



Measuring the social and economic performance of catch share programs: Definition of metrics and application to the U.S. Northeast Region groundfish fishery



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ABSTRACT

In May 2010 the New England Fishery Management Council introduced a catch share, program in the Northeast Multispecies (groundfish) Fishery. Amendment 16 of the Northeast Multispecies Fishery Management Plan allocated quota to 17 self organized groups of permit holders based on their collective catch history. These groups are commonly referred to as Sectors and are similar to harvest cooperatives. Sectors represented a significant shift from previous management approaches reliant on limits to days at sea and other input controls. Given the potential for significant social and economic effects of catch shares and other management programs, social and economic performance measures were developed from 2009 to 2010 by Northeast Fisheries Science Center (NEFSC) social scientists. Previous social and economic monitoring of management outcomes had been ad hoc and provided minimal opportunity for inter-fishery comparison. This paper describes the process of identifying performance measures and associated indicators to serve as the foundation of monitoring social and economic outcomes for all federal fisheries in the U.S. Northeast Region, and for planning NEFSC social and economic research priorities. It then presents how these performance measures were applied to assess the first year of the Amendment 16 Sector program. Challenges and limitations of this process are presented along with a description of efforts underway to broaden the use of these social and economic metrics to other fisheries.

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1. Introduction

The development of social and economic indicators to inform policy making began in earnest in the 1960s [1]. Researchers then and since have sought to develop indices that both speak to policy needs and have the academic rigor necessary to allow meaningful analyses [2]. Some track purely objective economic indicators (e.g., Consumer Price Index) while others primarily track subjective indicators across a variety of domains [3,4] and others do both [5,6].

In fisheries in the United States, basic economic and some social data have been tracked by NOAA/NMFS¹ for some time. *Fisheries of the U.S.*, available annually online back to 1995 and in print to 1959, includes national level data on landings, ex-vessel prices and the value of U.S. processed fishery products and imported seafood. *Fisheries Economics of the U.S.*, published annually online since 2006, provides national, regional and state

level data on commercial and recreational economic impacts trends (e.g., jobs, income, sales, value added, ex-vessel value). *Fishing Communities of the U.S.* (providing primarily basic census data) was first published in 2006 and has not been updated, as regions have individually published fishing community profiles that combined census and fishery data. However, all these data are intended to describe in broad strokes the characteristics of the fisheries and communities rather than to illuminate social and economic changes via targeted indicators that support a process of ecosystem-based adaptive management.

In this paper the authors describe, as social scientists within NMFS' Northeast Fisheries Science Center, a process undertaken to define and implement a framework for examining social and economic outcomes of fisheries management in the U.S. Northeast Region (Northeast) to be used for directing investments in social science research as well as supporting more effective and informed fisheries management in the region. It then discusses NEFSC use of these measures to assess the first year of the Sector program, and future plans to apply this process to other fisheries and improve the available input data.

U.S. marine fisheries management is overseen and approved by NOAA/NMFS, but day-to-day crafting of regulations occurs largely

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¹ The U.S. National Marine Fisheries Service (NMFS), the agency that oversees all management of U.S. marine fisheries, is located within the National Oceanic and Atmospheric Administration (NOAA).

through regional fisheries management councils. Council members and stakeholders have voiced concerns over the difficulty of fully integrating social science into management discussion [7,8]. This limits council and NMFS ability to practice the ecosystem-based, adaptive management they have been charged to do by legislation (MSA² Section 406(a)–(f)), executive order (E.O.13547) and NOAA policy [9]. Part of the difficulty has lain in the lack of appropriate social and economic trend data to complement existing biological trend data. Ecosystem-based management requires social and economic data as well as biological and ecological data [5,6], and adaptive management requires trend data [10], to assess when a course change is warranted.

In May 2010, the New England Fishery Management Council (NEFMC) introduced a new catch shares program via Amendment 16 to the U.S. federal Northeast Multispecies³ (groundfish) Fishery Management Plan (FMP). As a fundamental part of this program, quota was allocated to each of 17 groups of self-organized and self-managed permit holders (called Sectors). Allocations to Sectors were based on the catch history of their individual members. While encouraged by NOAA/NMFS at the policy level [11] (see Fig. 1 for current U.S. programs), catch shares are not without controversy in the U.S. Seen by some as the ideal tool for reining in overfishing and improving efficiency, others have deep concerns about potential economic, social and cultural consequences including fleet consolidation and coastal community impacts.

