



INTRODUCTION

Traditionally, fisheries management in the U.S. is based on a single species, single population, or single stock approach. This means managers focus on individual stock dynamics to inform catch decisions with limited or no consideration of their place in the wider ecosystem (e.g., relationships with other species or responses to changing ocean conditions). Although the single species approach is practical and has yielded positive outcomes, there is a growing body of evidence that management of all fisheries in a given area as a composite coordinated system- or as a portfolio of fisheries- may enhance their productivity and value while reducing risks like overfishing. This evidence is largely theoretical, however, with few examples of application in practice.

The Lenfest Ocean Program is supporting Dr. Steve Cadrin, University of Massachusetts, Dr. Jason Link, National Oceanic and Atmospheric Administration (NOAA), and a team of collaborators to investigate the feasibility of implementing portfolio approaches to U.S. fisheries under current legal mandates, with a focus on the New England and South Atlantic as case study regions. The goal is to show proof of concept as to whether these approaches can prevent overfishing, improve sustainability, and increase value of fisheries. If so, this project could help facilitate more ecosystem-based approaches in fisheries management.

APPLYING PORTFOLIO THEORY TO FISHERIES MANAGEMENT

Loosely analogous to a financial portfolio, using portfolio theory in fisheries management provides an alternate framing to traditional single-species methods providing managers with another tool to facilitate ecosystem-based fisheries management (EBFM). As opposed to managing fisheries for each species independently of one another, portfolio approaches consider the collective group of species in a region and their inherent environmental and ecological linkages as a complex system that requires a coordinated approach to management. The idea behind it is that much like a financial stock portfolio, a diversity of stock types in a portfolio would arguably be more stable than managing any one species on its own and as a result mitigate risks such as monetary loss.

Historically, U.S. management authorities (e.g., NOAA regional offices, fisheries science centers, fishery management councils, and interstate fisheries commissions) have been reluctant to integrate portfolio approaches into decision-making because of the persistent gap between them as theory and their practical application. Thus, demonstrating worked examples in fishery management regions would allow interested managers to more thoughtfully explore ways to operationalize portfolio approaches where appropriate.



RESEARCH APPROACH

In this exploratory project, Drs. Cadrin, Link, and their team will test whether and how portfolio approaches result in better fisheries outcomes, can be replicated across regions, and can provide a solid base from which to recommend improvements to the management system. Researchers will first convene an interdisciplinary advisory committee comprised of fisheries scientists, managers, economists, and portfolio experts from across NOAA, including headquarters, the regional offices, fisheries science centers, the Fishery Management Councils' (FMCs) Science and Statistical Committees (SSCs), and academia. This team will provide advice and feedback on the work throughout the life of the project.

Together with the advisory committee, the researchers will:

1. Compile, review, and synthesize current data on stocks and fisheries managed in these regions.
2. From the initial data gathering phase, create portfolio configurations of various groups of stocks and fisheries in at least two major large marine ecosystems in the U.S.
3. Use the identified portfolio configurations to calculate and compare the expected value and risk-gaps for single-species management and identify where ecosystem portfolio approaches could potentially improve outcomes (e.g., reduce risks to fisheries and revenue losses) for management regions.
4. Provide tangible examples of portfolio management by then conducting a more detailed analysis using the South Atlantic and New England fishery regions as case studies.

The researchers will also work with the advisory committee to engage with the SSCs of the regional FMCs and other relevant stakeholders to explore different portfolio options. This engagement will be determined based on the researchers' ongoing understanding of their needs as the project progresses through key milestones. The project will culminate in a presentation to the two regional SSCs, providing an opportunity to incorporate their feedback and revise the portfolio analyses.

Finally, the researchers will produce peer-reviewed scientific publications and work with the Lenfest Ocean Program to release communications summaries and presentations. Through sharing results widely, the researchers aim to socialize the method and help facilitate ongoing dialogue around tools that can be used to implement ecosystem approaches to fisheries management.

RESEARCH TEAM

- Steven Cadrin, University of Massachusetts- Dartmouth
- Jason Link, NOAA Fisheries

CONTACT

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