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EVALUATION OF WASTE CONCRETE ROAD MATERIALS FOR USE IN OYSTER AQUACULTURE – FIELD TEST

Problem

The Maryland State Highway Administration (SHA) has a commitment to maintaining at least 84 percent of the SHA pavement network in acceptable overall condition. The SHA also intends to increase the use of recycled materials and to use products in an environmentally responsible manner. One way of meeting these objectives is by incorporating recycled materials in an environmentally responsible project. As roads and bridges are resurfaced, old concrete is removed and is usually discarded. It would be in the best interest of SHA and the environment if these materials were recycled into an alternative use, such as to condition portions of the Chesapeake Bay bottom to support spat-on-shell aquaculture projects.

Recycled concrete aggregate (RCA) is created by crushing and milling old concrete pavement or road infrastructure. The material is processed and sorted for reuse as base, sub-base, fill material for embankments, and new concrete mix. For RCA to be used within the aquatic setting of the Chesapeake Bay, it is necessary to ensure that it does not have adverse impacts on oysters, or the Bay's aquatic ecosystem and is compatible with the traditional ways of oyster harvesting in the Chesapeake Bay. In Phase I of this project, the research team used laboratory experiments to determine the type and quantity of leachates from RCA and evaluated the impacts of RCA on the growth and survivorship of juvenile oysters.

Objective

The primary objective of this Phase II study was to determine the suitability of RCA from road projects as bottom conditioning material for on-bottom oyster aquaculture in the Chesapeake Bay. The testing was designed to:

- Evaluate the potential introduction of organisms attracted to the RCA pile in situ that may be potential predators of oyster spat.
- Determine potential impacts on or disruptions to the use of traditional harvesting gear on aquaculture areas conditioned with RCA.
- Identify regulatory or administrative structures that oversee the use of RCA and challenges within those structures.

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Description & Results

Three substrates were tested for their effect on benthic communities: RCA, RCA with a veneer of oyster shells and oyster shells. There was no difference in population or community parameters among the three substrates. The number and type of species were the same among the substrates as were their absolute and relative abundances. Oyster spat settlement was the same among the three substrates as well. Waterman tonging on RCA found it heavier and more difficult to work than tonging on oyster shells. They recommended that RCA be used either with a veneer of oyster shells or in applications where tonging was not anticipated. Overall the findings support the use of RCA in select applications. However, the regulatory structures presently in place do not include a mechanism for the acceptance of a novel material. Moving forward with RCA or any new material requires an application for a reef project. The acceptance of the project is then a de facto acceptance of the material. Adopting a criteria for materials used in reef construction will provide agencies with a basis for supporting choices on materials used and the private sector with a basis to develop products to meet restoration and aquaculture needs.

Report Information

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Link to Phase I Report:

http://www.roads.maryland.gov/OPR_Research/MD-13-SP109B4E_Waste-Concrete-for-Oyster-Aquaculture_Report.pdf

Link to Phase II Report:

http://www.roads.maryland.gov/OPR_Research/MD-15-SHA-MSU-3-12_Waste-Concrete-for-Oyster-Aquaculture-Phase-II_Report.pdf