Title:  
**Cointegration: A tool for Ecosystem-Based Conservation and Management of Fisheries**

Authors:  
Ben Fissel, UCSD (USA)  
Richard Carson, UCSD  
Wolfram Schlenker, Columbia

Abstract:  
Species within marine ecosystems are known to be interconnected. This is a result of many factors including predation and competition for resources. Despite this, many fisheries are still managed using a single species framework. This paper uses cointegration analysis to quantify the relationship between different fish species. Cointegration is a method for examining how time series variables that are integrated (e.g., I(0) or long memory fractional) and move together. Using data from Northern Anchovy, Pacific Sardines, and Albacore Tuna off the California coast, a vector error correction model is estimated which shows a statistically significant relationship between anchovy and tuna harvests. Results suggest financial gains from accounting for external effects between these two fisheries and provide an economic justification for ecosystem based management.