

over the surface to be protected. However, it has been realized that AF coatings contain inorganic or organic biocides that pollute the ocean and inland water environment and cause ecological concerns. An environmentally-friendly coating system (called DUPLEX), was therefore developed, which does not contain biocides and other harmful materials. The new novel coating system offers excellent foul release performance. Other unique properties include low VOC, high flash point, easy application, good mechanical durability, etc. Any of related industries, such as ship building/repairing, power plant water cooling intake, fish farming nettings, etc., should be benefitted by using Fujifilm DUPLEX system.

PAYMENT FOR ECOSYSTEM SERVICES PROVIDED THROUGH SHELLFISH AQUACULTURE: CHALLENGES AND OPPORTUNITIES

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Cultured and wild bivalves provide an array of ecosystem services including water filtration, nutrient sequestration and denitrification, and habitat. The ecosystem services provided also have direct human use benefits with commercial, recreational, subsistence and cultural value. While progress has been made recognizing the ecosystem functions of shellfish, the non-commercial values of the benefits accrued are generally provided free of charge, remain largely outside the realm of economic decision-making, are not protected from degradation, and are often only appreciated when it is too late. Payment for ecosystem services (PES) is receiving considerable attention in broader society and has been applied to other activities such as forested watershed and wetland conservation, contaminated site remediation, and insecticide use. However, little traction has been gained in recognizing the values provided by commercial shellfish farming. For commercial operations, the challenge faced in the acceptance of PES relate to validating the benefits of shellfish culture with the episodic pulse disturbances that occur during production. This paper will consider how ecosystem services have been successfully considered in other applications, review potentially available markets for the ecosystem services provided by shellfish, and examine the challenges that the industry must address to receive broader recognition of the services provided.

CHANNELED WHELK (*BUSYCOTYPUS CANALICULATUS*) ASSESSMENT IN THE MID-ATLANTIC: SEXUAL COMPOSITION, SIZE FREQUENCY, AND AGE AT MATURITY.

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Relatively few studies have been carried out on the reproduction of channel whelk despite their importance as a fishery product in the US. An understanding of the sizes at which a fishery becomes

reproductively mature is essential for management considerations. This research investigates the reproductive biology of the channel whelk population in the Mid-Atlantic region and in particular calculates the size and age at which the population becomes sexually mature. Spatial variations within the channel whelk Mid-Atlantic resource area may have consequences in the implementation of minimum landing sizes for the fishery. Preliminary results on whelk aging techniques, population size frequencies, and reproductive assessment will be discussed.

OVERVIEW OF SEAFOOD, HARMFUL ALGAL BLOOMS (HABS), AND HUMAN HEALTH.

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Harmful algal blooms (HABs) are caused by exuberant growth of phytoplankton (e.g. dinoflagellates, diatoms and cyanobacteria) which cause harm to humans, other animals and the environment through the production of potent natural toxins and/or anoxia. HABs appear to be increasing in their incidence and geographic distribution worldwide in all aquatic environments. Several diseases have been identified in humans and other animals associated with the consumption of seafood contaminated with these HAB toxins, as well as through other routes of exposure (including direct water contact and aerosols), resulting in acute and chronic illness. Although the majority of the HAB-associated diseases consist of acute gastrointestinal (vomiting and diarrhea) and neurologic symptoms (strange sensations known as paresthesias) lasting a few days, these illnesses can be deadly. Furthermore, in certain cases, these illnesses can continue for weeks to months, causing significant neurologic symptoms (paresthesias, and possibly mood and memory changes). Since these HAB toxins are tasteless and resistant to heat and acidity, cooking and storage methods do not prevent these diseases, only the prevention of exposure through the detection of the organisms or of the toxin contamination. As the HABs increase, the seafood industry will increasingly face their growing negative perception and economic impacts.

REGULATION OF WATER PROCESSING IN SUSPENSION-FEEDING BIVALVE MOLLUSCS

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This study examined modulation of pumping activity under conditions of varying dietary quality and quantity over both long (>300 min) and short (30 min) time periods. Although many studies have shown that changes in seston concentration and quality affect water processing, digestion and absorption rates in suspension feeders, the physiological mechanisms underpinning these responses have yet to be identified. Planar (2D) particle image velocimetry (PIV) was used to visualize and calculate flow fields generated by water