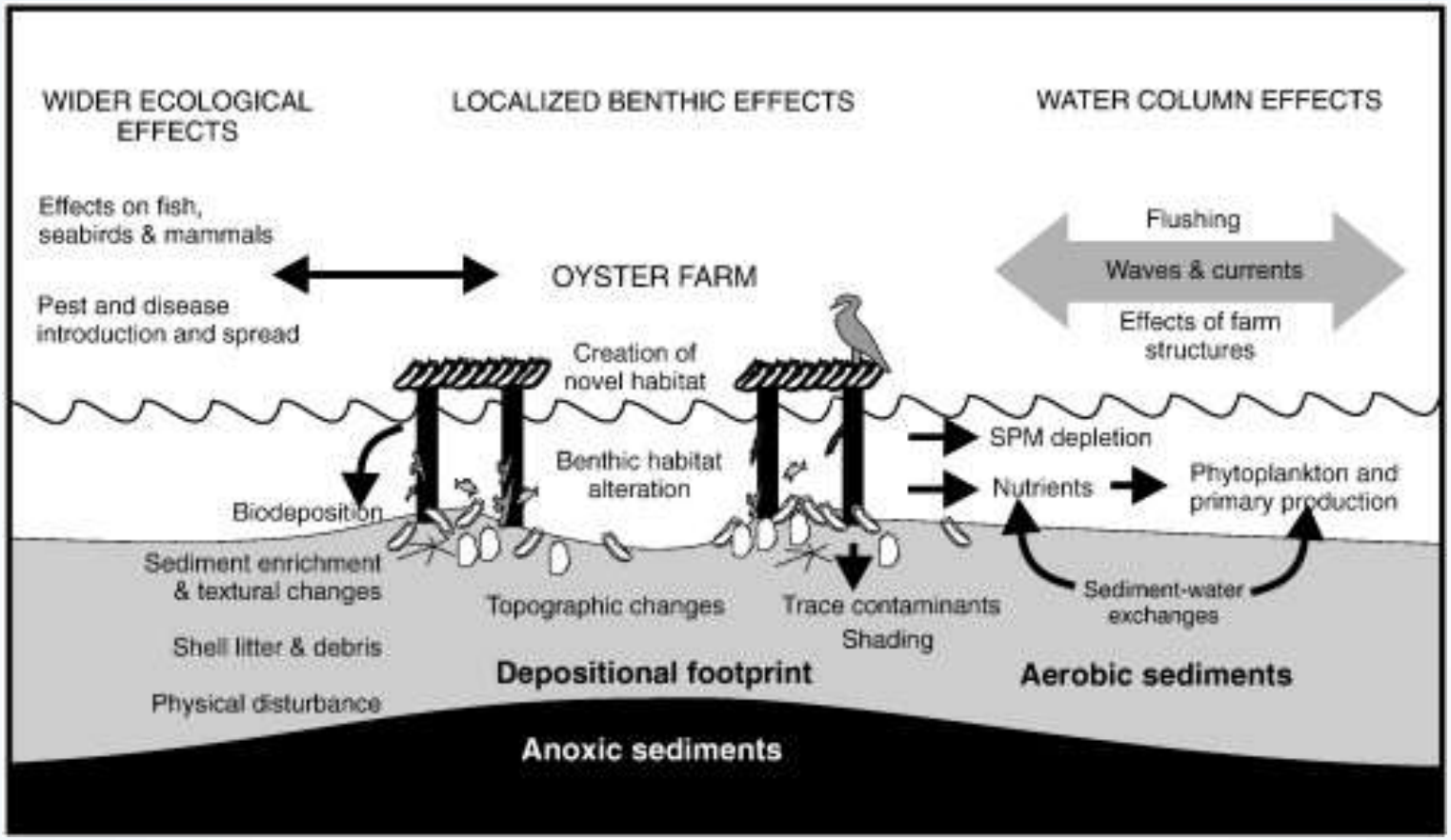
Areas of Concern with Oyster Mariculture



Bivalve aquaculture in estuaries: Review and synthesis of oyster cultivation effects Barrie M.Forrest Nigel B.Keeley1 Grant A.Hopkins1 Stephen C.Webb1 Deanna M.Clement1

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Summary of Findings

- Oyster mariculture effects tend be locally/site focused
- Potential ecological benefits of oyster mariculture are equal if not greater than negative effects (site and scale considerations)
- Ecosystem impacts, though analogous for some functions, are not the same as for natural reefs.
- Can reduce pressure on wild stock, and build disease resistance in oyster population
- Wider ecological effects are still being researched

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Recommendations

- Ensure appropriate protocols and monitoring are in place to avoid and monitor pest and disease introduction and spread
- Develop greater understanding of interaction with wild stocks (e.g. genetic)
- Research and model estuary level and embayment level effects of numerous oyster farms
- Monitor effects of oyster relay from closed areas
- Establish and maintain Best Management Practices to promote ecological benefits and reduce concerns and negative effects

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