

Project Abstract Summary

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Funding Opportunity Number

F24AS00331

CFDA(s)

15.628

Applicant Name

FLORIDA INSTITUTE OF TECHNOLOGY, INC.

Descriptive Title of Applicant's Project

2024 MSCGP - Integrative modeling to predict the distribution of essential fish habitat under future climate change scenarios in the southeastern USA

Project Abstract

Highly migratory fishes like sharks, tuna, and billfish are important for many recreational sport fisheries, but their broad movements, use of inshore coastal areas, and low overall genetic diversity make them vulnerable to extinction. Of major concern is how such fishes will respond to climate change, particularly among essential fish habitats (EFH) that are critical for the health of the young, and how this will affect the future sustainability of these stocks. Genetic diversity metrics have shown to be powerful contributors to and predictors of species' health and resilience, and while DNA samples are taken as part of regular biomonitoring efforts, genetic data are widely underused because no template exists to integrate them with traditional conservation metrics. We are developing a series of models for coastal fishes to identify EFH in the southeastern US, gauge population health, pinpoint hotspots of diversity, and predict the distribution of future EFH based on current climate scenarios. Specifically, we are developing genetic Species Distribution Models (gSDM) and genetic Population Viability Analyses (gPVA) for coastal sharks and bony fishes, which we are expanding to incorporate Climate Vulnerability Analysis, a method of directly estimating how fish populations will respond to warming based on habitat and life history. These models will be made openly available to users at state wildlife agencies as a template for combining existing genetic datasets with the products of ongoing biomonitoring efforts, to better assess and predict the health and viability of sportfish populations in response to climate change.