2. Developing social and economic performance measures for Northeast Fisheries

To measure the performance of this and other Northeast FMPs, NEFSC social scientists initiated a process in 2009 to identify and define social and economic performance measures. Previous social and economic monitoring occurred on an ad hoc basis, limiting opportunities for cross fishery comparisons. Given the controversy surrounding Amendment 16 [12–21], the large number of fishermen involved (see Section 4.1), the many social and economic objectives of this Amendment (see Section 4.2) and the likelihood of a major transformation to the social and economic context of the fishery, it was critical to measure and track the social and economic performance of this program. Additionally, because of the widespread interest and impact of these new measures, NEFSC felt it especially important to include fishermen and other stakeholders in the indicator development process. This approach was also supported by now well documented research [22–24] indicating that stakeholder participation is likely to lead to more legitimate and effective outcomes.

To identify relevant regional social and economic performance measures, legal requirements, management objectives, academic literature and reports from non-governmental organizations (NGOs) on management impacts for overall commonalities and expected outcomes of catch share programs were reviewed. The authors developed a draft set of indicators based on that review that was vetted by the full NEFSC Social Science Branch (SSB) staff. Input was sought from industry leaders, the Mid Atlantic and New England Fishery Management Councils, staff at the NMFS Northeast Regional

Office (NERO), academics and other regional NMFS social scientists to further refine the measures and ensure their saliency to the region. Presentations were made at council meetings to reach out broadly to the fishing community and other interested parties. Additionally, outreach meetings were held opportunistically in the field to try to reach groups that might not attend more formal (and lengthy) council meetings. Importantly, because crew members are typically under represented at public meetings, a contract was initiated with the Gulf of Maine Research Institute to conduct extensive field interviews to integrate crew perspectives into the final set of performance measures and indicators. To seek maximum industry involvement, NEFSC informed regional press of our efforts [25].⁴

2.1. Literature

In the academic literature, fisheries-specific examples of indicators include the Jepson and Jacob vulnerability index [26,27], the Canadian Genuine Progress Index [28] focusing on resilience, the Pollnac et al. [7] Fisheries Social Impact Assessment Model focusing on well-being, the Tuler et al. [29] analysis of vulnerability, the Mahon et al. [30] approach to governance characteristics of large marine ecosystems, the World Bank [31] case for fisheries reform, multiple studies of job satisfaction [32,2] and numerous applications of economic indicators [33–39].

Another set of literature concentrates on variables related specifically to catch shares and the related concept of property rights. Overall, the academic literature⁵ shows that where property-like systems are implemented, vessel profitability rises—largely due to increases in output prices [40,41,35,42–44]. This may be accompanied by consolidation. While consolidation can be good for vessels that remain in the fishery, fishing communities overall can experience negative impacts to local economies [45–48] and sociocultural fabric [49–53]. Results on stewardship and safety are mixed [54,–60,53,61]. Finally, catch share programs may lead to higher monitoring and enforcement costs for the fishing industry and higher organizational costs for cooperatives and similar organizations [53], though lower costs for government [62].

Environmental groups have also been actively engaged in the discussion of indicators specifically related to catch share programs. For example, the Environmental Defense Fund [60] proposed compliance, safety, capacity, season length, boat yields, revenues, employment, and ownership concentration. More recently, the Meridian Institute and MRAG Americas [64], under grant to the Betty Moore Foundation, proposed measuring stock condition, discarding, quota compliance, ability to match catch to quota, operational flexibility, participation in stock assessment/cooperative research/use of experience-based knowledge, decentralized decision-making, capital/infrastructure and fishing community employment.

Most of these indices – whether specific to property/pseudo-property (e.g., catch shares) or to fisheries more generally – rely on objective measures, because subjective data are harder to acquire [28]. Yet people's subjective experiences are often at odds with their objective condition [70,71]. Thus indices without subjective measures may miss important trends, as well as differences between groups [72,2].

2.2. Management requirements

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires U.S. fisheries to adhere to 10 National Standards (NSs) (16 U.S.C. 1851 § 301), including many directly related to social

² Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended through 2007 (16 U.S.C. § 1801 et seq.).

³ Species currently managed under the FMP are: winter flounder (blackback, lemon sole) (*Pleuronectes americanus*), Atlantic cod (*Gadus morhua*), dab (American Plaice) (*Hippoglossoides platessoides*), haddock (*Melanogrammus aeglefinus*), Ocean pout (*Macrozoarces americanus*), pollock (*Pollachius virens*), redfish (*Sebastes fasciatus*), red hake (ling) (*Urophycis chuss*), windowpane flounder (sand flounder) (*Scophthalmus aquosus*), witch flounder (gray sole) (*Glyptocephalus cynoglossus*), yellowtail flounder (*Limanda ferruginea*), white hake (*Urophycis tenuis*), Atlantic halibut (*Hippoglossus hippoglossus*) and Atlantic wolffish (*Anarhichas lupus*).

⁴ See [63] for more details on the process.

⁵ For good overviews see [65–69].

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