

(draft) Morgan Kelly #1 Sirovy et al

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Project

» [Collaborative Research: Testing for local adaptation and responses to multiple stressors in populations of eastern oysters inhabiting a natural salinity gradient](#) (Oyster adaptation)

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Coverage

Spatial Extent: Lat:0 Lon:0

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Parameters

Parameters for this dataset have not yet been identified

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Project Information

Collaborative Research: Testing for local adaptation and responses to multiple stressors in populations of eastern oysters inhabiting a natural salinity gradient (Oyster adaptation)

Coverage: Gulf of Mexico, North America

NSF Award Abstract:

The project focuses on understanding how oysters from different regions in the Gulf of Mexico (GOM) will be affected by ongoing changes to salinity and temperature caused by a warming climate, altered rainfall patterns, and changes in land use in this region. The oyster fishery in the GOM provides more than half of the national total, and these oyster reefs provide water filtration, shoreline stability, and critical habitat for other species. By investigating how present-day oyster populations respond to changes in temperature and salinity, this research will provide valuable information to ecologists, conservation biologists, state managers, and small-scale farmers as they plan for the effects of future changes in the environment. By identifying populations of oysters that are the most resilient to environmental changes, this research will identify potential source populations that may be used in future restoration efforts aimed at declining populations. Additionally this project will integrate research and education through a semester-long immersive research experience. Three undergraduates, two graduate students, and a postdoctoral scholar will be mentored. Public outreach will be conducted through development of middle school lesson plans, public lectures, and dissemination of results to managers.

This research will test whether eastern oysters (*Crassostrea virginica*) in the Gulf of Mexico are locally adapted to salinity, and whether combined changes in salinity and temperature will have synergistic effects on oyster physiology and ecology. Both temperature and salinity are expected to change rapidly in the Gulf of Mexico over the coming century, due to effects of climate change, altered rainfall patterns, and changes to coastal hydrology. Oysters are a critical habitat-forming species in this region, and while they inhabit a wide range of

salinities, preliminary data indicate substantial differences in salinity tolerances among populations. This research will integrate genomic and physiological tools with controlled rearing experiments to (1) quantify genomic variation among populations of *C. virginica*, (2) test for local adaptation, and (3) measure physiological rates and gene expression as a function of temperature and salinity. The investigators will then use these data to build estuary-specific dynamic energy budget models, linking salinity and temperature to population growth. This project will provide critical support to ongoing restoration efforts, identifying adaptive variation among populations targeted for supportive breeding programs and informing management decisions in the face of ongoing ocean warming and changes to coastal hydrology.

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