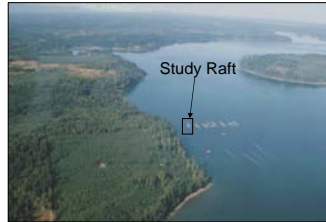




ABSTRACT

Description of the changes associated with the suspended culture of mussels and oysters is essential for the siting and evaluation of new culture facilities and in improving yield and production of existing facilities. Part of a larger national Sea Grant Program funded study of two high density mussel culture systems, this research focuses on one of three general objectives: to assess mussel shell growth and meat yield against measured physical, chemical and biological variables. During the first year (2001-02), multiple observations were made of water currents, water chemistry, phytoplankton, mussel growth, seston, fouling, and fish utilization at a commercial mussel culture facility in Totten Inlet, Washington. During the second year (2002-03), experiments were continued in Totten Inlet and initiated at a second facility in Penn Cove, Washington which cultivates two species of mussels. Generally, the first year findings indicated water quality and current effects were localized in the immediate culture facility. Water currents, affected in part by predator netting, were decidedly lower within the mussel culture system than at control stations. Although turbidity and chlorophyll decreased through the system with the clearest water in the center of the raft units, mussel growth differed insignificantly throughout the raft system.



Totten Inlet

RESULTS

Figure 1 illustrates the slow down of water currents inside the raft as water comes from the North or South (tidal dependant). Note current velocities just north of the raft system average 16 cm/sec while inside averages 2.77 cm/sec.



Mytilus galloprovincialis

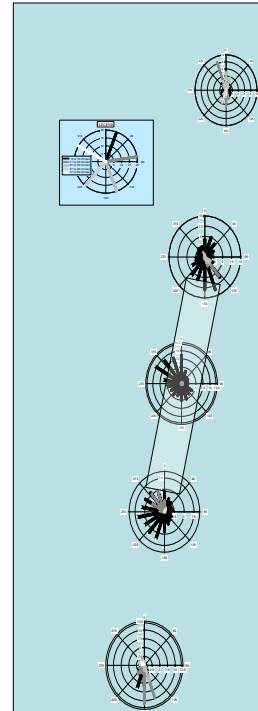


Figure 1. Current velocities at locations inside and surrounding the raft system.



Mytilus Trossulus

OBJECTIVES

1. Study raft influences on water currents surrounding and inside raft culture.
2. Examine water quality constituents surrounding and inside raft culture of mussels.

METHODS:

The raft system chosen for this study was part of a large mussel farm in Totten Inlet, WA operated by Taylor Shellfish Farms. The site was selected due to being located in an area of intensive suspended mussel culture and for directional current flows. Overall, Taylor operates eight raft systems in this area, while adjacent and south of the operation, Kamilche Sea Farms also cultivates mussels.



Two YSI 6600 recording water quality instruments measuring temperature, dissolved oxygen, salinity, pH, chlorophyll, turbidity, and depth were deployed at locations around and inside the raft system.



YSI 6600 sonde

One in-house and 6 contracted acoustic doppler velocimeters (ADV's) were used to gather velocity and directional data at locations inside and outside the raft system.



SonTek Argonaut ADV

Chlorophyll levels drop significantly as water enters the raft (figure 2). Velocities may have an effect on keeping chlorophyll levels low as water residence time increases with slower velocities.

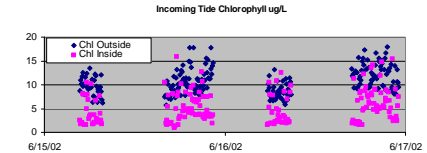


Figure 2. Chlorophyll levels inside and outside of the raft.

The raft system was comprised of 6 units strung together in a north/south fashion. Figure 3 shows cumulative growth (by weight) of mussels in each unit of the raft. Mussel growth was relatively uniform from unit to unit.

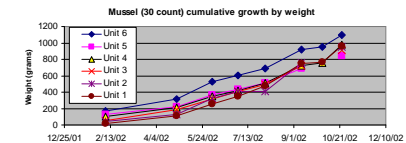


Figure 3. Mussel cumulative growth in grams.

CONCLUSIONS

1. The raft system deflects currents around the raft and decreases inside current flows.
2. Lower chlorophyll levels found inside the raft may be due to a longer water residence time.
3. Longer residence times and low chlorophyll levels show little effect on increasing or decreasing mussel yields on the studied raft system.

ACKNOWLEDGEMENTS

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