Coastal Acidification Impacts on Shell Mineral Structure of Bivalve Molluscs

BACKGROUND:

The Wallis Lake Estuary Processes & Seafood Production Group was set up to investigate environmental factors that could have driven a drop in oyster production in Wallis Lake. Initial work by the group found a correlation between higher rainfall and lower production but the actual causes remain unknown. This research examined the crystalline structure of calcium carbonate in oyster shells from sites experiencing 'good' and 'bad' production in Wallis Lake & Port Stephens. 'Bad' sites were located further up each estuary than 'good' sites. Available water quality information was analysed as were samples taken at the time of shell collection.

WHO?

Research jointly led by Dr. Susan Fitzer (Institute of Aquaculture, Stirling University) and Prof. Maria Byrne (University of Sydney) in collaboration with Brian Hughes (Hunter LLS), Wayne O'Connor, Michael Dove (NSW DPI), Jaime Potts and Peter Scanes (NSW OEH)

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WHAT WAS FOUND:

The crystalline structure of oysters at the upper estuary sites were found to be more disordered than those at lower estuary sites. Upper estuary sites experienced lower pH and alkalinity. This indicates that there are changes in the way that the oysters grow their shells when grown under coastal acidification. This also indicates that catchment sources of acidification are currently more significant than ocean acidification in NSW estuaries. Both freshwater run off and acid sulphate soils were considered likely sources for this acidification. Historic trends showing a decline in larger 'plate' grade oysters and increase in smaller oysters could be driven by a number of physical, biological and economic factors. This study has now linked

coastal acidification with changes to shell growth at the crystal level and therefore identified acidification as an important factor reducing oyster growth at some sites.

HOW WILL THIS HELP THE OYSTER INDUSTRY?

The research highlights the problems of coastal acidification on oyster shell growth and adds further weight to the need for catchment works such as remediation of acid sulphate soils.

The techniques used in this research could also provide a tool for determining whether oysters in a particular area are being affected by acidification. As freshwater runoff is considered an important source of acidification following rainfall, catchment interventions may not be possible and industry may need to develop adaptation strategies to avoid/manage impacts on shell growth. Further research will also examine whether DPI's selective breeding program can identify family lines with better performance in areas experiencing acidification.

FURTHER INFORMATION:

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