Biology Department Seminar

Monday December 8, 4:00 PM, CLS 005

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Effects of environmental stress on bivalve populations: gaining insights into climate change

Climate change and other anthropogenic stressors are having effects on ecosystems throughout the world. Energetic trade-offs exist in all organisms, and under stress related to climate change, energy may be allocated away from growth and reproduction and towards physiological defense and repair mechanisms. Coastal ecosystems are particularly vulnerable to climate change given their location at the land-sea interface, and mussels and oysters that reside in these ecosystems are excellent indicators of stress because of their abundance, inability to move, and sensitivity to the external environment. Recently, severe, regional drought in the U.S. Southeast and increased demands for drinking water due to human population growth has led to reduced freshwater input into the Apalachicola-Chattahoochee-Flint River basin. Decreased freshwater input has caused high-salinity conditions in the downstream Apalachicola Bay, Florida estuary, leading to negative impacts on oyster populations that have high economic and ecological importance. Field surveys and laboratory experiments revealed that increased salinity leads to poor health of oysters and to high oyster mortality from both disease and increased feeding rates of marine predators. In collaboration with the oyster industry and World Wildlife Fund, a conservation effort is underway to obtain sustainable seafood certification for Apalachicola oysters. The implications of certification in this fishery could cascade throughout the watershed and influence upstream water management decisions. Future research will include: developing a regional model to forecast the effects of climate change on intertidal and subtidal oyster populations in the U.S. Southeast, forecasting the impacts of reduced freshwater input and alterations to precipitation on downstream estuarine oysters, and quantifying the effects of climate change on marine invertebrate fitness across latitudinal gradients on the U.S. East and West coasts.